

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, 1 Trip No MIL Emissions Neutral "Safety Emissions Neutral Diagnostic"

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.	<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 K Q impedance between signal and controller ground.	<p>P0010is Enabled</p> <p>System supply voltage</p> <p>Output driver is commanded on</p> <p>Ignition switch is in crank or run position</p>	> 11.00 Volts	<p>20 failures out of 25 samples</p> <p>250 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.
Intake Camshaft System Performance - Bank 1	P0011	Detects a VVT system error by comparing the desired and actual cam positions when WT 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_CamPosErrorLimId)deg AND < (CalculatedPerfMaxId) deg < 7.50 deg for (P0011_P05CC_StablePositionTimeId) seconds P0010 P2088 P2089	100.00 failures out of 500.00 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 SensorA	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	 >= 2 cam edges < -11.0Crank Degrees > 11.0 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 = 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.
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.	<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 is Enabled</p> <p>Ignition Voltage Engine Speed</p>	= Crank or Run > 11.0 volts > 400 RPM	<p>20 failures out of 25 samples</p> <p>250 ms / sample</p> <p>Continuous</p>	Type B, 2 Trips Note: In certain controllers P0031 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank1 Sensors	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.	<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 Q impedance between output and controller ground.	<p>Diagnostic is Enabled</p> <p>Ignition Voltage Engine Speed</p>	= Crank or Run > 11.0 volts > 400 RPM	<p>20 failures out of 25 samples</p> <p>250 ms / sample</p> <p>Continuous</p>	Type B, 2 Trips Note: In certain controllers P0030 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank1 Sensors	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.	<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 Q impedance between output and controller power.	<p>Diagnostic is Enabled</p> <p>Ignition Voltage Engine Speed</p>	= Crank or Run > 11.0 volts > 400 RPM	<p>20 failures out of 25 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.
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.	<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 is Enabled</p> <p>Ignition</p> <p>Voltage</p> <p>Engine Speed</p>	= Crank or Run >11.0 volts > 400 RPM	<p>20 failures out of 25 samples</p> <p>250 ms / sample</p> <p>Continuous</p>	Type B, 2 Trips Note: In certain controllers P0037 may also set

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.	<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 Q impedance between output and controller power.	<p>Diagnostic is Enabled</p> <p>Ignition Voltage Engine Speed</p>	= Crank or Run > 11.0 volts > 400 RPM	<p>20 failures out of 25 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.
O2S Heater Control Circuit Bank 2 Sensor 1	P0050	Controller specific output driver circuit diagnoses the heater output low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	<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 is Enabled</p> <p>Ignition Voltage Engine Speed</p>	= Crank or Run >11.0 volts > 400 RPM	<p>20 failures out of 25 samples</p> <p>250 ms / sample</p> <p>Continuous</p>	Type B, 2 Trips Note: In certain controllers P0051 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank2 Sensors	P0051	Controller specific output driver circuit diagnoses the heater output low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	<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 Q impedance between output and controller ground.	<p>Diagnostic is Enabled</p> <p>Ignition Voltage Engine Speed</p>	= Crank or Run >11.0 volts > 400 RPM	<p>20 failures out of 25 samples</p> <p>250 ms / sample</p> <p>Continuous</p>	Type B, 2 Trips Note: In certain controllers P0050 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank2 Sensors	P0052	Controller specific output driver circuit diagnoses the heater output low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	<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 Q impedance between output and controller power.	<p>Diagnostic is Enabled</p> <p>Ignition Voltage Engine Speed</p>	= Crank or Run > 11.0 volts > 400 RPM	<p>20 failures out of 25 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.
HO2S Heater Resistance Bank 1 Sensor 1	P0053	<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 longer 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	3.1 < ohms < 8.4	<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 <0.04 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.
HO2S Heater Resistance Bank 1 Sensor 2) (For Dual 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	3.1 < ohms <8.4	<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 < 0.04 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.
O2S Heater Control Circuit Bank 2 Sensor 2	P0056	Controller specific output driver circuit diagnoses the heater output low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	<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 is Enabled</p> <p>Ignition Voltage Engine Speed</p>	= Crank or Run >11.0 volts > 400 RPM	<p>20 failures out of 25 samples</p> <p>250 ms / sample</p> <p>Continuous</p>	Type B, 2 Trips Note: In certain controllers P0057 may also set

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank2 Sensor2	P0058	Controller specific output driver circuit diagnoses the heater output low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	<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 Q impedance between output and controller power.	<p>Diagnostic is Enabled</p> <p>Ignition Voltage Engine Speed</p>	<p>= Crank or Run > 11.0volts > 400 RPM</p>	<p>20 failures out of 25 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.
HO2S Heater Resistance Bank 2 Sensor 1	P0059	<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	3.4 < ohms <8.6	<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 <0.09 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.
HO2S Heater Resistance Bank 2 Sensor 2	P0060	<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	3.4 < ohms < 8.6	<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 <0.09 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>> 20.0 deg C</p> <p>> 20.0 deg C</p> <p><= 20.0 deg C</p> <p><= 20.0 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	 > 20.0 deg C > 20.0 deg C <= 20.0 deg C <= 20.0 deg C	Diagnostic is Enabled Time between current ignition cycle and the last time the engine was running Engine is running Vehicle Speed Engine airflow OAT-to-IAT engine running equilibrium counter The "OAT-to-IAT engine running equilibrium counter" is a counter that is incremented or decremented based on vehicle speed and engine air flow when the engine is running. When this counter is high enough, the vehicle has reached an equilibrium where IAT and OAT can be compared. The value that is added or subtracted to the counter every 100 msec is contained in table P0071: OAT Performance Drive Equilibrium Engine Running No Active DTCs:	 >= 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

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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	P0089	This DTC determines when the high pressure pump control has reached to its max or min authority	High Pressure Fuel Pump Delivery Angle OR High Pressure Fuel Pump Delivery Angle	 >= 124° ≤ 0°	High Pressure Pump Performance Diagnostic Enable Battery Voltage Low Side Fuel Pressure Barometric Pressure Inlet Air Temp Fuel Temp Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) andCam or Crank Sensor Not FA and IAT,IAT2,ECTNot FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In	True >=11 Volts > 0.275 MPa Enabled when a code clear is not active or not exiting device control Engine is not cranking >= 70.0 KPA >= -40.0 degC -20 ≤ Temp degC ≤ 132	Windup High/Low 10.00 seconds failures out of 12.50 Seconds samples	Type B, 2 Trips

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

24OBDG06A HD Part 2 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 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	<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>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</p> <p>100 ms /sample</p> <p>Continuous</p>	Type A, 1 Trips

24OBDG06A HD Part 2 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</p> <p>Enabled when a code clear is not active or not exiting device control</p>	<p>20 failures out of 40 samples</p> <p>100 ms /sample</p> <p>Continuous</p>	Type A, 1 Trips

24OBDG06A HD Part 2 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 Cntrl Solenoid Enable Low Side Short to Power	P0092	Controller specific output driver circuit 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 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 2 Circuit Performance (applications with humidity sensor, but no manifold temperature sensor)	P0096	<p>Detects an Intake Air Temperature 2 (IAT2) sensor value that is stuck in range by comparing the IAT2 sensor value against the IAT and coolant temperature sensor values and failing the diagnostic if the IAT2 value is more different than the IAT and coolant temperature 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>The diagnostic will fail if the IAT and coolant temperature values are similar, and the IAT2 value is not similar to the IAT and coolant temperature values.</p> <p>This diagnostic is executed once per ignition cycle if the enable conditions are met.</p>	<p>ABS(Power Up IAT - Power Up IAT2)</p> <p>AND</p> <p>ABS(Power Up ECT - Power Up IAT2)</p> <p>>=</p> <p>ABS(Power Up ECT - 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_Sensor_Ckt_FA IAT_SensorCircuitFA HumTempSnsrCktFA EngineModeNotRunTimer Error</p>	Executes once at the beginning of each ignition cycle if 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.
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 IAT2 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 -100 <= °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>8 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 >= -40.0 DegC		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Pressure Measuremen t System - Multiple Sensor Correlation (naturally aspirated with TIAP/ Baro sensor)	P00C7	Detects an inconsistency between pressure sensors in the induction system in which a particular sensor cannot be identified as the failed sensor.	ABS(Manifold Pressure - Baro Pressure)	> 10.0 kPa	Time between current ignition cycle and the last time the engine was running Engine is not rotating Manifold Pressure Manifold Pressure Baro Pressure Baro Pressure No Active DTCs: No Pending DTCs: Diagnostic is Enabled LIN communications established with MAF	> 5.0 seconds >= 50.0 kPa <= 115.0 kPa >= 50.0 kPa <= 115.0 kPa EngineModeNotRunTimer Error MAP_SensorFA AAP_SnsrFA AAP_LIN1_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP AAP_LIN1_SnsrCktFP	4 failures out of 5 samples 1 sample every 12.5 msec for applications without LIN MAF 1 sample every 25 msec for applications with LIN MAF	Type B, 2 Trips
		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) 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 and BARO are compared to see if their values are similar. If the MAP and BARO values are not similar, there are no other pressure sensors to compare against to identify which sensor is not rational. The Multiple Pressure	Manifold Pressure OR Manifold Pressure	< 50.0 kPa > 115.0 kPa	Time between current ignition cycle and the last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	> 5.0 seconds EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA AAP_LIN1_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP	4 failures out of 5 samples 1 sample every 12.5 msec for applications without LIN MAF 1 sample every 25 msec for applications with LIN MAF	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Sensor Correlation Diagnostic will fail in this case.			Diagnostic is Enabled LIN communications established with MAF	AAP_LIN1_SnsrCktFP		
			Barometric Pressure OR Barometric Pressure	< 50.0 kPa > 115.0 kPa	Time between current ignition cycle and the last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs: Diagnostic is Enabled LIN communications established with MAF	> 5.0 seconds EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA AAP_LIN1_SnsrCktFA MAP_SensorCircuitFP AAP_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	

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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

24OBDG06A HD Part 2 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.
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 without LIN MAF)	P00F5	<p>Detects a humidity sensor that is outputting a duty cycle signal that is too high. The diagnostic monitors the humidity sensor duty cycle output and fails the diagnostic when the humidity duty cycle is too high.</p> <p>The humidity sensor converts the capacitance across the sensor to a relative humidity. The relative humidity value is converted by the sensor to a duty cycle value in %. A digital square wave signal is transmitted by the sensor to the ECM. The ECM calculates the duty cycle of the square wave signal and converts that duty cycle to a relative humidity value in % through a transfer function.</p>	Humidity Duty Cycle	>= 95.0 %	<p>Diagnostic is Disabled</p> <p>Powertrain Relay Voltage for a time</p> <p>No Active DTCs:</p>	<p>>= 11.0 Volts</p> <p>>= 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 (naturally aspirated)	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 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 will fail.</p>	<p>Filtered Throttle Model Error AND ABS(Measured Flow - Modeled Air Flow) Filtered AND ABS(Measured MAP - MAP Model 2) Filtered</p>	<p>$\leq 300 \text{ kPa}^*(\text{g/s})$</p> <p>$> 25.0 \text{ grams/sec}$</p> <p>$> 22.0 \text{ kPa}$</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>Minimum total weight factor (all factors multiplied together)</p> <p>See Residual Weight Factor tables.</p>	<p>$\geq 400 \text{ RPM}$ $\leq 5,400 \text{ RPM}$</p> <p>$\geq -9 \text{ Deg C}$</p> <p>= TRUE)</p> <p>$\leq 130 \text{ Deg C}$</p> <p>= FALSE)</p> <p>-20 Deg C $\leq 129 \text{ Deg C}$</p> <p>≥ 0.50</p> <p>Filtered Throttle Model Error multiplied by P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM</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>Continuous</p> <p>Calculation are performed every 12.5 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.
					<p>No Active DTCs:</p> <p>No Pending DTCs:</p> <p>Diagnostic is Enabled</p>	<p>MAP Model 2 Error multiplied by P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM</p> <p>MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA</p> <p>EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP</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 (Continental MAF)	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 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 air flow value is converted by the sensor to a frequency value in Hertz. A digital square wave signal is transmitted by the sensor to the ECM. The ECM calculates the frequency of the square wave signal and converts that frequency to a mass air flow value in grams/second through a transfer function.</p>	MAF Output	<= 850 Hertz (>= 337.1 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</p> <p>≥ 0.5 seconds</p>	<p>400 failures out of 500 samples</p> <p>1 sample every cylinder firing event</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 Sensor Circuit High Frequency (Continental MAF)	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 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 air flow value is converted by the sensor to a frequency value in Hertz. A digital square wave signal is transmitted by the sensor to the ECM. The ECM calculates the frequency of the square wave signal and converts that frequency to a mass air flow value in grams/second through a transfer function.</p>	MAF Output	>= 14,500 Hertz (<= 0.00 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</p> <p>>= 0.5 seconds</p>	<p>400 failures out of 500 samples</p> <p>1 sample every cylinder firing event</p>	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 Performance (naturally aspirated)	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 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 will fail.</p>	<p>Filtered Throttle Model Error AND ABS(Measured MAP - MAP Model 1) Filtered AND ABS(Measured MAP - MAP Model 2) Filtered</p>	<p>$\leq 300 \text{ kPa}^*(\text{g/s})$</p> <p>$> 22.0 \text{ kPa}$</p> <p>$> 22.0 \text{ kPa}$</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>Minimum total weight factor (all factors multiplied together)</p> <p>See Residual Weight Factor tables.</p>	<p>$\geq 400 \text{ RPM}$ $\leq 5,400 \text{ RPM}$</p> <p>$\geq -9 \text{ Deg C}$</p> <p>= TRUE)</p> <p>$\leq 130 \text{ Deg C}$</p> <p>= FALSE)</p> <p>-20 Deg C $\leq 129 \text{ Deg C}$</p> <p>≥ 0.50</p> <p>Filtered Throttle Model Error multiplied by P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM</p> <p>MAP Model 1 Error multiplied by 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>Continuous</p> <p>Calculations are performed every 12.5 msec</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.
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 6.1 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	> 90.0% of 5 Volt Range (This is equal to 115.1 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, but no 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 coolant temperature sensor values and failing the diagnostic if the IAT value is more different than the IAT2 and coolant temperature 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>The diagnostic will fail if the IAT2 and coolant temperature values are similar, and the IAT value is not similar to the IAT2 and coolant temperature values.</p> <p>This diagnostic is executed once per ignition cycle if the enable conditions are met.</p>	<p>ABS(Power Up IAT - Power Up IAT2)</p> <p>AND</p> <p>ABS(Power Up ECT - Power Up IAT) > ABS(Power Up ECT - Power Up IAT2)</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 >= 0.9 seconds</p> <p>PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA HumTempSnsrCktFA EngineModeNotRunTimer Error</p>	Executes once at the beginning of each ignition cycle if 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.
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 Not Plausible (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: EngCoolantTempSnsr1</p> <p>Temperature Sensor 1: CeEECR_e_EngCoolantTempSnsr1</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_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 - BiasChkByplnCIntSnsr - 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_CktFA</p> <p>EECR_CylHeadCoolant_CktFA</p> <p>EECR_BlockCoolant_CktFA</p> <p>EECR_EngineInlet_CktFA</p> <p>EECR_EngineOutlet_CktFA</p> <p>EECR_HeaterCoreInlet_CktFA</p> <p>EECR_HeaterCoreOutlet_CktFA</p> <p>EECR_RadiatorOutlet_CktFA</p> <p>EECR_BypassInlet_CktFA</p> <p>EECR_CylHeadMetal1_CktFA</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

[illegible]

24OBDG06A HD Part 2 ECM Summary Tables

[illegible]

24OBDG06A HD Part 2 ECM Summary Tables

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_AuxHeaterN©Effect Block Heater: CeEECR_e_AuxHeaterN©Effect Threshold A: Threshold B:	50.00 °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)	Disabled Enabled CeAEHR_e_BlkhTrCylHdClntSnsr CeAEHR_e_BlkhTrEngO utClntSnsr CeAEHR_e_BlkhTrOutsideAirSnsr CeAEHR_e_BlkhTrIntake AirSnsr 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 2) This sensor is below both comparison sensors 3) This sensor is above both comparison sensors and an aux heat source has not been detected to cause this skew 4) This sensor is below both comparison sensors and an aux heat source has not been detected to cause this skew	>A °C >A °C >B °C >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_BlkhTrEngO utClntSnsr >0.90 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_BlkhtrIntakeAirSnsr</p> <p>>5.0 °C</p> <p>>400.0 seconds >24.0kph</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_BlkhtrEngOutCIntSnsr</p> <p>>3.00 L/min</p> <p>1.0 -20.0 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 =====	< 80.0 seconds >300.0 seconds <-0.10°C/sec > 2 counts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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_NollseAssg nmnt Temperature Sensor 3: CeEECR_e_NollseAssg nmnt Temperature Sensor 4: CeEECR_e_NollseAssg nmnt Temperature Sensor 5: CeEECR_e_NollseAssg 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: EngCoolantTempSnsr1</p> <p>Temperature Sensor 1: CeEECR_e_EngCoolant TempSnsr1</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_NollseAssg 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.
			caluculated limits are 101 °C and 73 °C. The next reading (after the 90 °C reading) must be between 73 °C and 101 °C to be valid. *****					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Throttle Position Sensor Performance (naturally aspirated)	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 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 Performance diagnostic will fail.</p>	Filtered Throttle Model Error AND ABS(Measured MAP - MAP Model 2) Filtered	<p>> 300 kPa*(g/s)</p> <p><= 22.0 kPa</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>Minimum total weight factor (all factors multiplied together)</p> <p>See Residual Weight Factor tables.</p> <p>No Active DTCs:</p>	<p>>= 400 RPM <= 5,400 RPM</p> <p>>= -9 Deg C</p> <p>= TRUE)</p> <p><= 130 Deg C</p> <p>= FALSE)</p> <p>-20 Deg C <= 129 Deg C</p> <p>>= 0.50</p> <p>Filtered Throttle Model Error multiplied by P0101, P0106, P0121, P012B, P0236, P1101: TPS 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_SensorCircuitFA EGRValvePerformance_F A MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA</p>	<p>Continuous</p> <p>Calculation are performed every 12.5 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.
					No Pending DTCs: Diagnostic is Enabled	EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP		

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 maxium energy is greater than as shown in the supporting tables prior to the Engine outlet coolant achieving the target a fault will be indicated.</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 74.9 °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 °C</p>	<p>P0128 Maximum Acculated Energy - Primary</p> <p>P0128 Maximum Acculated 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_AuxPumpF A THMR_AHV_FA THMR_SWP_Control_FA THMR_SWP_Flow8tuckO n_FA THMR_SWP_NoFlow_FA OAT_PtEstFiltFA VehicleSpeedSensor_FA EngineTorqueEstInaccura te MAF_SensorFA ETHR_CoolantEnergyMo del ETHR_RemedialActionLe veil ETHR_RemedialActionLe vel2 ETHR_RemedialActionLe vel3 EECR_EngineOutlet_FA</p> <p>> 1,800.0 seconds 20.0- 1,800.0 seconds</p> <p><55.5 °C <35.6 °C <35.6 °C</p> <p>8,192 rpm 5.0 seconds</p> <p>> 1.2 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 -9.1 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 30.0 °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 enviroment, heat loss to cabin, heat loss to DFCO, heat loss to engine oil, heat loss to exhaust, and eat 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		

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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 1	P0131	<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	< 25.0 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 10.0 < Volts = Not active = Not active = Not active = Not active</p> <p>= False = False</p> <p>0.9922 < ratio < 1.0137 150 < mgram < 800 = 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		

24OBDG06A HD Part 2 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 1	P0132	<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 AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum</p> <p>Low Fuel Condition Diag Only when 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>*****</p> <p>All of the above met for</p>	<p>TPS_ThrottleAuthorityDefaulted MAF_SensorFA MAP_SensorFA EvapExcessPurgePsbl_FA FuelInjectorCircuit_FA Ethanol Composition Sensor FA AIR System FA</p> <p>10.0 < Volts = All Cylinders active = Complete > 5.0 seconds > 30.0 seconds</p> <p>= False = False</p> <p>*****</p> <p>> 100.0 seconds when engine soak time > 28,800 seconds</p> <p>> 100.0 seconds when engine soak time < 28,800 seconds</p> <p>< 1.014 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.
O2S Heater Performance Bank 1 Sensor 1	P0135	<p>This DTC determines if the 02 sensor heater is functioning properly by monitoring the current through the heater circuit. This test compares the measured heater current (monitored thru the low side driver) and compares it to the expected values (over the voltage range provided) for the released sensor.</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	$0.3 < \text{Amps} < 3.1$	<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>System Voltage Heater Warm-up delay 02S Heater device control</p> <p>B1S1 02S Heater Duty Cycle</p> <p>All of the above met for</p>	<p>ECT_Sensor_FA</p> <p>>10.0 Volts = Complete = Not active > zero >120 seconds</p>	<p>/failures out of 9 samples</p> <p>Frequency: 1 tests per trip 5 seconds delay between tests and 1 second execution rate</p>	Type B, 2 Trips

24OBDG06A HD Part 2 ECM Summary Tables

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 Dual 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	< 25 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 10.0 < Volts = Not active = Not active = Not active = Not active</p> <p>= False = False</p> <p>0.992 < ratio < 1.014 150 < mgrams < 800 = 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		

24OBDG06A HD Part 2 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 Dual Bank Exhaust Only	P0138	<p>This DTC determines if the 02 sensor signal circuit is shorted high or open. When enabled, the diagnostic monitors the 02S signal and compares it to the threshold.</p> <p>The diagnostic failure counter is incremented if the 02S signal is above the threshold value. This DTC is set based on the fail and sample counters.</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>*****</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>10.0 < 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>> 100.0 seconds when engine soak time > 28,800 seconds</p> <p>> 100.0 seconds when engine soak time < 28,800 seconds</p> <p>< 1.014 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. ThisDTC 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><u>Primary method:</u> 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 0.28 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>> 75.0 grams (upper voltage threshold is 500 mvols and lower voltage threshold is 200 mvols)</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 FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA O2S_Bank_1_TFTKO O2S_Bank_2_TFTKO</p> <p>P013B, P013E, P013F, P2270 or P2271</p> <p>>10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs") = Not Valid, Green O2S condition is considered valid until the accumulated air flow is greater than Multiple DTC Use_Green Sensor Delay Criteria - Limit for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab. Airflow accumulation is</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>	<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 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</p> <p>DTC's Passed</p> <p>=====</p> <p>After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).</p>	<p>only enabled when airflow is above 22.0 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. < 125.0 Nm</p> <p>P2270 (and P2272 if applicable) P013E (and P014A if applicable)</p> <p>=====</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.
		<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. DTCP013B 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>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>=====</p> <p>After above conditions are met: Fuel Enrich mode continued.</p>	<p>Airflow accumulation is only enabled when airflow is above 22.0 grams/sec.</p> <p>= Not Valid, Green Cat System condition is considered valid until accumulated airflow is greater than 720,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is greater than 22.0 grams/sec.</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> <p>=====</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.			<p>=====</p> <p>During this test the following must stay TRUE or the test will abort: 0.950 < Base Commanded EQR < 1.100</p> <p>=====</p> <p>During this test: Engine Airflow must stay below:</p> <p>and the delta Engine Airflow over 12.5msec must be :</p>	<p>=====</p> <p>100 gps</p> <p>< 100.0 gps</p>		

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 2 Sensor 2	P013C	<p>The P013C diagnostic is the third in a sequence of six intrusive secondary 02 monitors which include DTCs P2272, P014A, P013C, P2273, P014B, &P013D. ThisDTC 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><u>Primary method:</u> The P013C 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 0.28 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>>75.0 grams (upper voltage threshold is 500 mvolts and lower voltage threshold is 200 mvolts)</p>	<p>Diagnostic is Enabled</p> <p>No Active DTCs</p> <p>B2S2 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 FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA O2S_Bank_1_TFTKO O2S_Bank_2_TFTKO</p> <p>P013D, P014A, P014B, P2272 or P2273</p> <p>>10.0 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: B1S2, B2S2 in Supporting Tables tab.</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 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. DTCP013C 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</p> <p>DTC's Passed</p> <p>=====</p> <p>After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).</p>	<p>Airflow accumulation is only enabled when airflow is above 22.0 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. < 125.0 Nm</p> <p>P2272 P014A</p> <p>=====</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.
		<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. DTCP013Dis 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>=====</p> <p>After above conditions are met: Fuel Enrich mode continued.</p>	<p>Airflow accumulation is only enabled when airflow is above 22.0 grams/sec.</p> <p>= Not Valid, Green Cat System condition is considered valid until accumulated airflow is greater than 720,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is greater than 22.0 grams/sec.</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>P2272 P014A P013C P2273 P014B</p> <p>=====</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.			<p>=====</p> <p>During this test the following must stay TRUE or the test will abort: 0.950 < Base Commanded EQR < 1.100</p> <p>=====</p> <p>During this test: Engine Airflow must stay below:</p> <p>and the delta Engine Airflow over 12.5msec must be :</p>	<p>=====</p> <p>100 gps</p> <p>< 100.0 gps</p>		

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:</p> <p>1) Catalyst has been rich for a minimum of</p> <p>AND</p> <p>2) Catalyst Rich Accumulation Air Flow is</p>	<p>> 500 mvolts</p> <p>> 84 grams</p> <p>> 1 secs</p> <p>> 10.4 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</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>FuelTrimSystemB1_FA</p> <p>FuelTrimSystemB2_FA</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, P013F, P2270 or P2271</p> <p>>10.0 Volts</p> <p>= 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</p> <p>Multiple DTC Use Green Sensor Delay Criteria - Limit</p> <p>for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab.</p>	<p>Frequency: Once per trip</p> <p>Note: if NaPOPD_b_ResetFastRespFunc = 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>Low Fuel Condition Only when FuelLevelDataFault</p> <p>Post fuel cell</p> <p>Crankshaft Torque</p> <p>DTC's Passed</p> <p>Number of fueled cylinders =====</p> <p>After above conditions are met: DFCO mode entered (wo driver initiated pedal input).</p>	<p>Airflow accumulation is only enabled when airflow is above 22.0 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. < 125.0 Nm</p> <p>P2270</p> <p>< 7 cylinders =====</p>		

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. ThisDTC 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>>400 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 FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA 02S_Bank_ 1_TFTK0 02S_Bank_ 2_TFTK0</p> <p>P013A, P013B, P013E, P2270 or P2271</p> <p>>10.0 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: B1S2, B2S2 (if applicable) in Supporting Tables tab.</p>	<p>Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed</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>=====</p> <p>After above conditions are met: Fuel Enrich mode</p>	<p>Airflow accumulation is only enabled when airflow is above 22.0 grams/sec.</p> <p>= Not Valid, Green Cat System condition is considered valid until accumulated airflow is greater than 720,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is greater than 22.0 grams/sec.</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</p> <p>> 1 cylinders</p> <p>=====</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>entered.</p> <p>=====</p> <p>During this test the following must stay TRUE or the test will abort: 0.950 < Base Commanded EQR < 1.100</p> <p>=====</p> <p>During this test: Engine Airflow must stay below:</p> <p>and the delta Engine Airflow over 12.5msec must be :</p>	<p>=====</p> <p>100 gps</p> <p>< 100.0 gps</p>		

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 Dual Bank Exhaust Only	P0141	<p>This DTC determines if the 02 sensor heater is functioning properly by monitoring the current through the heater circuit. This test compares the measured heater current (monitored thru the low side driver) and compares it to the expected values (over the voltage range provided) for the released sensor.</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	0.3 > amps > 2.9	<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>System Voltage</p> <p>Heater Warm-up delay</p> <p>02S Heater device control</p> <p>B1S1 02S Heater Duty Cycle</p> <p>All of the above met for</p>	<p>ECT_Sensor_FA</p> <p>>10.0 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: 1 tests per trip 5 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 2 Sensor 2	P014A	<p>The P014A diagnostic is the second in a sequence of six intrusive secondary 02 monitors which include DTCs P2272, P014A, P013C, P2273, P014B, & P013D. This DTC determines if the secondary 02 sensor has an initial delayed response to an A/F change from Rich to Lean and thereby can no longer be used for secondary 02 sensor fuel control or for catalyst monitoring. This diagnostic commands fuel cut off while monitoring the sensor signal and the accumulated mass air flow.</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>> 500 mvolts</p> <p>> 84 grams</p> <p>> 1 secs</p> <p>> 10.4 grams</p>	<p>Diagnostic is Enabled</p> <p>No Active DTCs</p> <p>B2S2 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 FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA 02S_Bank_ 1_TFTK0 02S_Bank_ 2_TFTK0</p> <p>P013C, P013D, P014B, P2272 or P2273</p> <p>>10.0 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: B1S2, B2S2 in Supporting Tables tab.</p>	<p>Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed</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>Low Fuel Condition Only when FuelLevelDataFault</p> <p>Post fuel cell</p> <p>Crankshaft Torque</p> <p>DTC's Passed</p> <p>Number of fueled cylinders =====</p> <p>After above conditions are met: DFCO mode entered (wo driver initiated pedal input).</p>	<p>Airflow accumulation is only enabled when airflow is above 22.0 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. < 125.0 Nm</p> <p>P2272</p> <p>< 7 cylinders =====</p>		

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 2 Sensor 2	P014B	<p>The P014B diagnostic is the fifth in a sequence of six intrusive secondary 02 monitors which include DTCs P2272, P014A, P013C, P2273, P014B, &P013D. ThisDTC 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</p> <p>AND</p> <p>The Accumulated mass airflow monitored during the Delayed Response Test</p>	<p>< 350mvolts</p> <p>> 400 grams.</p>	<p>Diagnostic is Enabled</p> <p>No Active DTCs</p> <p>B2S2 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 FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA 02S_Bank_ 1_TFTK0 02S_Bank_ 2_TFTK0</p> <p>P013C, P013D, P014A, P2272 or P2273</p> <p>>10.0 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: B1S2, B2S2 in Supporting Tables tab.</p>	<p>Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed</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>=====</p> <p>After above conditions are met: Fuel Enrich mode</p>	<p>Airflow accumulation is only enabled when airflow is above 22.0 grams/sec.</p> <p>= Not Valid, Green Cat System condition is considered valid until accumulated airflow is greater than 720,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is greater than 22.0 grams/sec.</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>P2272 P014A P013C P2273</p> <p>> 1 cylinders</p> <p>=====</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>entered.</p> <p>=====</p> <p>During this test the following must stay TRUE or the test will abort: 0.950 < Base Commanded EQR < 1.100</p> <p>=====</p> <p>During this test: Engine Airflow must stay below:</p> <p>and the delta Engine Airflow over 12.5msec must be :</p>	<p>=====</p> <p>100 gps</p> <p>< 100.0 gps</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Low Voltage Bank 2 Sensor 1	P0151	<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	< 25 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</p> <p>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 10.0 < Volts = Not active = Not active = Not active = Not active</p> <p>= False = False</p> <p>0.992 < ratio < 1.014 150 < APC < 800 mgrams</p> <p>= Closed Loop = TRUE</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.
					<p>All Fuel Injectors for active Cylinders Fuel Condition</p> <p>Ethanol Estimation in Progress</p> <p>Fuel State</p> <p>All of the above met for</p>	<p>(Please see “Closed Loop Enable Clarification” in Supporting Tables).</p> <p>Enabled (On) < 87 % Ethanol</p> <p>= Not Active (Please see “Ethanol Estimation in Progress” in Supporting Tables).</p> <p>DFCO not active</p> <p>> 5.0 seconds</p>		

24OBDG06A HD Part 2 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 2 Sensor 1	P0152	<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	Diagnostic is Enabled No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Low Fuel Condition Only when FuelLevelDataFault ***** Secondary delay after above conditions are complete (cold start condition) Secondary delay after above conditions are complete (not cold start condition) Commanded Equivalence Ratio ***** All of the above met for	TPS_ThrottleAuthorityDef aulted MAF_SensorFA MAP_SensorFA EvapExcessPurgePsbl_F A FuelInjectorCircuit_FA Ethanol Composition Sensor FA AIR System FA 10.0 < Volts = All Cylinders active = Complete > 5.0 seconds > 30.0 seconds = False = False ***** > 140.0 seconds when engine soak time > 28,800 seconds > 140.0 seconds when engine soak time < 28,800 seconds < 1.014 EQR ***** > 3 seconds	100 failures out of 125 samples Frequency: Continuous in 100 milli- second loop	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Performance Bank 2 Sensor 1	P0155	<p>This DTC determines if the 02 sensor heater is functioning properly by monitoring the current through the heater circuit. This test compares the measured heater current (monitored thru the low side driver) and compares it to the expected values (over the voltage range provided) for the released sensor.</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	0.3 > amps > 3.1	<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>System Voltage</p> <p>Heater Warm-up delay</p> <p>02S Heater device control</p> <p>B1S1 02S Heater Duty Cycle</p> <p>All of the above met for</p>	<p>ECT_Sensor_FA</p> <p>>10.0 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: 1 tests per trip 5 seconds delay between tests and 1 second execution rate</p>	Type B, 2 Trips

24OBDG06A HD Part 2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Low Voltage Bank 2 Sensor 2	P0157	<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	< 25 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 FuelTankPressureSnrCkt_FA FuelInjectorCircuit_FA</p> <p>= Not active = Not active = Not active = Not active 10.0 < Volts = Not active = Not active = Not active = Not active</p> <p>= False = False</p> <p>0.992 < ratio < 1.014 150< mgrams < 800 = 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) < 87 % Ethanol = Not Active (Please see " Ethanol Estimation in Progress " in Supporting Tables). DFCO not active > 5.0 seconds		

24OBDG06A HD Part 2 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 2 Sensor 2	P0158	<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 AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum</p> <p>Low Fuel Condition Only when 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>*****</p> <p>All of the above met for</p>	<p>TPS_ThrottleAuthorityDef aulted MAF_SensorFA MAP_SensorFA EvapExcessPurgePsbl_F A FuelInjectorCircuit_FA Ethanol Composition Sensor FA AIR System FA</p> <p>10.0 < Volts = All Cylinders active = Complete > 5.0 seconds > 30.0 seconds</p> <p>= False = False</p> <p>*****</p> <p>> 140.0 seconds when engine soak time > 28,800 seconds</p> <p>> 140.0 seconds when engine soak time < 28,800 seconds</p> <p>< 1.014 EQR</p> <p>*****</p> <p>> 3 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 Delayed Response Rich to Lean Bank 1 Sensor 1) (For use w/o WRAF	P015A	<p>DTC P015A detects that the primary 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 02 sensor signal transitions from above to below the 02 voltage threshold, otherwise the Secondary method is used.</p> <p>Primary method: The P015A diagnostic measures the primary 02 sensor response time between a rich condition above a starting voltage threshold and a lower voltage threshold. The response time is then scaled and normalized to mass air flow rate, engine speed, Baro, and intake air temperature resulting in a normalized delay</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 0.20 coefficient. This method calculates the result when the Pre 02 sensor voltage is</p> <p>OR</p> <p>Secondary Method: The Accumulated time monitored during the R2L Delayed Response Test.</p> <p>AND</p> <p>Pre 02 sensor voltage is</p>	<p>> 0.70 EWMA (sec) < 0.60 EWMA (sec)</p> <p>< 450mvolts</p> <p>> 3.5 Seconds</p> <p>> 100.0 mvolts</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 FuelTankPressureSnrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131, P0132, P013A, P013B, P013E, P013F, P2270, P2271</p> <p>>10.0 Volts = Not active = Not active = Not active = Not active</p> <p>= False = 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>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>Secondary method: This fault is set if the primary 02 sensor does not achieve the required lower voltage threshold before a delay time threshold is reached.</p>			<p>Green 02S Condition</p> <p>02 Heater (pre sensor) on for Learned Htr resistance</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 initiallv enabled)</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 22.0 grams/sec.</p> <p>> 30 seconds = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's")</p> <p>> 50 °C =TRUE)</p> <p>> -40 °C > 30 seconds</p> <p>800<RPM< 2,500</p> <p>750 < RPM < 2,650</p> <p>4.0 < gps < 20.0</p> <p>40.4 < MPH < 82.0</p> <p>36.0 < MPH < 87.0</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Closed loop integral Closed Loop Active Evap Ethanol Estimation in Progress Baro Post fuel cell EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on Time Predicted Catalyst temp Fuel State ===== All of the above met for at least 0.5 seconds, and then the Force Cat Rich intrusive stage is requested. ===== Pre O2S voltage B1S1 at end of Cat Rich stage Fuel State Number of fueled cylinders ===== After above conditions are	0.75 < 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). > 70kpa = enabled = not active = not active > 60.0 sec 575 < °C < 1,000 = DFCO possible ===== ===== > 750mvolts = DFCO active < 7 cylinders =====		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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) (For use w/o WRAF	P015B	<p>DTC P015B detects that the primary 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 02 sensor signal transitions from lean condition to above the 02 voltage threshold, otherwise the Secondary method is used.</p> <p><u>Primary method:</u> The P015B diagnostic measures the primary 02 sensor response time between a lean condition and a higher voltage threshold. The response time is then scaled and normalized to mass air flow rate, engine speed, Baro, and intake air temperature resulting in a normalized delay value. The normalized delay is fed into a 1st</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 0.20 coefficient.</p> <p>OR</p> <p>Secondary method: The Accumulated time monitored during the L2R Delayed Response Test.</p> <p>AND</p> <p>Pre 02 sensor voltage is</p> <p>OR</p> <p>At end of Cat Rich stage the Pre 02 sensor output is</p>	<p>> 0.68 EWMA (sec) < 0.58 EWMA (sec)</p> <p>> 2.5 Seconds</p> <p>< 450mvolts</p> <p>< 750mvolts</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 FuelTankPressureSnrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131, P0132, P013A, P013B, P013E, P013F, P015A, P2270, P2271</p> <p>= Passed</p> <p>>10.0 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>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 O2 sensor does not achieve the required higher voltage threshold before a delay time threshold is reached.</p>			<p>Only when FuelLevelDataFault</p> <p>Green 02S Condition</p> <p>02 Heater (pre sensor) on for Learned Htr resistance</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</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 22.0 grams/sec.</p> <p>> 30 seconds = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's")</p> <p>> 50 °C =TRUE)</p> <p>> -40 °C > 30 seconds</p> <p>800 < RPM < 2,500</p> <p>750 < RPM < 2,650</p> <p>4.0 < gps < 20.0</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					enable test Vehicle Speed range to keep test enabled (after initially enabled) Closed loop integral Closed Loop Active Evap Ethanol Estimation in Progress Baro Post fuel cell EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on Time Predicted Catalyst temp Fuel State Number of fueled cylinders ===== When above conditions are met: Fuel Enrich mode is entered. ===== During this test: Engine Airflow must stav	40.4 < MPH < 82.0 36.0 < MPH < 87.0 0.75 < 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). > 70kpa = enabled = not active = not active > 60.0 sec 575 < °C < 1,000 = DFCO inhibit > 1 cylinders ===== =====		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					between: and the delta Engine Airflow over 12.5msec must be :	4 < gps < 30 < 50.0 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 2 Sensor 1) (For use w/o WRAF	P015C	<p>DTC P015C detects that the primary oxygen sensor for Bank 2 has delayed response when the air fuel ratio transitions from rich to lean condition. This diagnostic runs simultaneously with the intrusive secondary 02 monitor rich to lean tests (P014A/ P013C / P2273), which commands fuel cut off.</p> <p>Note: The Primary method is used when the primary 02 sensor signal transitions from above to below the 02 voltage threshold, otherwise the Secondary method is used.</p> <p><u>Primary method:</u> The P015C diagnostic measures the primary 02 sensor response time between a rich condition above a starting voltage threshold and a lower voltage threshold. The response time is then scaled and normalized to mass air flow rate, engine speed, Baro, and intake air temperature resulting in a normalized delay</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 0.20 coefficient. This method calculates the result when the Pre 02 sensor voltage is</p> <p>OR</p> <p>Secondary method: The Accumulated time monitored during the R2L Delayed Response Test.</p> <p>AND</p> <p>Pre 02 sensor voltage is above</p>	<p>> 0.70 EWMA (sec) < 0.60 EWMA (sec)</p> <p>< 450mvolts</p> <p>> 3.5 Seconds</p> <p>> 100mvolts</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 FuelTankPressureSnrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA P0151, P0152, P013C, P013D, P014A, P014B, P2272, P2273</p> <p>>10.0 Volts = Not active = Not active = Not active = Not active</p> <p>= False = 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>value. The normalized delay is fed into a 1st order lag filter to update the final EWMA result. DTC P015C is set when the EWMA value exceeds the EWMA threshold.</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 02 sensor does not achieve the required lower voltage threshold before a delay time threshold is reached.</p>			<p>Green 02S Condition</p> <p>02 Heater (pre sensor) on for Learned Htr resistance</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</p> <p>Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after</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 for the following locations: B1S1, B2S1 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 22.0 grams/sec.</p> <p>> 30 seconds = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's")</p> <p>> 50 °C =TRUE)</p> <p>> -40 °C >30seconds</p> <p>800 < RPM < 2,500</p> <p>750 < RPM < 2,650</p> <p>4.0 < gps < 20.0</p> <p>40.4 < MPH < 82.0</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					initially enabled) Closed loop integral Closed Loop Active Evap Ethanol Estimation in Progress Baro Post fuel cell EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on Time Predicted Catalyst temp Fuel State =====	36.0 < MPH < 87.0 0.75 < 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). > 70kpa = enabled = not active = not active > 60.0 sec 575 < °C < 1,000 = DFCE possible =====		
					All of the above met for at least 0.5 seconds, and then the Force Cat Rich intrusive stage is requested. =====			
					Pre O2S voltage B1S1 at end of Cat Rich stage Fuel State Number of fueled cylinders =====	> 750mvolts = DFCE active <= 7 cylinders =====		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 2 Sensor 1) (For use w/o WRAF	P015D	<p>DTC P015D detects that the primary oxygen sensor for Bank 2 has delayed response when the air fuel ratio transitions from lean to rich condition. This diagnostic runs simultaneously with the intrusive secondary 02 monitor lean to rich tests (P014B / P013D), which commands fuel enrichment.</p> <p>Note: The Primary method is used when the primary 02 sensor signal transitions from lean condition to above the 02 voltage threshold, otherwise the Secondary method is used.</p> <p><u>Primary method:</u> The P015D diagnostic measures the primary 02 sensor response time between a lean condition and a higher voltage threshold. The response time is then scaled and normalized to mass air flow rate, engine speed, Baro, and intake air temperature resulting in a normalized delay value. The normalized delay is fed into a 1st</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 0.20 coefficient.</p> <p>OR</p> <p>Secondary method: The Accumulated time monitored during the L2R Delayed Response Test.</p> <p>AND</p> <p>Pre 02 sensor voltage is below</p> <p>OR</p> <p>At end of Cat Rich stage the Pre 02 sensor output is</p>	<p>> 0.68 EWMA (sec) < 0.58 EWMA (sec)</p> <p>> 2.5 Seconds</p> <p>< 450 mvolts</p> <p>< 750 mvolts</p>	<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>P015C test 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 FuelTankPressureSnrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA</p> <p>P0151, P0152, P013C, P013D, P014A, P014B, P015C, P2272, P2273</p> <p>= Passed</p> <p>>10.0 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>order lag filter to update the final EWMA result. DTC P015D is set when the EWMA value exceeds the EWMA threshold. Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value.</p> <p><u>Secondary method:</u> This fault is set if the primary O2 sensor does not achieve the required higher voltage threshold before a delay time threshold is reached.</p>			<p>Only when FuelLevelDataFault</p> <p>Green 02S Condition</p> <p>02 Heater (pre sensor) on for Learned Htr resistance</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</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 22.0 grams/sec.</p> <p>> 30 seconds = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's")</p> <p>> 50 °C =TRUE)</p> <p>> -40 °C > 30 seconds</p> <p>800 < RPM < 2,500</p> <p>750 < RPM < 2,650</p> <p>4.0 < gps < 20.0 40.4 < MPH < 82.0</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Vehicle Speed range to keep test enabled (after initially enabled) Closed loop integral Closed Loop Active Evap Ethanol Estimation in Progress Baro Post fuel cell EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on Time Predicted Catalyst temp Fuel State Number of fueled cylinders ===== When above conditions are met: Fuel Enrich mode is entered. ===== During this test: Engine Airflow must stay between:	36.0 < MPH < 87.0 0.75 < 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). > 70kpa = enabled = not active = not active > 60.0 sec 575 < °C < 1,000 = DFCO inhibit > 1 cylinders ===== ===== 4 < aos < 30		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					and the delta Engine Airflow over 12.5msec must be :	< 50.0 gps		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Performance Bank 2 Sensor 2	P0161	<p>This DTC determines if the 02 sensor heater is functioning properly by monitoring the current through the heater circuit. This test compares the measured heater current (monitored thru the low side driver) and compares it to the expected values (over the voltage range provided) for the released sensor.</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	0.3 > amps > 2.9	<p>Diagnostic is Enabled</p> <p>No Active DTC's</p> <p>System Voltage</p> <p>Heater Warm-up delay</p> <p>02S Heater device control</p> <p>B1S1 02S Heater Duty Cycle</p> <p>All of the above met for</p>	<p>ECT_Sensor_FA</p> <p>>10.0 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: 1 tests per trip 5 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.
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 and short-term fuel trim. A normally operating system operates centered around long-term fuel trim metric of 1.0. For lean conditions extra fuel trim is required therefor values > 1.0 indicate a Lean condition.</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 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>≥ 1.325</p> <p>≥ 0.100</p> <p>If a fault has been detected the long-term fuel trim metric must be < 1.150 and the short-term fuel trim metric must be < 1.150 to repass the diagnostic.</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< 7,000 > 70 kPa > -40 °C (or OBD Coolant Enable Criteria = TRUE) < 150 °C 10 <kPa< 255 -40 <°C< 150 1 <g/s< 1,000 > 10% or if fuel sender is faulty the diagnostic will bypass the fuel level criteria.</p> <p>> 25.00 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>-----</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>-----</p> <p>No active DTC:</p> <p>-----</p>	<p>Enabled Enabled (Please see "Closed Loop Enable Clarification" and "Long Term FT 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>-----</p> <p>No Delay</p> <p>-----</p> <p>1AC_SystemRPM_FA MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR_System FA EvapExcessPurgePsbl_F A Ethanol Composition Sensor FA FuelInjectorCircuit_FA</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit_FA MAP_EngineVacuumStatus AmbPresDfItStatus TC_BoostPresSnrFA 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 > 0.710, 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 <= 0.710, 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>		<p>term fuel trim metric must be > 0.850 to repass the diagnostic. The intrusive test will be enabled at long-term fuel metric values < 0.71 until the diagnostic repasses after a failure.</p>		<p>If the accumulated purge volume is > 0.0 grams, the intrusive test will not be inhibited even if Purge Vapor Fuel is > 100.0 %.</p>	<p>time to purge excess vapors from the canister. During this period, fuel trim will pass if the filtered Purge Long Term Fuel Trim metric > 0.710 for at least 200.00 seconds, indicating that the canister has been purged.</p>	

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.
Fuel System Too Lean Bank 2	P0174	Determines if the primary fuel control system for Bank 2 is in a lean condition, based on the filtered long-term and short-term fuel trim. A normally operating system operates centered around long-term fuel trim metric of 1.0. For lean conditions extra fuel trim is required therefor values > 1.0 indicate a Lean condition. A fault is determined, when the long term fuel metric exceeds the threshold value. In addition to the long-term fuel trim limit, the short-term fuel trim metric can be monitored and the fault sets once both threshold values are exceeded. The short-term fuel trim metric is only monitored on programs that have acceptable emissions when the long-term fuel metric reaches its full authority.	The filtered long-term fuel trim metric AND The filtered short-term fuel trim metric (Note: any value below 0.95 effectively nullifies the short-term fuel trim criteria)	>= 1.325 >= 0.100 If a fault has been detected the long-term fuel trim metric must be < 1.150 and the short-term fuel trim metric must be < 1.150 to repass the diagnostic.	The primary fuel trim diagnostic is enabled Engine speed BARO Coolant Temp Coolant Temp MAP Inlet Air Temp MAF Fuel Level Long Term Fuel Trim data accumulation: Sometimes, certain Long-Term Fuel Trim Cells are not utilized for control and/or diagnosis	400 <rpm< 7,000 > 70 kPa > -40 °C (or OBD Coolant Enable Criteria = TRUE) < 150 °C 10 <kPa< 255 -40 <°C< 150 1 <g/s< 1,000 > 10 % or if fuel sender is faulty the diagnostic will bypass the fuel level criteria. > 25.00 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 (Please see P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage in Supporting Tables for a list of cells utilized for diagnosis)	Frequency: 100 ms Continuous Loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>Closed Loop Long Term FT</p> <p>EGR Diag. Catalyst Diag. Post 02 Diag. Device Control EVAP Diag.</p> <p>-----</p> <p>Delay during GPF Regeneration Standard startup delays are re-initialized following completion of GPF Regen to allow system stabilization. (See "Long Term Fuel Trim data accumulation" above.)</p> <p>-----</p> <p>No active DTC:</p>	<p>Enabled Enabled (Please see "Closed Loop Enable Clarification" and "Long Term FT 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>-----</p> <p>No Delay</p> <p>-----</p> <p>1AC_SystemRPM_FA MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR_System FA EvapExcessPurgePsbl_F A Ethanol Composition Sensor FA FuelInjectorCircuit_FA</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit_FA MAP_EngineVacuumStatus AmbPresDfItStatus TC_BoostPresSnsrFA O2S_Bank_2_8ensor_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 > 0.710 , 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 <= 0.710 .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>		0.705 and the short-term fuel trim metric must be > 0.850 to repass the diagnostic. The intrusive test will be enabled at long-term fuel metric values < 0.71 until the diagnostic repasses after a failure.		<p>the intrusive test will not be inhibited even if Purge Vapor Fuel is > 100.0 %.</p> <p>(Note: values greater than 50% indicate the Purge Vapor Fuel requirement is not being used)</p>	<p>purge excess vapors from the canister. During this period, fuel trim will pass if the filtered Purge Long Term Fuel Trim metric > 0.710 for at least 200.00 seconds, indicating that the canister has been purged.</p>	

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.
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_FuelPresSnrCktFA c3) Reference Voltage Fault Status [DTC P0641] c4) Fault bundle FAB_FuelPmpCktFA c5) Fuel Control Enable Fault Active [DTC P12A6] c6) Fuel Pump Driver Module OverTemp Fault Active [DTC P1255] c7) Fuel Pump Speed Fault Active [DTCP129F] c8) CAN Sensor Bus message \$0C3 Comm Fault [DTCP165C] 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 c3) == False c4) == False c5) == False c6) == False c7) == False c8) == False c9) == False c10) == False c11) == CeFDBR_e_WiredTo_FT ZM c12) == TRUE d) == False 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] [DTCU18A7] 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 $[(\text{Abs } 5.0\text{V} - \text{SensorVoltsActual}) / 5.0\text{V}] * 100\%$	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] [Info]	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 $[(\text{Abs } 5.0\text{V} - \text{SensorVoltsActual}) / 5.0\text{V}] * 100\%$	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.
SENT SIDI 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><=</p> <p>P0191 - Low fail limit of fuel control due to pressure sensor skewed low (See supporting table)</p> <p>>=</p> <p>P0191 - High fail limit of fuel control due to high pressure sensor skewed High (see Supporting table)</p> <p>>= 1.00 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 mpa</p> <p>>= 1.25 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 >= 1.50 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 (repressing the refernce voltage) is below the lower digital threshold, the low fail counter then increments. If the low fail counter reaches its threshold then a fail is reported. A pass is reported for this DTC if the low sample counter reaches its threshold.</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.
Engine Oil Temperature (EOT) Sensor Performance	P0196	Determines if the engine oil temperature (EOT) sensor is stuck or biased in range. Three independent tests can be used. 1) Cold Start Test Compares EOT to ECT and IAT at powerup after a long soak (Fast and regular tests). 2) Warm Up Test Compares EOT to a target EOT after a large enough accumulated airflow has occurred. 3) Continuous Test Compares the measured EOT to modeled EOT on a continuous basis on a warm engine.	Fast Cold Start Test <u>To indicate an fast fail:</u> Absolute value of Powerup EOT - Powerup ECT AND Absolute value of Powerup IAT - Powerup ECT <u>To indicate a fast pass:</u> Absolute value of Powerup EOT - Powerup ECT AND Absolute value of Powerup EOT - Powerup IAT	EOT Temp Diff > FastFailTempDiff (See P0196 details on Supporting Tables Tab) AND < 16 degrees C AND < 16 degrees C AND < 16 degrees C	EOT Diagnostic main Status AND Engine Running Cold Start Specific EOT Test Conditions: Use Cold Start Diagnostic Engine Off Time Engine Off Timer Validity No active DTC's	Enabled = True Enabled > 28,800 Seconds = True Fault bundles: IgnitionOffTimer_FA IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA EngOilTempSensorCircuit FA	Cold Start Fast Test - one failure out of one sample - test performed once per second	Type B, 2 Trips
			Cold Start Test <u>Pass Condition 1:</u> Absolute value of Powerup EOT - Powerup ECT AND Absolute value of Powerup EOT - minIAT OR <u>Pass Condition 2:</u> Absolute value of Powerup EOT - Powerup ECT	<= 16 Deg C <= 16 Deg C OR > 16 Deg C	All three tests (Cold/Warm/Continuous) EOT Diagnostic main enable AND Engine Running Cold Start Specific EOT Test Conditions: Use Cold Start Diagnostic Engine Off Time Engine Off Timer Validity	Enabled = True Enabled > 28,800 Seconds = True		

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Oil Temperature (EOT) Circuit Low	P0197	Controller specific output driver circuit diagnoses the Engine Oil Temperature (EOT) Sensor low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Engine Oil Temperature Sensor (EOT) Circuit Resistance	< 25 ohms	Diagnostic Status	Enabled	4 failures out of 5 samples Sampled every 1 second	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Oil Temperature (EOT) Circuit High	P0198	Controller specific output driver circuit diagnoses the Engine Oil Temperature (EOT) Sensor low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Engine Oil Temperature Sensor (EOT) Circuit Resistance	> 450,000 ohms	Diagnostic Status Engine Run Time OR ECT	Enabled > 20.0 seconds ≥ -20 Deg C	4 failures out of 5 samples Sampled every 1 second	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Oil Temperature Sensor (EOT) Circuit Intermittent	P0199	Determines if an intermittent fault exists on the engine oil temperature sensor circuit. This diagnostic compares each temperature sample to the previous sample and measures cumulative error over a sample period.	Continuous Test <u>Pass/Fail Condition:</u> Temperature signal string length, cumulative sum of absolute value of (Oil Temperature - Previous Oil Temperature)	String Length ≥ 20.00 °C	None	Enabled	4 failures out of 5 samples, sampled every 2 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	< 68.9 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 Thermostat duty cycle	ECT_Sensor_Ckt_FA VehicleSpeedSensor_FA OAT_PtEstFiltFA THMR_AWP_AuxPumpFA THMR_AHV_FA THMR_SWP_Control_FA EngineTorqueEstInaccuracy ECT_Sensor_Perf_FA THMR_SWP_NoFlow_FA THMR_SWP_Flow8tuckOn_FA >30.0 seconds >1.2 km > 55.0 kPa > -9.0 Deg C > 74.9 Deg C > P01F0 - Heat To Coolant Min 2D < 35.0 seconds < 101.0%	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.
					RPM Active Fuel Management is not in	< 8,192 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 ≥ 0 Seconds</p> <p>P062B notFAorTFTK</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 ≥ 0 Seconds</p> <p>P062B notFAorTFTK</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.
Injector3 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>≥ 0 Seconds</p> <p>P062B notFAorTFTK</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</p> <p>≥ 0 Seconds</p> <p>P062B notFAorTFTK</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.
Injector5 Open Circuit - (SIDI)	P0205	<p>Controller specific output driver circuit diagnoses Injector 5 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.</p> <p>Or</p> <p>Controller specific output driver circuit diagnoses Injector 5 high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.</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 ≥ 0 Sec</p> <p>P062B notFAorTFTK</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 6 Open Circuit - (SIDI)	P0206	<p>Controller specific output driver circuit diagnoses Injector 6 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.</p> <p>Or</p> <p>Controller specific output driver circuit diagnoses Injector 6 high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.</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 ≥ 0 Seconds</p> <p>P062B notFAorTFTK</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 7 Open Circuit - (SIDI)	P0207	<p>Controller specific output driver circuit diagnoses Injector 7 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.</p> <p>Or</p> <p>Controller specific output driver circuit diagnoses Injector 7 high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.</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 ≥ 0 Seconds</p> <p>P062B notFAorTFTK</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.
Injector8 Open Circuit - (SIDI)	P0208	<p>Controller specific output driver circuit diagnoses Injector 7 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.</p> <p>Or</p> <p>Controller specific output driver circuit diagnoses Injector 7 high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.</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 ≥ 0 Seconds</p> <p>P062B notFAorTFTK</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.
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.	<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>	<= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	<p>>=11 Volts >=0 Seconds</p> <p>P062B notFAorTFTK</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 1 Low side circuit shorted to power (SIDI)	P0262	Controller specific output driver circuit diagnoses Injector 1 low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

24OBDG06A HD Part 2 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 ground (SIDI)	P0264	Controller specific output driver circuit diagnoses Injector 2 low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	<= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

24OBDG06A HD Part 2 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.	<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>	25 amp \geq through low side driver	Battery Voltage Engine Run Time	≥ 11 Volts ≥ 0 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

24OBDG06A HD Part 2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector3 Low side circuit shorted to ground (SIDI)	P0267	Controller specific output driver circuit diagnoses Injector 3 low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	<= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B notFAorTFTK	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.
Injector3 Low side circuit shorted to power (SIDI)	P0268	Controller specific output driver circuit diagnoses Injector 3 low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

24OBDG06A HD Part 2 ECM Summary Tables

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 >=0 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

24OBDG06A HD Part 2 ECM Summary Tables

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 >=0 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

24OBDG06A HD Part 2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector5 Low side circuit shorted to ground (SIDI)	P0273	Controller specific output driver circuit diagnoses Injector 5 low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	<= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B notFAorTFTK	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.
Injector5 Low side circuit shorted to power (SIDI)	P0274	Controller specific output driver circuit diagnoses Injector 5 low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B notFAorTFTK	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 6 Low side circuit shorted to ground (SIDI)	P0276	Controller specific output driver circuit diagnoses Injector 6 low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	<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>	<= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B notFAorTFTK	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 6 Low side circuit shorted to power (SIDI)	P0277	Controller specific output driver circuit diagnoses Injector 6 low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

24OBDG06A HD Part 2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 7 Low side circuit shorted to ground (SIDI)	P0279	Controller specific output driver circuit diagnoses Injector 7 low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	<= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

24OBDG06A HD Part 2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 7 Low side circuit shorted to power (SIDI)	P0280	Controller specific output driver circuit diagnoses Injector 7 low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

24OBDG06A HD Part 2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector8 Low side circuit shorted to ground (SIDI)	P0282	Controller specific output driver circuit diagnoses Injector 8 low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	<= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B notFAorTFTK	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.
Injector8 Low side circuit shorted to power (SIDI)	P0283	Controller specific output driver circuit diagnoses Injector 8 low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B notFAorTFTK	10.00 to 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.
Cylinder 5 Injector Circuit Range/ Performance	P02F2	Diagnostic to determine if Cylinder 5 injector voltage feedback measured from the analog to digital converter is rational. The measured voltage is checked when the injection pulse width is large enough ensuring the injector pintle has achieved max travel and the injector voltage flux through the coil has reach the max stabilization limit	<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 6 Injector Circuit Range/ Performance	P02F3	Diagnostic to determine if Cylinder 6 injector voltage feedback measured from the analog to digital converter is rational. The measured voltage is checked when the injection pulse width is large enough ensuring the injector pintle has achieved max travel and the injector voltage flux through the coil has reach the max stabilization limit	<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 7 Injector Circuit Range/ Performance	P02F4	Diagnostic to determine if Cylinder 7 injector voltage feedback measured from the analog to digital converter is rational. The measured voltage is checked when the injection pulse width is large enough ensuring the injector pintle has achieved max travel and the injector voltage flux through the coil has reach the max stabilization limit	<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 8 Injector Circuit Range/ Performance	P02F5	Diagnostic to determine if Cylinder 8 injector voltage feedback measured from the analog to digital converter is rational. The measured voltage is checked when the injection pulse width is large enough ensuring the injector pintle has achieved max travel and the injector voltage flux through the coil has reach the max stabilization limit	<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 -9°C < ECT Or if OBD Max Coolant Achieved = TRUE -9°C<ECT< 130°C		
Cylinder 2 Misfire Detected	P0302				Or If ECT at startup Then	< -9°C If OBD Max Coolant Achieved = FALSE 21°C < ECT If OBD Max Coolant Achieved = TRUE 21°C < ECT < 130°C		
Cylinder 3 Misfire Detected	P0303							
Cylinder 4 Misfire Detected	P0304							
Cylinder 5 Misfire Detected	P0305	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 < 95.00 % per 25 ms < 95.00 % per 25 ms	Failure reported for (1) Exceedence in 1st (16) 200 rev block tests, or (4) Exceedences thereafter.	
Cylinder 6 Misfire Detected	P0306	SINGLE CYLINDER CONTINUOUS MISFIRE((Medres_Decel Medres_Jerk OR (Medres_Decel Medres_Jerk OR (Lores_Decel Lores_Jerk OR (Lores_Decel Lores_Jerk OR RevBalanceTime)	> 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			
Cylinder 7 Misfire Detected	P0307		> SCD.Decel AND > SCD_Jerk)					
Cylinder 8 Misfire Detected	P0308		> RufCyl_Decel AND > RufCyl.Jerk)					
			> CylModeDecel AND > CylModeJerk)					
		Default Action: If Misfire P030x sets on some hybrid applications, the isolation damper		>RevMode_Decel			OR when Early Termination Reporting = Enabled and engine rev > 1,000 revs and < 3,200 revs at end of trip	

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	>= 2 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.
			CONSECUTIVE CYLINDER MISFIRE 1st cylinder uses single cyl continuous misfire thresholds; 2nd Cylinder uses: (Medres_Decel AND Medres_Jerk) OR (Medres_Decel AND Medres_Jerk) OR (Lores_Decel AND Lores_Jerk) OR (Lores_Decel AND Lores_Jerk)	> RufSCD_Decel * ConsecSCD_Decel > RufSCD_Jerk * ConsecSCD_Jerk >SCD_Decel * ConsecSCD_Decel > SCD_Jerk * ConsecSCD_Jerk > RufCyl_Decel * ConsecCylModDecel > RufCyl.Jerk * ConsecCylModeJerk > CylModeDecel * ConsecCylModDecel > CylModeJerk * ConsecCylModeJerk				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			CYLINDER DEACTIVATIONMODE (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	$> \text{CylModeDecel} * \text{ClyAfterAFM_Decel}$ $> \text{CylModeJerk} * \text{CylAfterAFM_Jerk}$ $> \text{CylModeDecel} * \text{CylBeforeAFM_Decel}$ $> \text{CylModeJerk} * \text{ClyBeforeAFM_Jerk}$ $> 3 \text{ Engine Cycles}$ $> \text{CylModeDecel} * \text{ClyAfterAFM_Decel} * \text{RandomAFM_Decl}$ $> \text{CylModeJerk} * \text{CylAfterAFM_Jerk} * \text{RandomAFM_Jerk}$ $> \text{CylModeDecel} * \text{CylBeforeAFM_Decel} * \text{RandomAFM_Decl}$				

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>				
			Misfire Percent Emission Failure Threshold	> 1.80 % P0300				
			Misfire Percent Catalyst	>				

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>< 1,500 FTP rpm AND < 15 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>> 1,500 rpm AND > 20 % load AND < 180 counts on one cylinder</p>		
					Engine Speed	<p>400 < 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>	4 cycle delay	
					No active DTCs:	<p>TPS_FA EnginePowerLimited MAF_SensorTFTKO MAP_SensorTFTKO IAT_SensorTFTKO ECT_Sensor_Ckt_TFTKO 5VoltReferenceB_FA CrankSensor_TFTKO CrankSensor_FA CamLctnIntFA</p>	4 cycle delay	

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 AmbPresDfItStatus		
					P0315 & engine speed	> 1,000 rpm	4 cycle delay	
					Fuel Level Low	LowFuelConditionDiagnostic	500 cycle delay	
					Cam and Crank Sensors	in sync with each other	4 cycle delay	
					Misfire requests TCC unlock	Not honored because Transmission in hot mode or POPD intrusive diagnostic running	4 cycle delay	
					Fuel System Status	# Fuel Cut	4 cycle delay	
					Active FuelManagement	Transition in progress	0 cycle delay	
					Undetectable engine speed and engine load region	Undetectable region from Malfunction Criteria	4 cycle delay	
					Abusive Engine Over Speed	> 8,192 rpm	0 cycle delay	
					Below zero torque (except CARB approved 3000 rpm to redline triangle.)	< ZeroTorqueEngLoad or < ZeroTorqueAFM if AFM is active in Supporting Tables	4 cycle delay	
					Below zero torque: TPS Vehicle Speed	< 0.8 % (< 0.8% in AFM) > 30 mph (> 30 mph AFM)	4 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	> 95.00 %	7 cycle delay	
					After Fuel resumes on Automatic shift containing Fuel Cut		2 Cylinder delay	
					Delay if PTC engaged	Enabled	4 cycle delay	
					Delay if error in indices of buffered data is detected and delay is enabled	Delay Enabled	3 cycle delay	
					Delay if IMEP calculation	initializing on startup or running resets (expires before rpm enablement)	4 cycle delay	
					*****	*****	*****	
					This Feature not used on Gasoline engines			
					Combustion Mode	= InfrequentRegen value in Supporting Tables	0 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Driver cranks before Wait to Start lamp extinguishes Brake Torque ***** DRIVELINE RING FILTER After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early. Filter Driveline ring: Stop filter early: ABNORMAL ENGINE SPEED OSCILLATION: (checks each "misfire" candidate in 100 engine Cycle test to see if it looks like some disturbance like rough road (abnormal).) Used Off Idle, and while not shifting, TPS Engine Speed Veh Speed Auto Transmission individual candidate deemed abnormal if number of consecutive decelerating	IF TRUE > 199.99% Max Torque ***** > "Ring Filter" # of engine cycles after misfire in Supporting Tables > "Number of Normals" # of engine cycles after misfire in Supporting Tables tab > 3 % > 950 rpm > 3 mph not shifting	WaitToStart cycle delay 0 cycle delay *****	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>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 the 100 engine cycles.</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>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>Additionally, the crankshaft is checked aaain a small</p>	<p>Enabled</p> <p>Not Enabled</p> <p>Enabled</p> <p>1,000 < rpm < 3,000 > 5.0 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>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>3 Cylinders</p> <p>< Misfire_Jerk * SnapDecayAfterMisfire</p> <p>< Misfire_Jerk * SnapDecayAfterMisfire * RepetSnapDecayAdjst in Supporting Tables</p> <p>>0.60</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>*****</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 OR ABS = OR Traction = OR Vehicle Stability) =</p> <p>AND No Emission Neutral Default Action DTCs</p> <p>*****</p> <p>IF Rough Road Source = "FromABS"</p> <p>(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"</p> <p>TOSS dispersion</p>	<p>*****</p> <p>Disabled</p> <p>CeRRDR_e_None</p> <p>*****</p> <p>> WSSRoughRoadThres</p> <p>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</p> <p>active active active</p> <p>ABS Failed Vehicle Dynamics Control System Status</p> <p>*****</p> <p>>TOSSRoughRoadThres</p> <p>in supporting tables</p> <p>Transmission Output Shaft Angular Velocity Validity</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>	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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°.	<p>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.</p> <p>Set the DTC if the Difference between the sum of the reluctor wheel's teeth and 360 degrees is greater than:</p>	> 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 >200 mg/cylinder AND < 2,000 mg/cylinder > -40 deg's C = TRUE > -40 deg's C > 42 revs	First Order Lag Filters with Weight Coefficient = 0.0234 Updated each engine event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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>> 50 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 = 0.0100</p> <p>Updated each engine event</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 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><</p> <p>P0326_P0331_AbnormalNoise_Threshold (Supporting Table)</p> <p>OR</p> <p>Case 2: Engine <u>is</u> in AFM mode</p> <p><</p> <p>P0326_P0331_AbnormalNoise_Thresh_AFM (Supporting Table; Engine is 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>> 2,000 RPM (not in AFM mode) OR > 2,000 (in AFM mode)</p> <p>AND < 8,500 RPM</p> <p>> 300 mg/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>> 158 Revs</p>	<p>First Order Lag Filters with Weight Coefficient =</p> <p>0.0043</p> <p>Updated each engine event</p>	Type B, 2 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 > 400 RPM and < 8,500 RPM	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 > 400 RPM and < 8,500 RPM	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Knock Sensor (KS) Circuit Bank 2	P0330	<p>This diagnostic checks for an open in the knock sensor circuit Sensor 2/Bank 2. 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):</p> <p>> P0325_P0330_OpenCktThrshMin (20 kHz) AND < P0325_P0330_OpenCktThrshMax (20 kHz)</p> <p>Case 2 (Normal Noise Method):</p> <p>> 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>> 50 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 = 0.0100</p> <p>Updated each engine event</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>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 Suooorting 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_OpenMethod 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	This diagnostic checks for knock sensor performance out of the normal expected range, on a per sensor basis. This diagnostic is specifically designed to identify the fault condition where the knock sensor is properly attached electrically, but produces an Abnormally low output due to being unattached (or loosely attached) with the the mounting bolt (and thus unable to properly transfer the engine vibration energy from the engine block to the knock sensor). The term "Abnormal (engine) Noise" is used to define this diagnostic method. A fault condition is identified when a first-order lag filtered version of the Abnormal Noise signal falls below the diagnostic threshold. The failure thresholds can be the same for both sensors (in a 2 sensor application), or the failure thresholds can be unique to each sensor.	Individual Sensor Thresholds Enabled? Filtered FFT Intensity (where 'FFT Intensity' = Non-knocking, background engine noise) Filtered FFT Intensity	= 0, Use Case 1 and 2 Case 1: Engine <u>not</u> in AFM mode < P0326_P0331_Abnor malNoise_Threshold (Supporting Table) OR Case 2: Engine <u>is</u> in AFM mode < P0326_P0331_Abnor malNoise_Thresh_AF M (Supporting Table) Case 3: Engine not in AFM mode < P0331_AbnormalLo2 (Supporting Table) OR Case 4: Engine is in AFM mode < P0331_AbnormalLoA FM_2 (Supporting Table)	Diagnostic Enabled? Engine Run Time Engine Speed Engine Air Flow Engine Coolant Temperature or OBD Coolant Enable Criteria Inlet Air Temperature Individual Cylinders enabled for Abnormal Noise Cumulative Number of Engine Revs Above Min Eng Speed (per key cycle)	Yes > 2.0 seconds > 2,000 RPM (not in AFM mode) OR > 2,000 (in AFM mode) AND < 8,500 RPM > 300 mg/cylinder AND < 2,000 mg/cylinder > -40 deg's C = TRUE > -40 deg's C P0326_P0331-Abnormal NoiseCylsEnabled (Supporting Table) > 158 Revs	First Order Lag Filter with Weight Coefficient Case 1 & 2: Weight Coefficient = 0.0100 Updated each engine event Case 3 & 4: Weight Coefficient = 0.01 Updated each engine eventFirst	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 > 400 RPM and < 8,500 RPM	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 > 400 RPM and < 8,500 RPM	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP) SensorA 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 > 3.0 grams/second))	Continuous every 100 msec	Type B, 2 Trips
			No crankshaft pulses received	≥ 0.1 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 P0340 P0341	2 failures out of 10 samples One sample per engine revolution	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP) SensorA Performance	P0336	1. Fail counts will occur if the engine goes out of synchronization repeatedly over a period of time and will pass if the engine stays in synchronization. 2. Diagnostic will fail if synchronization gap is not found in a specified period of time and will pass if the synchronization gap is found. 3. Diagnostic will fail if the incorrect number of crank sensor teeth are detected in-between detecting the synchronization gap and will pass if the correct number of teeth are seen.	Time in which 10 or more crank re-synchronizations occur	< 10.0 seconds	Engine Air Flow Cam-based engine speed No DTC Active:	Test is Enabled ≥ 3.0 grams/second > 450 RPM P0335	Continuous every 250 msec	Type B, 2 Trips
			No crankshaft synchronization gap found	≥ 0.4 seconds	Engine is Running Starter is not engaged	Test is Enabled	Continuous every 12.5 msec	
			Time since starter engaged without detecting crankshaft synchronization gap	≥ 3.3 seconds	Starter engaged AND (cam pulses being received OR (MAF_SensorFA AND Engine Air Flow	Test is Enabled = FALSE > 3.0 grams/second))	Continuous every 100 msec	
			Crank pulses received in one engine revolution OR Crank pulses received in one engine revolution	< 1 pulses > 65,535 pulses	Engine is Running OR Starter is engaged No DTC Active:	Test is Enabled P0340 P0341	8 failures out of 10 samples One sample per engine revolution	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 > 3.0 grams/second))	Continuous every 100 msec	Type B, 2 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 24 MEDRES events (There are 24 MEDRES events per engine cycle) Test begins when MEDRES region AND accumulated number of MEDRES events	= region 6 >= 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 SensorA	P0341	Diagnostic will fail if an incorrect number of cam sensor pulses are detected over a number of engine cycles and will pass if the number of cam pulses is correct.	The number of camshaft pulses received during 24 MEDRES events is OR (There are 24 MEDRES events per engine cycle) Test begins when MEDRES region AND accumulated number of MEDRES events	< 4 pulses > 8 pulses = region 6 >= 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 B, 2 Trips
			The number of camshaft pulses received during 100 engine cycles OR	< 398 pulses > 402 pulses	Crankshaft is synchronized No DTC Active:	Test is Enabled CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #1 CIRCUIT	P0351	Diagnoses Cylinder #1 Ignition Control (E8T) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 30 kQ impedance between signal and controller ground	Engine running Ignition Voltage	> 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #2 CIRCUIT	P0352	Diagnoses Cylinder #2 Ignition Control (E8T) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 30 kQ impedance between signal and controller ground	Engine running Ignition Voltage	> 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #3 CIRCUIT	P0353	Diagnoses Cylinder #3 Ignition Control (E8T) 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 B, 2 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 (E8T) 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 B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #5 CIRCUIT	P0355	Diagnoses Cylinder #5 Ignition Control (E8T) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 30 kQ impedance between signal and controller ground	Engine running Ignition Voltage	>11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #6 CIRCUIT	P0356	Diagnoses Cylinder #6 Ignition Control (E8T) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 30 kQ impedance between signal and controller ground	Engine running Ignition Voltage	>11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #7 CIRCUIT	P0357	Diagnoses Cylinder #7 Ignition Control (E8T) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 30 kQ impedance between signal and controller ground	Engine running Ignition Voltage	>11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #8 CIRCUIT	P0358	Diagnoses Cylinder #8 Ignition Control (E8T) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	> 30 kQ impedance between signal and controller ground	Engine running Ignition Voltage	>11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Catalyst System Low Efficiency Bank 1	P0420	<p>NOTE: The information below applies to applications that use the Decel Catalyst Monitor Algorithm</p> <p>Oxygen Storage. The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and O₂ during lean A/F excursions to store the excess oxygen (Le. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H₂ to release this stored oxygen (I.e. Cerium Reduction). This is referred to as the Oxygen Storage Capacity, or OSC. CatMon's strategy is to "measure" the OSC of the catalyst through forced Rich (intrusive rich) and Lean (decel fuel cutoff) A/F excursions</p> <p>Normalized Ratio OSC Value Calculation Information and Definitions =</p> <ol style="list-style-type: none"> 1. Raw OSC Calculation = (post cat O₂ Resp time - pre cat O₂ Resp time) 2. BestFailing OSC value from a calibration 	<p>Normalized Ratio OSC Value</p> <p>The EWMA calculation uses a 0.16 coefficient.</p>	< 0.35	<p>Diagnostic is Enabled</p> <p>All enable criteria associated with P0420 can be found under P2270 - (O₂ Sensor Signal Stuck Lean Bank 1 Sensor 2)</p> <p>Rapid Step Response (RSR) feature will initiate multiple tests:</p> <p>If the difference between current EWMA value and the current OSC Normalized Ratio value is</p> <p>and the current OSC Normalized Ratio value is</p> <p>Maximum number of RSR tests to detect failure when RSR is enabled.</p> <p>MAF</p> <p>Predicted catalyst temperature</p> <p>Front O₂ Sensor or Front WRAF</p> <p>Rear O₂ Sensor</p> <p>General Enable Criteria</p> <p>In addition to the p-codes</p>	<p>>0.60</p> <p><0.10</p> <p>9</p> <p>> 3.00 g/s < 20.00 g/s</p> <p><900 ° C</p> <p>>740.00 mV or >1.10EQR</p> <p>>815.00 mV</p>	<p>1 test attempted per valid decel period</p> <p>Minimum of 1 test per trip</p> <p>Maximum of 3 tests per trip</p> <p>Frequency: Fueling Related : 12.5 ms</p> <p>OSC Measurements: 100 ms</p> <p>Temp Prediction: 12.5ms</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>table (based on temp and exhaust gas flow)</p> <p>3. WorstPassing OSC value (based on temp and exhaust gas flow)</p> <p>Normalized Ratio Calculation = (1-2) / (3-2)</p> <p>A Normalized Ratio of 1 essentially represents a good part and a ratio of 0 essentially represents a very bad part.</p> <p>Refer to the P0420_WorstPassingOSCTableBI and P0420_BestFailingOSCTableBI in Supporting Tables tab for details</p> <p>The Catalyst Monitoring Test is completed during a decel fuel cutoff event. This fuel cutoff event occurs following a rich intrusive fueling event initiated by the 02 Sensor Signal Stuck Lean Bank 1 Sensor 2 test(P2270). Several conditions must be met in order to execute this test.</p> <p>Additional conditions and their related values</p>			<p>listed under P2270, the following DTC's shall also not be set:</p> <p>For switching 02 sensors:</p> <p>For WRAF 02 sensors:</p>	<p>O2S_Bank_1_Sensor_1_FA 02S_Bank_1_Sensor_2_FA 02S_Bank_2_Sensor_1_FA 02S_Bank_2_Sensor_2_FA</p> <p>WRAF_Bank_1_FA WRAF_Bank_2_FA</p> <p>P0420_WorstPassingOSCTableBI</p> <p>P0420_BestFailingOSCTableBI</p>		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Catalyst System Low Efficiency Bank 2	P0430	<p>Note: The information below applies to applications that use the Decel Catalyst Monitor Algorithm</p> <p>Oxygen Storage. The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and O₂ during lean A/F excursions to store the excess oxygen (Le. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H₂ to release this stored oxygen (I.e. Cerium Reduction). This is referred to as the Oxygen Storage Capacity, or OSC. CatMon's strategy is to "measure" the OSC of the catalyst through forced Rich (intrusive rich) and Lean (decel fuel cutoff) A/F excursions</p> <p>Normalized Ratio OSC Value Calculation Information and Definitions =</p> <ol style="list-style-type: none"> 1. Raw OSC Calculation = (post cat O₂ Resp time - pre cat O₂ Resp time) 2. BestFailing OSC value from a calibration 	<p>Normalized Ratio OSC Value</p> <p>The EWMA calculation uses a 0.16 coefficient.</p>	< 0.35	<p>Diagnostic is Enabled</p> <p>All enable criteria associated with P0430 can be found under P2272 - (O₂ Sensor Signal Stuck Lean Bank 2 Sensor 2)</p> <p>Rapid Step Response (RSR) feature will initiate multiple tests:</p> <p>If the difference between current EWMA value and the current OSC Normalized Ratio value is</p> <p>and the current OSC Normalized Ratio value is</p> <p>Maximum number of RSR tests to detect failure when RSR is enabled.</p> <p>MAF</p> <p>Predicted catalyst temperature</p> <p>Front O₂ Sensor or Front WRAF</p> <p>Rear O₂ Sensor</p> <p>General Enable Criteria</p> <p>In addition to the p-codes</p>	<p>>0.60</p> <p><0.10</p> <p>9</p> <p>> 3.00 g/s < 20.00 g/s</p> <p><900 °C</p> <p>>740.00 mV or >1.10EQR</p> <p>> 815.00 mV</p>	<p>1 test attempted per valid decel period</p> <p>Minimum of 1 test per trip</p> <p>Maximum of 3 tests per trip</p> <p>Frequency: Fueling Related : 12.5 ms</p> <p>OSC Measurements: 100 ms</p> <p>Temp Prediction: 12.5ms</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>table (based on temp and exhaust gas flow)</p> <p>3. WorstPassing OSC value (based on temp and exhaust gas flow)</p> <p>Normalized Ratio Calculation = (1-2) / (3-2)</p> <p>A Normalized Ratio of 1 essentially represents a good part and a ratio of 0 essentially represents a very bad part.</p> <p>Refer to the P0430_WorstPassingOSCTableB2 and P0430_BestFailingOSCTableB2 in Supporting Tables tab for details</p> <p>The Catalyst Monitoring Test is completed during a decel fuel cutoff event. This fuel cutoff event occurs following a rich intrusive fueling event initiated by the O2 Sensor Signal Stuck Lean Bank 2 Sensor 2 test(P2272). Several conditions must be met in order to execute this test.</p> <p>Additional conditions and their related values</p>			<p>listed under P2272, the following DTC's shall also not be set:</p> <p>For switching O2 sensors:</p> <p>For WRAF O2 sensors:</p>	<p>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>WRAF_Bank_1_FA WRAF_Bank_2_FA</p> <p>P0430_WorstPassingOSCTableB2</p> <p>P0430_BestFailingOSCTableB2</p>		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission (EVAP) System Small Leak Detected (No ELCP - Conventional EVAP Diagnostic - with EAT using OAT Sensor - with Fuel Tank Zome Module (FTZM))	P0442	This DTC will detect a small leak (> 0.020") in the EVAP system between the fuel fill cap and the purge solenoid. On some applications a small leak is defined as > 0.025", 0.030", or 0.150". The engine off natural vacuum method (EONV) is used. EONV is an evaporative system leak detection diagnostic that runs when the vehicle is shut off when enable conditions are met. Prior to sealing the system and performing the diagnostic, the fuel volatility is analyzed. In an open system (Canister Vent Solenoid [CVS] open) high volatility fuel creates enough flow to generate a measurable pressure differential relative to atmospheric. After the volatility check, the vent solenoid will close. After the vent is closed, typically a build up of pressure from the hot soak begins (phase-1). The pressure typically will peak and then begin to decrease as the fuel cools. When	The total delta from peak pressure to peak vacuum during the test is normalized against a calibration pressure threshold table that is based upon fuel level and ambient temperature. (Please see P0442 EONV Pressure Threshold (Pascals) in Supporting Tables). The normalized value is calculated by the following equation: 1 - (peak pressure - peak vacuum) / pressure threshold. The normalized value is entered into EWMA (with 0= perfect pass and 1= perfect fail). When EWMA is the DTC light is illuminated. The EWMA calculation uses a 0.13 weighting coefficient. The DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 3 additional consecutive trips.	< 0.35 (EWMA Re-Pass Threshold) > 0.55 (EWMA Fail Threshold),	Diagnostic is Enabled Fuel Level Drive Time Drive length (ECT OR OBD Coolant Enable Criteria Baro Distance since assembly plant Engine not run time before key off must be Time since last complete test if normalized result and EWMA is passing OR Time since last complete test if normalized result or EWMA is failing Estimated Ambient Temperature (EAT) using OAT sensor at end of drive Conditions for Estimated	10 % < Percent < 90 % > 900 seconds > 9.7 miles > 63 °C = TRUE) > 70 kPa > 10.0 miles < refer to P0442 Engine Off Time Before Vehicle Off Maximum as a Function of Estimated Ambient Temperature in Supporting Tables. > 8 hours > 8 hours 0 °C<Temperature<35 °C	Once per trip, during hot soak (up to 2,400 sec.). No more than 2 unsuccessful attempts between completed tests.	Type A, 1 Trips EWMA Average run length is 8 to 12 trips under normal conditions Run length is 3 to 6 trips after code clear or non-volatile reset

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.			Ambient Temperature Using OAT Sensor to be Valid ***** 1. Startup OAT is less than previous trip EAT OR 2. Startup ECT - previous trip EAT OR 3. Engine off time OR 4. At startup, time since previous EAT valid and able to learn OR 5. EAT - current OAT OR 6. EAT < current OAT and speed timer and current OAT - EAT Speed timer increments at 100 msec rate and increments vary based on vehicle speed as follows: vehicle speed < 10mph 10 mph<speed< 35 mph 35mph<speed<124 124mph<speed< 124 Speed timer can never be less than 0 seconds *****	***** <0 °C > 9,000 seconds < 3,600 seconds 0 °C < difference < 2 °C > 240 seconds < 2 °C -0.2 seconds 0.10 seconds 0.20 seconds 0.20 seconds *****		
					1. High Fuel Volatility			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>During the volatility phase, pressure in the fuel tank is integrated vs. volatility time. If the integrated pressure is then test aborts and unsuccessful attempts is incremented. This value equates to an average integrated fuel tank pressure > 1,245 Pa. Please see P0442 Volatility Time as a Function of Estimate of Ambient Temperature in Supporting Tables.</p> <p>OR</p> <p>2. Vacuum Refueling Detected</p> <p>See P0454 Fault Code for information on vacuum refueling algorithm.</p> <p>OR</p> <p>3. Fuel Level Refueling Detected</p> <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</p>	< -5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>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> <p>No Active DTCs TFTKO</p>	<p>0.50 seconds</p> <p>MAF_SensorFA ECT_Sensor_FA IAT_SensorFA VehicleSpeedSensor_FA ModuleOffTime_FA AmbientAirDefault FuelLevelDataFault</p> <p>P0443 P0446 P0449 P0452 P0453 P0455</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						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))	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 90 seconds</p> <p>> 1,245 Pa 90 seconds</p> <p>> 3,487 Pa 5 seconds >20 liters</p>	<p>Diagnostic is Enabled</p> <p>Fuel Level System Voltage Startup IAT Startup ECT BARO</p> <p>No active DTCs:</p> <p>No Active DTCs TFTKO</p>	<p>10 % < Percent < 90 % > 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 P130F U18A2</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.
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</p> <p>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</p> <p>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		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>Type A, 1 Trips</p> <p>EWMA</p> <p>Average run length: 6</p> <p>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. 1) Each time the EONV test completes, the (Y) sample counter is incremented. 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 in 12.5 msec. A refueling event is confirmed if the fuel level has a persistent change of for 30 seconds during a 600 second refueling rationality test.</p>	<p>> 112 Pa < 249 Pa >10 %</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>>90 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 DTCs 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 >2.50%</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 1,300 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 controllers P0443 may also set (Canister Purge Solenoid Open Circuit)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 a single fuel tank)	P0461	This DTC will detect a primary fuel tank level sensor stuck in-range.	a) Sensed fuel volume change is b) while engine fuel consumption is	a) < 6 liters b) > 48.61 liters	1. Diagnostic Enabled 2. Engine Operational State	1. == True 2. == Running	250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 enabled status b) Fuel Level Sensor Initialized status c) Fuel Level Sensor Data Available Status d) Communication faults status	a) — True b) == True c) == True d) <> True	40 failures out of 50 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 enabled status b) Fuel Level Sensor Initialized status c) Fuel Level Sensor Data Available Status d) Communication faults status	a) — True b) == True c) == True d) <> True	40 failures out of 50 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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>	<p>> 10 % > 10 %</p>	<p>This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes</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>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.
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 DTCs 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 > 10 sec > 90.00 pct < 16.00 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	Off-vehicle device control (service bay control) must not be active. following conditions not TRUE: (VeTESR_e_EngSpdReqI ntvType = CeTESR_e_EngSpdMinLi mitAND VeTESR_e_EngSpdReqR espType = CeTESR_e_NoSuggestio n) Clutch is not depressed TC_BoostPresSnsrFA 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 FuelLevelDataFault LowFuelConditionDiagnos tic Clutch Sensor FA AmbPresDfItdStatus		

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 > 10 sec The diagnostic does not run during autostop as engine is shutdown during that time (occurs in a hybrid or 12v start stop vehicle)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 > 90.00 pct < 16.00 pct PTC not active Transfer Case not in 4WD LowState Off-vehicle device control (service bay control) must not be active.	Diagnostic runs in every 12.5 ms loop Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No active DTCs	<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 FuelTrimSystemB1_FA FuelTrimSystemB2_FA FuelInjectorCircuit_FA MAF_SensorFA EngineMisfireDetected_FA IgnitionOutputDriver_FA TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA FuelLevelDataFaultLow FuelConditionDiagnostic Clutch SensorFA AmbPresDfltStatus P2771</p>		
					All of the above met	> 10 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 SCDAND >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 > 6.00 degC <= 66.00 degC >= 72.00 KPa < 1.00</p> <p>>= 550.00 RPM <= 2,000.00 RPM</p> <p><= 1.00 Pct</p> <p>< 100 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 >= 800.00 degC >= 1.00 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		

24OBDG06A HD Part 2 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	> 2,350.00 RPM > 3.00 Pct >= 100 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		

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_F A AcceleratorPedalFailure ECT_Sensor_FA IAT_SensorCircuitFA MnfdTempSensorCktFA CrankSensor_FA FuelInjectorCircuit_FA MAF_SensorFA MAP_SensorFA AnyCamPhaser_TFTKO ClutchPstnSnsr FA IAC_SystemRPM_FA IgnitionOutputDriver_FA TPS_FA VehicleSpeedSensor_FA FuelInjectorCircuit 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.
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 + 180.0 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 < (</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 > 8,000 RPM for longer than 30.0 seconds)</p> <p>Filtered Engine Speed within range</p> <p>Sensed 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>>30.0 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 < Sensed Oil Temperature < 120.0 degC</p> <p>Time since state change > 0.50 s</p> <p>Fault bundles: MAF_SensorFA 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 + 180.0 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 + 180.0 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 > 8,000 RPM for longer than 30.0 seconds) Filtered Engine Speed within range	TRUE Enabled Test not report a fail state Yes >30.0 seconds >70.0 kPa FALSE 1,000 RPM < Filtered Engine Speed < 4,500 RPM	> 40 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.
			<u>To pass when previously failing:</u> Filtered Engine Oil Pressure above low threshold plus an offset OR Filtered Engine Oil Pressure below high threshold minus an offset	Filtered Oil Pressure > (P0521_P06DD_P06DE_OP_LoStatePressure * 1.00 - 133.0 kPa + 10.0 kPa) OR Filtered Oil Pressure < (P0521_P06DD_P06DE_OP_LoStatePressure * 1.00 + 180.0 kPa - 10.0 kPa) (Details on Supporting Tables Tab: P0521_P06DD_P06DE_OP_LoStatePressure)	Sensed Oil Temperature within range Pump state change complete No active DTC's	40.0 deg C < Sensed Oil Temperature < 120.0 degC Time since state change > 0.50 s Time since state change > Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA CrankSensor_FA	> 10passes out of 50 samples. Performed every 100 msec	
			Two Stage Oil Pump EOP Sensor Test with Engine Off If enabled: <u>To Fail when previously passing with the engine off:</u> Filtered Engine Oil Pressure greater than threshold	Filtered Oil Pressure > 40.0 kPa	Two Stage Oil Pump is Present = TRUE Engine Off Rationality Test Diagnostic Status Engine Running Rationality Test Diagnostic Status Modelled Oil Temperature No Engine Movement No active DTC's	TRUE Enabled Test not report a fail state > 40.0 deg C > 10.0 seconds EngineModeNotRunTimer_FA EngOilTempFA	> 20 errors out of 40 samples. Run once per trip	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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, 1 Trip No MIL Emissions Neutral

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, 1 Trip No MIL Emissions Neutral

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.	<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	fail continuously for greater than 0.50 seconds	<p>Type C, 1 Trip No MIL Emissio ns Neutral , "Emissio ns Neutral Diagnost ics - 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 Resume Circuit Legacy	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.	fail continuously in the applied state for greater than 89.000 seconds	<p>Diagnostic is enabled.</p> <p>CAN cruise switch diagnostic enable in ECM</p>	1.00	fail continuously for greater than 89.00 seconds	<p>Type C, 1 Trip No MIL Emissions Neutral , "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 Set Circuit Legacy	P0568	<p>Detects a failure of the cruise set switch in a continously applied state</p> <p>"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."</p>	Cruise Control Set switch remains applied for greater than a calibratable period of time.	fail continuously in the applied state for greater than 89.000 seconds	<p>Diagnostic is enabled.</p> <p>CAN cruise switch diagnostic enable in ECM</p>	1.00	fail continuously for greater than 89.00 seconds	<p>Type C, 1 Trip No MIL Emissions Neutral , "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 Brake Switch Circuit 1 Low Voltage	P0572	Determines if brake pedal initial travel indication received from the BCM is valid "Emissions Neutral Default Action : When the ECM determines that the brake pedal initial travel indication received from the BCM in the associated frame is TRUE and the discrete electrical switch connected to the ECM indicates FALSE for longer than a duration, ECM sets the code and cruise control will be disengaged until the diagnostic passes.	If x of y samples are observed where serial data indicated value is TRUE and discrete electrical value is FALSE, default brake pedal initial travel set to true	0.50	Diagnostic is enabled. Cruise Control Brake Switch Circuit 1 Low Voltage Diagnostic Enable Serial communication to BCM Engine RPM higher than Engine RPM lower than	1.00 No loss of communication 400.00 8,191.88	4.00 Z5.00 counts	Type C, 1 Trip No MIL Emissio ns Neutral , "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.
Cruise Control Brake Switch Circuit 1 High Voltage	P0573	Determines if brake pedal initial travel indication received from the BCM is valid. "Emissions Neutral Default Action : When the ECM determines that the brake pedal initial travel indication received from the BCM in the associated frame is FALSE and the discrete electrical switch connected to the ECM indicates TRUE for longer than a duration, ECM sets the code and cruise control will be disengaged until the diagnostic passes.	If x of y samples are observed where serial data indicated value is FALSE and discrete electrical value indicates TRUE, default brake pedal initial travel set to true	0.50	Diagnostic is enabled. Cruise Control Brake Switch Circuit 1 High Voltage Diagnostic Enable Serial communication to BCM Engine RPM higher than Engine RPM lower than	1.00 No loss of communication 400.00 8,191.88	4.00 Z5.00 counts	Type C, 1 Trip No MIL Emissions Neutral , "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 associated cruise switch frame, the 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 OR Message fails authentication Message rolling 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), or Message Authentication (MAC) 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 15.00 sample counts CrsCntrlSwStatP rotVal: 6.00 fail counts out of 15.00 sample counts CrsSecSwStatA RC: 6.00 fail counts out of 0.00 sample counts CrsSecSwStatPV al : 6.00 fail counts out of 0.00 sample counts CrsSpdLmtrSwSt atARC: 6.00 fail counts out of 0.00 sample counts CrsSpdLmtrSwSt atPVal: 6.00 fail counts out of 15.00 sample counts	Type C, 1 Trip No MIL Emissio ns Neutral , "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.

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_FastTestPointWeight P057B as a function of calculated brake pedal position delta EWMA value is > 0.80	calculated brake pedal position delta sample counter > 50.00 for fast test OR calculated brake pedal position delta sample counter > 1,000.00 for slow test	calculated brake pedal position delta > 2.63 OR (for slow test) shift lever has been in park once this key cycle vehicle speed >= 5.00 accelerator pedal position < 5.00	total number of EWMA tests > 20.00	
			Calculated EWMA Value must be less than calibratable threshold after calibratable number of tests have completed to report a "test failed" for P057B. This test runs once per key cycle	EWMA value looked up in supporting table P057B KtBRKI_K_CmpltTestPointweight P057B as a function of calculated brake pedal position delta EWMA value is less than 0.40	no DTC's active (P057C, P057D)	shift lever has been in park once this key cycle vehicle speed >= 5.00 accelerator pedal position < 5.00	total number of EWMA tests > 2.00	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 and set DTC.	5.00	Diagnostic is enabled. Brake Pedal Position Sensor Low Voltage Diagnostic Enable	1.00	20.00 / 32.00 counts	MIL: Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	25.00	Diagnostic is enabled. Brake Pedal Position Sensor Circuit Intermittent / Erratic Diagnostic Enable	1.00	5.00/ 20.00 counts	MIL: Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 a mismatch between the data and dual data is found during RAM updates. Detects a mismatch in data and dual data updates >	0.47322 s			When dual store updates occur.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Indicates that the primary processor detects an illegal write attempt to protected RAM. Number of illegal writes are >	0 counts			Diagnostic runs continuously (background loop)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	0.450 seconds	Type A, 1 Trips
			MAIN processor receives seed in wrong order			always running	3 / 18 counts intermittent. 50 ms/count in the ECM main processor	
			2 fails in a row in the MAIN processor's ALU check			Test is Enabled: 1 (If 0, this test is disabled)	25 ms	
			2 fails in a row in the MAIN processor's configuration register masks versus known good data			Test is Enabled: 1 (If 0, this test is disabled)	12.5 to 25 ms	
			Checks number of stack over/under flow since last powerup reset >=	3.00		Test is Enabled: 1 (If 0, this test is disabled)	variable, depends on length of time to corrupt stack	
			Voltage deviation >	0.4950		Test is Enabled: 1 (If 0, this test is disabled)	5 / 10 counts or 0.150 seconds continuous; 50 ms/count in the ECM main processor	
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error 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: 1 (If 0, this test is disabled)	Fail Table, f(Loop Time). See supporting tables: P0606.PSW Sequence Fail f (Loop Time) / Sample Table, f (Loop Time)See supporting tables: P0606_PSW Sequence Sample f(Loop Time) counts 50 ms/count in the ECM main processor.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			MAIN processor determines a seed has not changed within a specified time period within the 50ms task.	Previous seed value equals current seed value.		KePISD_b_SeedUpdKey StorFltEnbl == 1 Value of KePISD_b_SeedUpdKey StorFltEnbl is: 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 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 RAM variable, depends on length of time to write flash to RAM	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 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	-144.70 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	144.70 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	144.70 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	100.27 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 428 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 > 560 rpm	Up/down timer 461 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 1,541.00 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 1,541.00 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	144.70 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.
			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 < 7,900.00 or 8,000.00 rpm (hysteresis pair)	Up/down timer 161 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	3 cylinders		Engine run flag = TRUE > 2.00 s Number of cylinder events since engine run > 24 No fuel injector faults active	Up/down timer 461 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) + 144.70	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	143.70 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	143.70 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	144.70 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	
			OR					
			Positive Torque Offset is less than its redundant calculation minus threshold					
			Commanded Predicted Engine Request is greater than its redundant calculation plus threshold	144.70 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, down time multiplier 0.5	

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 175 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. 144.70 Nm 2. 144.70 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	144.70 Nm			Up/down timer 175 ms continuous, 0.5 down time multiplier	
			Engine Capacity Minimum Engine Off is greater than threshold	0 Nm			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	144.70 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 161 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 161 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) + 144.70 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) + 144.70 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	1,541.00 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	1,541.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 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.
			Commanded Immediate Request is greater than its redundant calculation plus threshold OR Commanded Immediate Request is less than its redundant calculation minus threshold	1,541.00 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	57.80 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	143.70 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	
			Engine min capacity above threshold	144.70 Nm	Ignition State	Accessory, run or crank	Up/down timer 68 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 428 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 95 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 161 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 229 ms continuous, 0.5 down time multiplier	
			Desired throttle position greater than redundant calculation plus threshold	7.77 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	144.70 Nm	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 144.70 Nm Low Threshold -144.70 Nm	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 0.0001514 Low Threshold -0.0001514	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.
			Difference of base friction torque and its redundant calculation is out of bounds given by threshold range	High Threshold 144.70 Nm Low Threshold -144.70 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	
			Accessory drive friction torque is out of bounds given by threshold range	High Threshold 144.70 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	High Threshold	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.
			greater than commanded by AC control software or less than threshold limit	60.00 Nm Low Threshold 0.00 Nm			475 ms continuous, 0.5 down time multiplier	
			Difference of Oil temperature delta friction torque and its redundant calculation is out of bounds given by threshold range	High Threshold 144.70 Nm Low Threshold -144.70 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.
			Generator friction torque is out of bounds given by threshold range	High Threshold 144.70 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 calculation greater than threshold	144.70 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 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 144.70 Nm Low Threshold -144.70 Nm Rate of change threshold		Engine speed >0rpm MAF, MAP and Baro DTCs are false	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.
				9.04 Nm/loop				
			Torque error compensation is out of bounds given by threshold range	High Threshold 144.70 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	
			Delta Torque Baro compensation is out of bounds given by threshold range	High Threshold 13.14 Nm Low Threshold -19.80 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. 143.70 Nm 2. N/A 3. 143.70 Nm 4. 143.70 Nm	3. & 4.: Ignition State	1. & 2.: Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 144.70 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	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	
			Absolute difference of the	Table. ffDesired		Enoine soeed >0rom	Uo/down timer	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			calculated Intake Manifold Pressure during engine event versus during time event is greater than threshold	Engine Torque). See supporting tables: P060C_Delta MAP Threshold f(Desired Engine Torque)			161 ms continuous, 0.5 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	1,541.00 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) + 144.70 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	N/A		AFM not changing from	Up/down timer	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Engine Torque and its dual store are not equal			Active to Inactive and preload torque not changing and one loop after React command Engine speed >0rpm	2,048 ms continuous, 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 161 ms continuous, 0.5 down time multiplier	
			Difference of commanded spark advance and adjusted delivered is out of bounds aiven bv	15.00 degrees		Engine speed >0rpm	Up/down timer 428 ms continuous, 0.5	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			threshold range				down time multiplier	
			Absolute difference between Estimated Engine Torque and its dual store are above a threshold	144.70 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	144.70 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) > 144.70 Nm	Up/down timer 461 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	145 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 > 560 rpm	Up/down timer 461 ms continuous, 0.5 down time multiplier	
			Rate limited cruise axle torque request and its dual store do not match within a threshold	57.80 Nm	Ignition State	Accessory, run or crank	Up/down timer 163 ms continuous, 0.5 down time	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							multiplier	
			1. Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions and its redundant calculation is out of bounds given by threshold range OR 2. Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions and its dual store do not equal OR 3. Absolute difference of Calculated accelerator pedal position and its dual store do not equal	1. 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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Commanded axle torque is greater than its redundant calculation by threshold	1,541.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	
			Commanded axle torque is less than its redundant calculation by threshold	2,311.50 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	60.00 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 161 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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Absolute difference of maximum throttle area and its redundant calculation is greater than a threshold	15 mm2			Up/down timer 95 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	0.9 144.70 Nm	Ignition State	Accessory, run or crank	Up/down timer 175.00 ms continuous, 0.5 down time multiplier	
			Difference between Cruise Arbitration Request and its redundant calculation exceeds a threshold	57.79 Nm	Ignition State	Accessory, run or crank	Up/down timer 500.00 ms continuous, 0.5	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			-OR- Difference between Cruise Acceleration Request and its redundant calculation exceeds a threshold	0.05 KPH/Second			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	1,541.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,047.97 ms continuous, 0.5 down time multiplier	
			2,311.50 Nm					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Relay Control Circuit Open	P0627	Controller specific output driver circuit diagnoses the Feed Fuel Pump Relay high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	≥ 200 KOhms impedance between signal and controller ground.	Run/Crank Voltage	Voltage 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type A, 1 Trips Note: In certain controllers P0629 may also set (Fuel Pump Relay Control Short to Power)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Relay Control Circuit Low Voltage	P0628	Controller specific output driver circuit diagnoses the Feed Fuel Pump Relay high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	<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	Run/Crank Voltage	Voltage 11.00 volts	<p>8 failures out of 10 samples</p> <p>250 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.
Fuel Pump Relay Control Circuit High Voltage	P0629	Controller specific output driver circuit diagnoses the Feed Fuel Pump Relay high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	<p>Voltage measurement outside of controller specific acceptable range during driver off 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	Run/Crank Voltage	Voltage 11.00 volts	<p>8 failures out of 10 samples</p> <p>250 ms / sample</p>	<p>Type A, 1 Trips</p> <p>Note: In certain controlle rs P0627 may also set (Fuel Pump Relay Control Open Circuit)</p>

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 OR Internal ECU Boost Voltage OR Driver Status OR Driver Status	>= 90 Volts <= 40 Volts = Not Ready = Uninitialized	Battery Voltage	>= 8 or >= 11 Enabled when a code clear is not active or not exiting device control Engine is not cranking Powertrain Relay Voltage within range	High Voltage - 160 failures out of 200 samples Low Voltage - 160 failures out of 200 samples Driver Status Not Ready - 160 failures out of 200 samples Driver Status Uninitialized - Uninitialized state for >= 100 counts All at 12.5ms per sample	Type A, 1 Trips

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

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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

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 ms continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Malfunction Indicator Lamp (MIL) Control Circuit (ODM) Open	P0650	Detects an inoperative malfunction indicator lamp control low side driver circuit. This diagnostic reports the DTC when an open circuit is detected.	Voltage low during driver off state (indicates open circuit)	Open circuit: > 200 K Ω impedance between signal and controller ground	Run/Crank Voltage Remote Vehicle Start is not active	Voltage >11.00 volts	1 failures out of 1 samples 50 ms / sample	Type B, No MIL NO MIL Note: In certain controlle rs P263A may also set (MIL Control Short to Ground)

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 ms continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.	<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 0 ohms impedance between output and controller ground	<p>Powertrain relay Open circuit diagnostic 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>	<p>Type B, 2 Trips</p> <p>Note: In certain controlle rs P0686 may also set (Powertr ain Relay Control Short to Ground).</p>

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.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	Short to power: < 0.5 Q impedance between output and controller power	Powertrain relay Low Side driver short to power diagnostic enable = TRUE Run/Crank Voltage	1.00 Voltage >11.00 volts	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips

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

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 ms continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 ms continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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_OpenT estCktThrshMin AND < P06B6_P06B7_OpenT estCktThrshMax 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 < 4,000 RPM > 200 Revs > 50 mg/cylinder and < 2,000 mg/cylinder	First Order Lag Filter with Weight Coefficient Weight Coefficient = 0.0100 Updated each engine event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 < 4,000 RPM > 200 Revs > 50 mg/cylinder and < 2,000 mg/cylinder	First Order Lag Filter with Weight Coefficient Case 1 Weight Coefficient = 0.0100 Updated each engine event Case 2 Weight Coefficient = 0.0100 Updated each engine event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.	<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 impedance between output and controller ground	<p>Powertrain Relay Voltage</p> <p>Run/Crank Active</p> <p>Cranking State</p>	<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 P06DB may also set (Engine Oil Pressure Control Circuit Short To Ground)</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 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 0 impedance between output and controller ground	<p>Powertrain Relay Voltage</p> <p>Run/Crank Active</p> <p>Cranking State</p>	<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 controlle rs 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.	<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	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 - One Sided	P06DD	<p>Diagnoses the two stage oil pump is stuck. This diagnostic includes an intrusive test and a passive test.</p> <p>Intrusive test:</p> <p>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.</p> <p>Passive test:</p> <p>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.</p>	<p><u>Fail from 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 above 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_S tateChangeMin</p> <p>AND</p> <p>Filtered Oil Pressure > P06DD_P06DE_MinOi IPressThresh</p> <p>(see P06DD details on Supporting Tables Tab P06DD_P06DE_OP_S tateChangeMin P06DD_P06DE_MinOi IPressThresh)</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 > 8,000 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 = Enabled</p>	<p>TRUE</p> <p>> 30.0 seconds</p> <p>>70.0 kPa</p> <p>FALSE</p> <p>Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA CrankSensor_FA EngOilPressureSensorCkt FA AmbientAirDefault EngOilTempFA</p> <p>Enabled : OilPmpTFTKO</p> <p>Enabled Fault bundles for control disable : OilPmpTFTKO EngineTorqueEstlnaccura te EngOilPressureSensorFA PowertrainRelayFault CrankSensor_FA EngOilTempFA</p> <p>Enabled</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.
					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	> 1.5 seconds 40.0 deg 0 < Oil Temp < 110.0 degC 1,000 RPM < Filtered Engine Speed < 3,300 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) ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds] < 50 RPM 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	84.0 kPa < ABS[P0521_P06DD_P06DE_ OP_HiStatePressure - P0521_P06DD_P06DE_ OP_LoStatePressure] < 200.0 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 1.00 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	Oil Pressure delta = ABS [Filtered Oil Pressure at beginning	<u>Common Criteria:</u> Two Stage Oil Pump is Present	TRUE	0 errors out of 5 samples. Run once per trip	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			change and the measured filtered oil pressure is above a threshold	<p>of state change - filtered oil pressure after 1.5 seconds]</p> <p>Oil Pressure delta < P06DD_P06DE_OP_S tateChangeMin</p> <p>AND</p> <p>Filtered Oil Pressure > P06DD_P06DE_MinOi IPressThresh</p> <p>(see P06DD details on Supporting Tables Tab P06DD_P06DE_OP_S tateChangeMin P06DD_P06DE_MinOi IPressThresh)</p>	<p>Engine Running</p> <p>Ambient Air Pressure</p> <p>Oil Aeration (= TRUE if engine speed > 8,000 RPM for longer than 30.0 seconds)</p> <p>No active DTC's for diagnsotic 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 = Enabled</p> <p>Oil Pump in Low State</p> <p>Modelled Oil Temperature within range</p>	<p>> 30.0 seconds</p> <p>>70.0 kPa</p> <p>FALSE</p> <p>Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA CrankSensor_FA EngOilPressureSensorCkt FA AmbientAirDefault EngOilTempFA</p> <p>Enabled : OilPmpTFTKO</p> <p>Enabled Fault bundles for control disable :</p> <p>OilPmpTFTKO EngineTorqueEstlnaccura te EngOilPressureSensorFA PowertrainRelayFault CrankSensor_FA EngOilTempFA</p> <p>Enabled</p> <p>> 1.5 seconds</p> <p>40.0 deg C < Oil Temp < 110.0 degC</p>	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.
					<p>Filtered Engine Speed within range</p> <p>Engine Torque within range</p> <p>Expected Oil Pressure Delta within range</p> <p>Delta Filtered Engine Speed within a range</p> <p>Filtered Oil Pressure within range</p>	<p>1,000 RPM < Filtered Engine Speed < 3,300 RPM</p> <p>P06DD_P06DE_MinEnableTorque_OP < Indicated Requested Engine Torque < P06DD_P06DE_MaxEnableTorque_OP</p> <p>(see P06DD details on Supporting Tables Tab P06DD_P06DE_MinEnableTorque_OP P06DD_P06DE_MaxEnableTorque_OP)</p> <p>84.0 kPa <ABS[P0521_P06DD_P06DE_OP_HiStatePressure - P0521_P06DD_P06DE_OP_LoStatePressure] < 200.0 kPa</p> <p>ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds] < 50 RPM</p> <p>Filtered Engine Oil Pressure > P06DD_P06DE_MinOilPressureThresh</p> <p>(see P06DD details on Supporting Tables Tab P06DD_P06DE_MinOilPressureThresh)</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.
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>> 251 Nm for engine torque based traction torque system, OR > 4,000 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>	<p>Type C, 1 Trip</p> <p>No MIL 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.
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 Pump Driver Control Module System Voltage Performance (Only on applications that use an FTZM)	P1002	Detects low system voltage performance of the fuel pump driver control module system. This diagnostic reports the DTC when the absolute value of the difference between the fuel pump driver battery voltage and the fuel pump driver run/crank voltage exceeds a calibrated value.	Fuel Pump Driver Control Module Run Crank voltage low and high	ABS (Fuel Pump Driver Control Module Battery voltage - Fuel Pump Driver Control Module Run Crank voltage) > 3.00	Fuel Tank Zone Module (FTZM) is present on vehicle Fuel Pump Driver Control Module System Voltage Performance diagnostic is enabled Fuel Tank Zone Module (FTZM) serial messages are available FTZM Run Crank Active is TRUE Starter motor not engaged Sensor Bus relay is commanded ON Sensor Bus Relay FA = False	= 1 SensorBusRelayFA	50 failures out of 63 samples 12.5 ms /sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 Ignition Switch Run/Start Position Circuit High (Only on applications that use an FTZM)	P1007	Detects high voltage of the fuel pump driver control module ignition switch circuit. This diagnostic reports the DTC when the fuel pump driver control module ignition switch circuit voltage exceeds a calibrated value.	Fuel Pump Driver Control Module Ignition switch Run/Start position circuit high	FTZM Run Crank Active is TRUE	Fuel Tank Zone Module (FTZM) is present on vehicle Fuel Pump Driver Control Module Ignition Switch Run/Start Position Circuit High diagnostic is enabled Fuel Tank Zone Module (FTZM) serial messages are available Run Crank Active Sensor Bus relay is commanded ON Sensor Bus Relay FA = False	= 1 = FALSE SensorBusRelayFA	40 failures out of 50 samples 50 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.
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]. 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.
		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.
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]. 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.
Cylinder 1 Injection Pulse Performance	P10A3	Diagnostic to determine if injection pulse total compensation for cylinder 1 is less than the minimum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	< P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) FULR_b_FPV_MeasDiag _TFTKO Uncompensated Injection Pulse Width (Injection is commanded)	= True = True > 0	50.00 to 100.00 samples Continuous Cylinder event sample rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) FULR_b_FPV_MeasDiag _TFTKO Uncompensated Injection Pulse Width (Injection is commanded)	= True = True > 0	50.00 to 100.00 samples Continuous Cylinder event sample rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	> 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 3 Injection Pulse Performance	P10A7	Diagnostic to determine if injection pulse total compensation for cylinder 3 is less than the minimum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	< P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) FULR_b_FPV_MeasDiag _TFTKO Uncompensated Injection Pulse Width (Injection is commanded)	= True = True > 0	50.00 to 100.00 samples Continuous Cylinder event sample rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	> 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 4 Injection Pulse Performance	P10A9	Diagnostic to determine if injection pulse total compensation for cylinder 4 is less than the minimum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	< P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) FULR_b_FPV_MeasDiag _TFTKO Uncompensated Injection Pulse Width (Injection is commanded)	= True = True > 0	50.00 to 100.00 samples Continuous Cylinder event sample rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	> 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 5 Injection Pulse Performance	P10AB	Diagnostic to determine if injection pulse total compensation for cylinder 5 is less than the minimum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	< P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) FULR_b_FPV_MeasDiag _TFTKO Uncompensated Injection Pulse Width (Injection is commanded)	= True = True > 0	50.00 to 100.00 samples Continuous Cylinder event sample rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 5 Injection Pulse Performance	P10AC	Diagnostic to determine if injection pulse total compensation for cylinder 5 is greater than the maximum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	> 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 6 Injection Pulse Performance	P10AD	Diagnostic to determine if injection pulse total compensation for cylinder 6 is less than the minimum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	< P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) FULR_b_FPV_MeasDiag_TFTKO Uncompensated Injection Pulse Width (Injection is commanded)	= True = True > 0	50.00 to 100.00 samples Continuous Cylinder event sample rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 6 Injection Pulse Performance	P10AE	Diagnostic to determine if injection pulse total compensation for cylinder 6 is greater than the maximum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	> 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 7 Injection Pulse Performance	P10AF	Diagnostic to determine if injection pulse total compensation for cylinder 7 is less than the minimum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	< P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) FULR_b_FPV_MeasDiag _TFTKO Uncompensated Injection Pulse Width (Injection is commanded)	= True = True > 0	50.00 to 100.00 samples Continuous Cylinder event sample rate	Type B, 2 Trips

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 7 Injection Pulse Performance	P10B0	Diagnostic to determine if injection pulse total compensation for cylinder 7 is greater than the maximum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	> 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 8 Injection Pulse Performance	P10B1	Diagnostic to determine if injection pulse total compensation for cylinder 8 is less than the minimum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	< P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) FULR_b_FPV_MeasDiag _TFTKO Uncompensated Injection Pulse Width (Injection is commanded)	= True = True > 0	50.00 to 100.00 samples Continuous Cylinder event sample rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 8 Injection Pulse Performance	P10B2	Diagnostic to determine if injection pulse total compensation for cylinder 8 is greater than the maximum fail limit. The injection pulse total compensation is the sum of the opening magnitude and closing time compensation. Opening Magnitude and closing time compensation are determined using the voltage feedback across the injector enable and command wires.	Total Injection Small Pulse compensation	> 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.
Barometric Pressure Sensor AZ 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 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 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 (naturally aspirated)	P1101	<p>Detects a performance failure in the Manifold Pressure (MAP) 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 three 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 the system, but no</p>	<p>Filtered Throttle Model Error</p> <p>AND</p> <p>ABS(Measured Flow - Modeled Air Flow) Filtered</p> <p>OR</p> <p>ABS(Measured MAP - MAP Model 1) Filtered</p> <p>AND</p> <p>ABS(Measured MAP - MAP Model 2) Filtered</p>	<p>> 300 kPa*(g/s)</p> <p>> 25.0 grams/sec</p> <p>> 22.0 kPa)</p> <p>> 22.0 kPa</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>Minimum total weight factor (all factors multiplied together)</p> <p>See Residual Weight Factor tables.</p>	<p>>= 400 RPM <= 5,400 RPM</p> <p>>= -9 Deg C</p> <p>= TRUE)</p> <p><= 130 Deg C</p> <p>= FALSE)</p> <p>-20 Deg C <= 129 Deg C</p> <p>>= 0.50</p> <p>Filtered Throttle Model Error multiplied by P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM</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>Continuous</p> <p>Calculation are performed every 12.5 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.
		single failed sensor can uniquely be identified. In this case, the Inlet Airflow System Performance diagnostic will fail.			<p>No Active DTCs:</p> <p>No Pending DTCs:</p> <p>Diagnostic is Enabled</p>	<p>MAP Model 1 Error multiplied by 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_SensorCircuitFA EGRValvePerformance_F A MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA</p> <p>EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP</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 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 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 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 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>$\geq 3,000.00$ 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 >=0 Seconds P062B notFAorTFTK	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 >=0 Seconds P062B notFAorTFTK	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.
Injector3 low side circuit shorted to high side circuit	P124A	Controller specific output driver circuit diagnoses injector 3 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold	Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B notFAorTFTK	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 >=0 Seconds P062B notFAorTFTK	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.
Injector5 low side circuit shorted to high side circuit	P124C	Controller specific output driver circuit diagnoses injector 5 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold	Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B notFAorTFTK	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 6 low side circuit shorted to high side circuit	P124D	Controller specific output driver circuit diagnoses injector 6 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold	Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B notFAorTFTK	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 7 low side circuit shorted to high side circuit	P124E	Controller specific output driver circuit diagnoses injector 7 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold	Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B notFAorTFTK	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.
Injector8 low side circuit shorted to high side circuit	P124F	Controller specific output driver circuit diagnoses injector 8 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold	Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B notFAorTFTK	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 > 160 degC	<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 RC_ChkErr]</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 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 (repressing the refernce voltage) is below the lower digital threshold, the low fail counter then increments. If the low fail counter reaches its threshold then a fail is reported. A pass is reported for this DTC if the low sample counter reaches its threshold.</p>	High Pressure Rail Sensor 2 SENT digital read value	=< 94			Time Based: 400 Failuer out of 500 Samples 6.25 ms per Sample Continuous	Type A, 1 Trips

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

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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 SENT HWIO Determines message waveform fault (i.e. too many pulse, too few pulse, clock shift) and if the message age is too long.	SENT HWIO Determines message fault (i.e. too many pulse, too few pulse, clock shift) Message Age	= true > 1.69 ms	SENT signal Serial waveform diagnostics enable SENT power up delay No Fault Active on	True >= 0.00 seconds Enabled when a code clear is not active or not exiting device control U0625 P16E5	400 failures out of 500 samples 6.25 ms per sample Continuous	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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_ARC_ChkErr]</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) > 2.20 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 \$0CC Fuel Pump Command Message Signal Counter Incorrect [CFMR_b_FTZM_Info2_ARC_ChkErr] c) CAN Sensor Bus message \$OCC_Available d) Sensor Bus Relay On e) Timer [FABR t RunCrankActive]	a) 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.
Ignition Coil Positive Voltage Circuit Group 2 * * SIDI ONLY	P135B	This diagnostic checks for minimum voltage at the fuse which supplies power to the Ignition Coils (applicable only for SIDI applications). A diagnostic failure indicates a blown fuse.	Ignition Module Supply Voltage.	< 2.5 Volts	Diagnostic Enabled? 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: Type A, 1 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.	<p>Average desired accumulated exhaust power - Average actual accumulated exhaust power (too much energy delivered to catalyst)</p> <p>Average desired accumulated exhaust power - Average actual accumulated exhaust power (too little energy delivered to catalyst)</p> <p>(EWMA filtered)</p> <p>Average Power = output of P1400_EngineSpeedResidual_Table * output of P1400_SparkResidual_Table NOTE: Desired accumulated power would use the desired catalyst light off spark and desired engine speed and the actual accumulated power would use the final commanded spark and actual engine speed. Refer to the Supporting Tables for details</p>	<p>< -30.00 KJ/s (high RPM failure mode)</p> <p>> 6.00 KJ/s (low RPM failure mode)</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>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>< 550.00 degC AND > 6.00 degC AND <= 66.00 degC AND >= 72.00 KPa</p> <p>>= 800.00 degC AND >= 1.00 seconds</p> <p>> P1400_CatalystLightOffExtendedEngineRunTimeExit</p> <p>This Extended Engine run time exit is a function of percent ethanol and Catmons NormRatioEWMA. Refer to "Supporting Tables" for details.</p> <p>< 72.00 KPa</p>	<p>Runs once per trip when the cold start emission reduction strategy is active</p> <p>Frequency: 100ms Loop</p> <p>Test completes after 10 seconds of accumulated qualified data.</p>	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 qualified residual value to</p>	<p>0</p> <p><1.24MPH</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>> 2.00 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>> 90.00 %</p> <p><16.00%</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 MAF_SensorFA MAP_SensorFA EngineMisfireDetected_FA ClutchPstnSnsr FA IAC_SystemRPM_FA IgnitionOutputDriver_FA TPS_FA VehicleSpeedSensor_FA 5VoltReferenceMAP_OO R_Flt TransmissionEngagedState_FA EngineTorqueEstInaccuracy</p>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level SensorA Reference Feedback Range/ Performance [For use on vehicles with FTZM]	P1434	This DTC will detect a fault in Primary fuel tank level sensor 5V reference by comparing DEC ECU commanded signal period and pulse width values against measured period and pulse width reported by the smart device	Reference Voltage 0 Period Error Maximum [Measured Ref V Period - Commanded Ref V Period]	> 25.00 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>$\geq 3,000.00$ 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 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 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 ≥ 300.00 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	P14CE	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

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.
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	fail continuously for greater than 0.50 seconds	Diagnostic is enabled.		fail continuously for greater than 0.50 seconds	Type C, 1 Trip No MIL Emissions Neutral , "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 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 P158A DTC 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_ConvCruise	fail continuously for greater than 2.5 seconds.	Type C, 1 Trip No MIL Emissions Neutral "Emissions Neutral Diagnostics - Special Type C"

24OBDG06A HD Part 2 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 >= -40.0 degC -20 <= 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 and beyond controllers ONLY)	P16AF	Detects low voltage in the engine controls ignition relay feedback circuit 2. This diagnostic reports the DTC when low voltage is present. Monitoring occurs when run crank voltage is above a calibrated value.	Engine controls ignition relay feedback circuit 2 low voltage	Relay voltage <= 5.00	Powertrain relay low diag enable Powertrain relay voltage Run Crank voltage Powertrain relay state	= 1.00 >=11.00 >9.00 = ON	5 failures out of 6 samples 1000 ms/ sample	Type C, 1 Trip No MIL Emissions Neutral

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 > 11.00volts</p>	<p>8 failures out of 10 samples</p> <p>250 ms / sample</p>	<p>Type B, 2 Trips</p> <p>Note: In certain controlle rs 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

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 C, 1 Trip No MIL Emissions Neutral

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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>$\geq 3,000.00$ 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

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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	>10.00	Active Communication with EBCM	Received serial data	>= 6 failures out of10	Type C, 1 Trip No MIL Emissions Neutral Emissions Neutral Diagnostic - Type C
			OR Initialization Error -APA active (\$1C6/\$1C7) without an active torque request	APA active boolean transitions from False to True with Torque Intervention = No request	Power Mode Engine Running	= Run = True	Performed every 12.5ms	
			OR Exit Error - APA transitions to inactive during active torque request above a vehicle speed threshold	APA active boolean transitions from True to False with Torque Intervention <> No request when vehicle speed is > 1.00	Status of traction in GMLAN message (\$4E9)	= Traction Present	>= 6 failures out of10	
					Run/Crank Active	> 0.50 seconds	Performed every 12.5ms	
					Ignition Voltage	> 6.41 volts	When transition occurs, no number of samples	
							Performed every 12.5ms	

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 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 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.
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 $\geq 35\%$ 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 $\leq 30\%$ for ≥ 5.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary.</p>	<p>$\geq 93.0\%$</p> <p>$\geq 65.0\%$</p> <p>If the P2096 is actively failing then the Average Integral Offset must be $< 90.0\%$ and the Average Total Offset must be $< 60.0\%$ 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 $\leq 10,000.0$ ≥ 0 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 100.0 seconds (1,000 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).			<p>Condition</p> <p>-----</p> <p>Delay during GPF Regeneration</p> <p>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):</p> <p>Deceleration 0.00 Idle 0.00 Cruise 0.00 Light Acceleration 0.00 Heavy Acceleration 0.00</p> <p>-----</p> <p>No Fault Active for:</p>	<p>Green Cat System condition is considered valid until the accumulated air flow is greater than 720,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is above 22 grams/sec.</p> <p>-----</p> <p>No Delay</p> <p>-----</p> <p>AmbientAirDefault AIR System FA Ethanol Composition Sensor FA ECT_Sensor_FA EGRValveCircuit_FA EGRValvePerformance_FA A IAT_SensorFA</p>		

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

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).			

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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 >= 35 % for >= 5.0 seconds.</p> <p>Diagnosis resumes if the purge valve is closed OR the percent vapor is <= 30 % for >= 5.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary.</p>	<p><= -90.0 %</p> <p><= -75.0 %</p> <p>If the P2097 is actively failing then the Average Integral Offset must be > -75.0 % and the Average Total Offset must be > -200.0% 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 100.0 seconds (1,000 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 O2 sensor that is within its optimal operating range (neither rich nor lean).						

24OBDG06A HD Part 2 ECM Summary Tables

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 2	P2098	<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 P2098 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 >= 35 % 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 <= 30 % for >= 5.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary.</p>	<p>>= 93.0 %</p> <p>>= 65.0 %</p> <p>If the P2098 is actively failing then the Average Integral Offset must be < 88.0 % and the Average Total Offset must be < 60.0 % for the diagnostic to report a pass.</p>	<p>The post cat fuel trim diagnostic is enabled</p> <p>The diagnostic is enabled during:</p> <p>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 >= 0 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 100.0 seconds (1,000 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).			<p>Condition</p> <p>-----</p> <p>Delay during GPF Regeneration</p> <p>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):</p> <p>Deceleration 0.00 Idle 0.00 Cruise 0.00 Light Acceleration 0.00 Heavy Acceleration 0.00</p> <p>-----</p> <p>No Fault Active for:</p>	<p>Green Cat System condition is considered valid until the accumulated air flow is greater than 720,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is above 22 grams/sec.</p> <p>-----</p> <p>No Delay</p> <p>-----</p> <p>AmbientAirDefault AIR System FA Ethanol Composition Sensor FA ECT_Sensor_FA EGRValveCircuit_FA EGRValvePerformance_F A IAT_SensorFA</p>		

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

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 2	P2099	<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 P2099 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 $\geq 35\%$ for ≥ 5.0 seconds.</p> <p>Diagnosis resumes if the purge valve is closed OR the percent vapor is $\leq 30\%$ for ≥ 5.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary.</p>	<p>$\geq -90.0\%$</p> <p>.</p> <p>$\geq -75.0\%$</p> <p>If the P2099 is actively failing then the Average Integral Offset must be $< -75.0\%$ and the Average Total Offset must be $< -200.0\%$ for the diagnostic to report a pass.</p>	Same as P2098	Same as P2098	<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 100.0 seconds (1,000 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.
					active))			
			Throttle Position >	36.00 %	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.
Throttle Return to Default Performance	P2119	Throttle unable to return to default throttle position after de- energizing ETC motor.	(Normalized TPS1 percent Vref > AND Normalized TPS2 percent Vref > On the main processor) OR (Normalized TPS1 percent Vref < AND Normalized TPS2 percent Vref < On the main processor) (100% corresponds to 5.0 Volt)	1.7560 % Vref 1.7590 % Vref 1.4340 % Vref 1.4310% Vref	Throttle de-energized due to one of the following conditions: Powerup Default Learn OR Default Throttle Authority OR PT Relay Voltage OR Main System Shutdown OR Battery Saver Active OR (Powertrain Relay On AND Run/Crank Active)	 = TRUE = TRUE < 5.500 Volts = TRUE = TRUE = FALSE = FALSE	0.4969 s if ETC motor command is STOP (when Default Throttle Authority or Main System Shutdown is causing Throttle de-energize) 5.0000 s if ETC motor command is not STOP	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 > (100% corresponds to 5.0 Volt)	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) > (100% corresponds to 5.0 Volt)	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 >=0 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

24OBDG06A HD Part 2 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 >=0 Seconds P062B notFAorTFTK	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 >=0 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

24OBDG06A HD Part 2 ECM Summary Tables

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 >=0 Seconds P062B notFAorTFTK	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.
Injector3 high side circuit shorted to ground	P2153	Controller specific output driver circuit diagnoses Injector 3 high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

24OBDG06A HD Part 2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector3 high side circuit shorted to power	P2154	Controller specific output driver circuit diagnoses Injector 3 high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 1 volt between signal and controller power	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B notFAorTFTK	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 >=0 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

24OBDG06A HD Part 2 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 >=0 Seconds P062B notFAorTFTK	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.
Injector5 high side circuit shorted to ground	P216B	Controller specific output driver circuit diagnoses Injector 5 high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

24OBDG06A HD Part 2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector5 high side circuit shorted to power	P216C	Controller specific output driver circuit diagnoses Injector 5 high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	 ≤ 1 volt between signal and controller power	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B notFAorTFTK	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 6 high side circuit shorted to ground	P216E	Controller specific output driver circuit diagnoses Injector 6 high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

24OBDG06A HD Part 2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 6 high side circuit shorted to power	P216F	Controller specific output driver circuit diagnoses Injector 6 high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 1 volt between signal and controller power	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B notFAorTFTK	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.
Injector 7 high side circuit shorted to ground	P217B	Controller specific output driver circuit diagnoses Injector 7 high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

24OBDG06A HD Part 2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 7 high side circuit shorted to power	P217C	Controller specific output driver circuit diagnoses Injector 7 high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	 ≤ 1 volt between signal and controller power	Battery Voltage Engine Run Time	≥11 Volts ≥0 Seconds P062B notFAorTFTK	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.
Injector8 high side circuit shorted to ground	P217E	Controller specific output driver circuit diagnoses Injector 8 high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B notFAorTFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

24OBDG06A HD Part 2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector8 high side circuit shorted to power	P217F	Controller specific output driver circuit diagnoses Injector 7 high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 1 volt between signal and controller power	Battery Voltage Engine Run Time	>=11 Volts >=0 Seconds P062B notFAorTFTK	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.
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>>0.50</p> <p>If the diagnostic has reported a failure on the prior trip, the EWMA Filtered Ratio must fall below 0.40 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 0.35 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>900 to 3,800 RPM</p> <p><220 RPM</p> <p>7 to 700 g/s</p> <p><7 g/s</p> <p><0.65 g/s</p>	<p>Minimum of 1 test per trip, up to 9 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, 12.60 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 Bankl 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 Bankl Table). This quotient is then multiplied by a quality factor calibration from a 17 x 17 table (see Supporting Table P219A Quality Factor Bankl Table) . This result is referred to as the Ratio. Note that the quality factor ranges between 0 and 1 and represents robustness to false diagnosis in the current operating region. Regions with low quality factors are not used.</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 = 0.100</p> <p>Spark Advance</p> <p>Throttle Area (percent of max)</p> <p>Intake Cam Phaser Angle</p> <p>Exhaust Cam Phaser Angle</p> <p>-----</p> <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>150 to 850 mg/cylinder</p> <p><80mg/cylinder</p> <p><5.00 percent</p> <p>5 to 55 degrees</p> <p>2 to 100 percent</p> <p>0 to 30 degrees</p> <p>0 to 30 degrees</p> <p>-----</p> <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, 18 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.
		<p>Ratio.</p> <p>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.</p> <p>Some applications may need to command a unique cam phaser value before performing the above calculations since cam phasing has been shown to have an impact on overall signal quality. This application Does Not Use this feature.</p> <p>For programs using Active Fuel Management or Multiple Cam profiles, a secondary Imbalance Ratio can be calculated while in the secondary operating modes. This secondary ratio is an optional calculation and is labeled as the "Optional Mode Ratio". The Optional Mode Ratio is calculated the same as explained above with the following supporting</p>			<p>Intrusive Waste Gate Position Max</p> <hr/> <p>Delay during GPF Regeneration</p> <hr/> <p>Active Fuel Management Firing Fraction</p> <p>if the Optional Mode is enabled (see Malfunction Criteria) Active Fuel Management Firing fraction for Optional Mode calculations</p> <p>Intrusive Firing Fraction during Fast Initial Response or Rapid Step Response</p> <p>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.</p> <hr/> <p>For programs using multi-step cam profiles:</p> <p>High Lift Cam Profile will use:</p>	<p>101.0</p> <hr/> <p>No Delay</p> <hr/> <p>0.99 to 1.10</p> <p>0.99 to 0.01</p> <p>Disabled</p> <p>>=0.99</p> <hr/> <p>Standard Mode Filtered Ratio</p>		

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			Low Lift Cam Profile will use: Quality Factor (QF) QF calibrations are located in a 17x17 lookup table versus engine speed and load (see Supporting Table P219A Quality Factor 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. Fuel Control Status Closed Loop and Long Term FT Enabled for: Device Control AIR pump CASE learn EGR EVAP Engine Over Speed Protection Idle speed control PTO Injector base pulse width	Standard Mode Filtered Ratio >=0.99 >= 1.2 seconds (Please see " Closed Loop Enable Clarification " and " Long Term FT Enable Criteria " in Supporting Tables) Not active Not on Not active Not intrusive Not intrusive Not Active Normal Not Active Above min pulse limit		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>O2 learned htr resistance</p> <p>Rapid Step Response (RSR): RSR will trigger if the Ratio result from the last test is AND it exceeds the last Filtered ratio by</p> <p>Once triggered, the filtered ratio is reset to:</p> <p>Fast Initial Response (FIR): FIR will trigger when an NVM reset or code clear occurs. Once triggered, the filtered ratio is reset to:</p> <p>No Fault Active for:</p>	<p>= Valid (the O2 heater resistance has learned since NVM reset)</p> <p>>= 0.50</p> <p>>=0.75</p> <p>0.00</p> <p>0.00</p> <p>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</p>		

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.
Bank 2 Air- Fuel Ratio Imbalance	P219B	<p>This monitor determines if there is an Air Fuel Imbalance in the fueling system for a cylinder on a Bank 2. Detection is based on a the pre catalyst oxygen sensor voltage. The pre catalyst 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 dependant on engine speed and load and is normalized by comparing it to a known "good system" result for that speed and load, and generating a Ratio metric.</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: P219B EWMA Coefficient</p> <p>Optional Mode Filtered Ratio</p> <p>For this program the Optional Mode is NOT used</p> <p>The EWMA calculation uses the weighting coefficient from the following supporting table while in Optional Mode: P219B EWMA Coefficient Opt Mode</p>	<p>> 0.25</p> <p>If the diagnostic has reported a failure on the prior trip, the Filtered Ratio must fall below -0.10 in order to report a pass. This feature prevents the diagnostic from toggling between failing and passing.</p> <p>> 0.60</p> <p>If the diagnostic has reported a failure on the prior trip, the Filtered Ratio must fall below 0.45 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</p> <p>Note: first order lag filter coefficient applied to MAF = 0.050</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>900 to 3,800 RPM</p> <p><220 RPM</p> <p>7 to 700 g/s</p> <p><7 g/s</p> <p>< 0.65 g/s</p>	<p>Minimum of 1 test per trip, up to 9 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, 12.60 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.</p> <p>Generally, a report will be made within 5</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>P219B Variance Threshold Bank2 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 P219B Normalizer Bank2 Table) This quotient is then multiplied by a quality factor calibration from a 17 x 17 table (see Supporting Table P219B Quality Factor Bank2 Table) . This result is referred to as the Ratio. Note that the quality factor ranges between 0 and 1 and represents robustness to false diagnosis in the current operating region. Regions with low quality factors are not used.</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>			<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 = 0.100</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</p> <p>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</p>	<p>150 to 850 mg/cylinder</p> <p><80mg/cylinder</p> <p>< 5.00 percent</p> <p>5 to 55 degrees</p> <p>2 to 100 percent</p> <p>0 to 30 degrees</p> <p>0 to 30 degrees</p> <hr/> <p>No</p> <p>0.0 to 101.0</p> <p>Disabled</p> <p>0.0</p>	<p>minutes of operation.</p> <p>For RSRorFIR, 18 tests must complete before the diagnostic can report. See P219Ainfo</p>	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>Ratio.</p> <p>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.</p> <p>Some applications may need to command a unique cam phaser value before performing the above calculations since cam phasing has been shown to have an impact on overall signal quality. This application Does Not Use this feature.</p> <p>For programs using Active Fuel Management or Multiple Cam profiles a secondary Imbalance Ratio can be calculated while in the secondary operating modes. This secondary ratio is an optional calculation and is labeled as the "Optional Mode Ratio". The Optional Mode Ratio is calculated the same as explained above with the following supporting</p>			<p>Position Min</p> <p>Intrusive Waste Gate Position Max</p> <hr/> <p>Delay during GPF Regeneration</p> <hr/> <p>Active Fuel Management Firing Fraction</p> <p>if the Optional Mode is enabled (see Malfunction Criteria) Active Fuel Management Firing fraction for Optional Mode calculations</p> <p>Intrusive Firing Fraction during Fast Initial Response or Rapid Step Response</p> <p>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.</p> <hr/> <p>For programs using multi-step cam profiles:</p> <p>High Lift Cam Profile will use:</p>	<p>101.0</p> <hr/> <p>No Delay</p> <hr/> <p>0.99 to 1.10</p> <p>0.99 to 0.01</p> <p>Disabled</p> <p>>=0.99</p> <hr/> <p>Standard Mode Filtered Ratio</p>		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>Rapid Step Response (RSR): RSR will trigger if the Ratio result from the last test is</p> <p>AND it exceeds the last Filtered ratio by</p> <p>Once triggered, the filtered ratio is reset to:</p> <p>Fast Initial Response (FIR): FIR will trigger when an NVM reset or code clear occurs. Once triggered, the filtered ratio is reset to:</p> <p>No Fault Active for:</p>	<p>since NVM reset)</p> <p>≥ 0.25</p> <p>≥ 0.75</p> <p>0.00</p> <p>0.00</p> <p>MAP_SensorFA MAF_SensorFA ECT_Sensor_FA TPS_ThrottleAuthorityDefaulted FuelInjectorCircuit_FA AIR System FA EvapExcessPurgePsbl_FA CamSensorAnyLocationFA FuelTrimSystemB2_FA O2S_Bank_2_Sensor_1_FA O2S_Bank_2_Sensor_2_FA WRAF_Bank_2_FA</p>		

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 B, 2 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	> 110.0 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 B, 2 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 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. ThisDTC 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>< 825mvolts</p> <p>> 150 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 FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA 02S_Bank_ 1_TFTK0 02S_Bank_ 2_TFTK0</p> <p>P013A, P013B, P013E, P013F, P2270 or P2271</p> <p>>10.0 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: B1S2, B2S2 (if applicable) in Supporting Tables tab.</p>	<p>Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.</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	Airflow accumulation is only enabled when airflow is above 22.0 grams/sec. = False = False < 100.0% 4.0 < gps < 20.0 0.75 < 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. < 125.0 Nm = not active = not active > 60.0 sec > -40.0 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Predicted Catalyst temp Fuel State ===== All of the above met for at least 0.0 seconds, and then check the following Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled) Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled) ===== All of the above met for at least 0.5 seconds, and then the Force Cat Rich intrusive stage is requested. ===== During Stuck Lean test the following must stay TRUE or the test will abort: Commanded Fuel Crankshaft Torque	575 < °C < 1,000 = DFCO possible ===== 800 < RPM < 2,500 750 < RPM < 2,650 40.4 < MPH < 82.0 36.0 < MPH < 87.0 0.95 < EQR < 1.10 < 125.0 Nm		

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. ThisDTC 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>> 150 mvolts</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 FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA 02S_Bank_ 1_TFTK0 02S_Bank_ 2_TFTK0</p> <p>P013A, P013B, P013E, P013F or P2270</p> <p>>10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S 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: B1S2, B2S2 (if applicable) in Supporting Tables tab.</p>	<p>Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.</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).	Airflow accumulation is only enabled when airflow is above 22.0 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.
02 Sensor Signal Stuck Lean Bank 2 Sensor 2	P2272	<p>The P2272 diagnostic is the first in a sequence of six intrusive secondary 02 monitors which include DTCs P2272, P014A, P013C, P2273, P014B, &P013D. ThisDTC 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>< 825 mvolts</p> <p>> 150 grams.</p>	<p>Diagnostic is Enabled</p> <p>No Active DTCs</p> <p>B2S2 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 FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA 02S_Bank_ 1_TFTK0 02S_Bank_ 2_TFTK0</p> <p>P013C, P013D, P014A, P014B, P2272 or P2273</p> <p>>10.0 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: B1S2, B2S2 in Supporting Tables tab.</p>	<p>Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.</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	Airflow accumulation is only enabled when airflow is above 22.0 grams/sec. = False = False < 100.0% 4.0 < gps < 20.0 0.75 < 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. < 125.0 Nm = not active = not active >= 60.0 sec > -40.0 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Predicted Catalyst temp Fuel State ===== All of the above met for at least 0.0 seconds, and then check the following Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled) Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled) ===== All of the above met for at least 0.5 seconds, and then the Force Cat Rich intrusive stage is requested. ===== During Stuck Lean test the following must stay TRUE or the test will abort: Commanded Fuel Crankshaft Torque	575 < °C < 1,000 = DFCO possible ===== 800 < RPM < 2,500 750 < RPM < 2,650 40.4 < MPH < 82.0 36.0 < MPH < 87.0 0.95 < EQR < 1.10 < 125.0 Nm		

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 2 Sensor 2	P2273	<p>The P2273 diagnostic is the fourth in a sequence of six intrusive secondary 02 monitors which include DTCs P2272, P014A, P013C, P2273, P014B, &P013D. ThisDTC 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>> 150 mvolts</p> <p>> 12.0 grams.</p>	<p>Diagnostic is Enabled</p> <p>No Active DTCs</p> <p>B2S2 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 FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA 02S_Bank_ 1_TFTK0 02S_Bank_ 2_TFTK0 P013C, P013D, P014A, P014B or P2272 >10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTCs") = 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: B1S2, B2S2 in Supporting Tables tab.</p>	<p>Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.</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>Low Fuel Condition Only when FuelLevelDataFault</p> <p>Fuel State DTC's Passed</p> <p>=====</p> <p>After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).</p>	<p>Airflow accumulation is only enabled when airflow is above 22.0 grams/sec.</p> <p>= False</p> <p>= False</p> <p>= DFCO possible</p> <p>= P2272</p> <p>= P014A</p> <p>= P013C</p> <p>=====</p>		

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 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 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	> 110.0 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 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 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 B, 2 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 orTFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) andCam 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 active and Device control commanded pressure is false and Device control pump ckt enabled on is false and	True >=11 Volts > 0.275 MPa Enabled when a code clear is not active or not exiting device control Engine is not cranking	Positive Pressure Error - 10.00 second failures out of 12.50 second samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 >=-40.0 degC -20 <=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 or TFTKO) 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 active and Device control commanded pressure is false and Device control pump ckt enabled on is false and Engine movement	True >=11 Volts >0.275 MPa Enabled when a code clear is not active or not exiting device control Engine is not cranking	Negative Pressure Error - 10.00 second failures out of 12.50 second samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 >= -40.0 DegC -20 <= 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 (E8T) 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	<p>50 Failures out of 63 Samples</p> <p>100 msec 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.
IGNITION CONTROL #1 CIRCUIT High	P2301	Diagnoses Cylinder #1 Ignition Control (E8T) output driver circuit for a Short to Power fault. Controller specific output driver circuit diagnoses the low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	< 100 Q impedance between signal and controller power	Engine running Ignition Voltage	> 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #2 CIRCUIT Low	P2303	Diagnoses Cylinder #2 Ignition Control (E8T) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 100 Q impedance between signal and controller ground	Engine running Ignition Voltage	> 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #2 CIRCUIT High	P2304	Diagnoses Cylinder #2 Ignition Control (E8T) 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 B, 2 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 (E8T) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 100 Q impedance between signal and controller ground	Engine running Ignition Voltage	> 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #3 CIRCUIT High	P2307	Diagnoses Cylinder #3 Ignition Control (E8T) 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 B, 2 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 (E8T) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 100 Q impedance between signal and controller ground	Engine running Ignition Voltage	> 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #4 CIRCUIT High	P2310	Diagnoses Cylinder #4 Ignition Control (E8T) 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 B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #5 CIRCUIT Low	P2312	Diagnoses Cylinder #5 Ignition Control (E8T) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 100 Q impedance between signal and controller power	Engine running Ignition Voltage	> 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #5 CIRCUIT High	P2313	Diagnoses Cylinder #5 Ignition Control (E8T) 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 B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #6 CIRCUIT Low	P2315	Diagnoses Cylinder #6 Ignition Control (E8T) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 100 Q impedance between signal and controller power	Engine running Ignition Voltage	> 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #6 CIRCUIT High	P2316	Diagnoses Cylinder #6 Ignition Control (E8T) 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 B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #7 CIRCUIT Low	P2318	Diagnoses Cylinder #7 Ignition Control (E8T) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 100 Q impedance between signal and controller power	Engine running Ignition Voltage	> 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #7 CIRCUIT High	P2319	Diagnoses Cylinder #7 Ignition Control (E8T) 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 B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #8 CIRCUIT Low	P2321	Diagnoses Cylinder #8 Ignition Control (E8T) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	< 100 Q impedance between signal and controller power	Engine running Ignition Voltage	> 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #8 CIRCUIT High	P2322	Diagnoses Cylinder #8 Ignition Control (E8T) 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 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) OR Rolling count error - Serial Communication message (\$189/\$199) rolling count index value OR Range Error - Serial Communication message - (\$189/\$199) TCM Requested Torque Increase OR Multi-transition error - Trans torque intervention type request change	Message <> two's complement of message Message <> previous message rolling count value + one > 610 Nm Requested torque intervention type toggles from not increasing request to increasing request	Diagnostic Status Power Mode Ignition Voltage Engine Running Run/Crank Active No Serial communication loss to TCM (U0101)	Enabled = Run > 6.41 volts = True > 0.50 Sec No loss of communication	>= 16 failures out of 20 samples. Performed on every received message >= 6 Rolling count errors out of 10 samples. Performed on every received message >=6 range errors out of 10 samples. Performed on every received message >=5 multi-transitions out of 5 samples. Performed every 200 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.
Malfunction Indicator Lamp (MIL) Control Circuit (ODM) Low	P263A	Detects an inoperative malfunction indicator lamp control circuit. This diagnostic reports the DTC when a short to ground is detected.	Voltage low during driver off state (indicates short- to-ground)	Short to ground: < 0.5 Ω impedance between output and controller ground	Run/Crank Voltage Remote Vehicle Start is not active	Voltage >11.00 volts	1 failures out of 1 samples 50 ms / sample	Type B, No MIL NO MIL Note: In certain controlle rs P0650 may also set (MIL Control Open Circuit)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Malfunction Indicator Lamp (MIL) Control Circuit (ODM) High	P263B	Detects an inoperative malfunction indicator lamp control circuit. This diagnostic reports the DTC when a short to power is detected.	Voltage high during driver on state (indicates short to power)	Short to power: < 0.5 Q impedance between output and controller power	Run/Crank Voltage Remote Vehicle Start is not active	Voltage >11.00 volts	4 failures out of 5 samples 50 ms / sample	Type B, No MIL NO MIL

24OBDG06A HD Part 2 ECM Summary Tables

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Serial Number Not Programmed or Incompatible	P264F	This DTC checks that the engine serial number is correctly written	At least one of the programmed engine serial number digits	=0xFF	OBD Manufacturer Enable Counter	= 0	250 ms / test Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Sensor B Circuit Low	P2802	Controller specific PWM circuit diagnoses the internal range sensor (IRS) B for a short to ground failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates short to ground failure Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to ground	< 0.5 Q impedance between signal and controller ground	diagnostic monitor enable battery voltage update battery voltage timer PWM % duty cycle when voltage directly proportional OR PWM % duty cycle when voltage inversely proportional circuit sensor type	= 1 Boolean > 12.00 volts < 10.00 % > 10.00 % CeTRGD_e_VoltDirctProP	fail time > 0.50 seconds out of sample time > 1.00 seconds battery voltage timer > 1.00 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Sensor B Circuit High	P2803	Controller specific PWM circuit diagnoses the internal range sensor (IRS) B for a power short or open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit or power short failure Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit or power short	< 0.5 Q impedance between signal and controller voltage source OR > 200 K Q impedance between signal and controller ground	diagnostic monitor enable battery voltage update battery voltage timer PWM % duty cycle when voltage directly proportional OR PWM % duty cycle when voltage inversely proportional circuit sensor type	= 1 Boolean > 12.00 volts > 92.00 % < 92.00 % CeTRGD_e_VoltDirctPro P	fail time > 0.50 seconds out of sample time > 1.00 seconds battery voltage timer > 1.00 seconds	Type A, 1 Trips

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

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 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 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 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 5 Injection Pulse Performance	P2B0C	Diagnostic to determine if any of the commanded injection pulses for cylinder 5 during catalyst warm up was not delivered due to the injector pintle/armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter.	Injector voltage feedback is not able to detect an opening magnitude Or Measured Voltage feedback converted to Injector Opening Magnitude	=< P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude Misisng Pulse Fail Limit (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Catalyst Warm up enabled (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)	= True = True = True	50.00 to 100.00 samples Continuous Cylinder event sample rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cold Start Cylinder 6 Injection Pulse Performance	P2B0D	Diagnostic to determine if any of the commanded injection pulses for cylinder 6 during catalyst warm up was not delivered due to the injector pintle/armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter.	Injector voltage feedback is not able to detect an opening magnitude Or Measured Voltage feedback converted to Injector Opening Magnitude	=< P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude Misisng Pulse Fail Limit (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Catalyst Warm up enabled (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)	= True = True = True	50.00 to 100.00 samples Continuous Cylinder event sample rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cold Start Cylinder 7 Injection Pulse Performance	P2B0E	Diagnostic to determine if any of the commanded injection pulses for cylinder 7 during catalyst warm up was not delivered due to the injector pintle/armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter.	Injector voltage feedback is not able to detect an opening magnitude Or Measured Voltage feedback converted to Injector Opening Magnitude	=< P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude Misisng Pulse Fail Limit (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Catalyst Warm up enabled (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)	= True = True = True	50.00 to 100.00 samples Continuous Cylinder event sample rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cold Start Cylinder 8 Injection Pulse Performance	P2B0F	Diagnostic to determine if any of the commanded injection pulses for cylinder 8 during catalyst warm up was not delivered due to the injector pintle/armature not moving. The detection is based on the voltage flux feedback that occurs in the injector coil from the pintle/armature movement. The voltage feedback is measured in the ECM across the enable & command wires using an analog to digital converter.	Injector voltage feedback is not able to detect an opening magnitude Or Measured Voltage feedback converted to Injector Opening Magnitude	=< P2B00 P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude Misisng Pulse Fail Limit (See supporting table)	Small Pulse General Diagnostic Enable (See Definition in Supporting Material below) Catalyst Warm up enabled (See Definition in Supporting Material below) Fuel Pulse Voltage Feedback Data Ready (See Definition in Supporting Material below)	= True = True = True	50.00 to 100.00 samples Continuous Cylinder event sample rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 Catalyst Warm up	High Pressure Fuel Pump Delivery Angle OR High Pressure Fuel Pump Delivery Angle	$\geq 124^\circ$ $\leq 0^\circ$	Catalyst Warm Up High Pressure Pump Performance Diagnostic Enable Battery Voltage Low Side Fuel Pressure Barometric Pressure Inlet Air Temp Fuel Temp Catalyst Warm up enabled (See Definition in Supporting Material below) Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP orTFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) andCam or	True ≥ 11 Volts > 0.275 MPa Enabled when a code clear is not active or not exiting device control Engine is not cranking ≥ 70.0 KPA ≥ -40.0 degC $-20 \leq \text{Temp degC} \leq 132$ = 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 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 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.
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,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	True ≥11 Volts > 0.275 MPa = True Enabled when a code clear is not active or not exiting device control Engine is not cranking	Positive Pressure Error - 10.00 second failures out of 12.50 second samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 >=-40.0 degC -20 <=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 or TFTKO) 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 >0.275 MPa = True Enabled when a code clear is not active or not exiting device control Engine is not cranking	Negative Pressure Error - 10.00 second failures out of 12.50 second samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 >= -40.0 DegC -20 <= Temp degC <= 132		

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>1.25 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.
Fuel Pump Performance - Under Pressure	P3187	This DTC detects degradation in the performance of the electronically regulated fuel system by calculating the difference between the sensed, filtered system [line] pressure versus the ECM-commanded pressure [error calculation]. The calculated error is then compared to calibrated fault threshold tables for a fault decision.	Sensed Filtered Fuel System [line] pressure error	> Threshold [Supporting Table] P3187_Threshold	a) Diagnostic is .. b) Timer - Engine Running Minimum c1) Fuel Flow Rate Valid c2) Ambient Air Pressure Value Defaulted c3) Fault bundle FDB_FuelPresSnsrCktFA c4) Reference Voltage Fault Status [DTC P0641] c5) Exhaust AfterTreatment Fuel Injector A Control Circuit Short Low Fault [DTC P20CD] c6) Fuel Pres Sensor Performance Fault Active [DTC P018B] c7) Use Calculated Flow Performance Fault Thresholds c8) Engine Speed Status Valid c9) Fault bundle FAB_FuelPmpCktFA c10) Fuel Control Enable Fault Active [DTC P12A6] c11) Fuel Pump Driver Module OverTemp Fault	a) Enabled b) >= 30.00 seconds c1) == TRUE c2) == False c3) == False c4) == False c5) == False c6) == False c7) == False c8) ==TRUE c9) == False c10) == False d 1) == False	1 sample/ 12.5 millisec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Active [DTC P1255] c12) Fuel Pump Speed Fault Active [DTCP129F] c13) CAN Sensor Bus message \$0C3 Comm Fault [DTCP165C] c14) CAN Sensor Bus Fuel Pmp Spd Command ARC and Checksum Comm Fault Code [DTC U18A7] c15) Sensor Configuration [is Wired To FTZM?] c16) Sensor Bus Relay On d) Emissions Fuel Level Low [Message \$3FB] e) Fuel Control Enable f) Fuel Pump Control State g) Input circuit minimum voltage h) High Pres Fuel Pump Mode Management Active j) High Pres Fuel Pump Control Mode mI) Fuel Pmp Speed Command Alive Rollina	c12) == False c13) == False c14) == False c15) == CeFDBR_e_WiredTo_FT ZM c16) == TRUE d) == False e) == TRUE f) == normal g) >= 11.00 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	\leq 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] c7) Use Calculated Flow Performance Fault Thresholds c8) Engine Speed Status Valid c9) Fault bundle FAB_FuelPmpCktFA c10) Fuel Pump Driver Module OverTemp Fault Active [DTC P1255] c11) Fuel Pump Speed Fault Active [DTCP129F] c12) Fuel Pump Duty Cycle Fault Active [DTC P2BB3] c13) CAN Sensor Bus message \$0C3 Comm Fault [DTCP165C] c14) Fuel Pres Sensor Serial Comm Fault Active [DTC P14D5] c15) Sensor Bus Relay On d1) Timer -- Minimum Engine Running d2) Diaanostic Data_____	c6) == False c7) == False c8] ==TRUE c9] == False c10) == False d 1) == False c12) == False c13) ==False c14) == False c15) == TRUE d1)>= 30.00 seconds 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 [DTC P12A6] j) Emissions Fuel Level Low [Message \$3FB] k) High Pres Fuel Pump Mode Management Enabled l) High Pres Fuel Pump Control Mode m) Diagnostic Data OK n) Timer - Diagnostic Enable	e) == TRUE f) == Normal AND == NOT Over Response Active g) >= 0.05 gms /sec h) == False j) == False k) == False l) == NOT Disabled Mode AND NOT Over Response Active Mode m) == TRUE n) > 2.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communicati on 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	5 counts (equivalent to 800.01 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 Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII	> 15,000.00 milliseconds > 8.41 Volts => 3,000.00 milliseconds >11.00 Volts <=18.00 Volts	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 > 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.
Control Module Communicati on Powertrain Sensor CAN Bus Off	U0076	This DTC monitors for a Powertrain Sensor Bus S off condition	Bus off failures equals or exceeds before the sample time of is reached	5 counts (equivalent to 800.01 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 Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII	> 15,000.00 milliseconds > 8.41 Volts >= 3,000.00 milliseconds >11.00 Volts ≤18.00 Volts	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 > 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 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 \$189:</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>>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>>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>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 A, 1 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>> 8.41 Volts</p> <p>>=6.41 Volts</p> <p>Enabled</p> <p>>=11.00 Volts</p>		

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	U0121	This DTC monitors for a loss of communication with the Anti-Lock Brake System (ABS) Control Module (Non-OBD Module ID 243).	<p>Message is not received from controller for</p> <p>Message \$0C1</p> <p>Message \$0C5</p> <p>Message \$1C7</p> <p>Message \$1E9</p> <p>Message \$2F1</p> <p>Message \$2F9</p>	<p>>500.00 milliseconds</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>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, 1 Trip No MIL Emissio ns Neutral "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.
					<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>> 8.41 Volts</p> <p>>=6.41 Volts</p> <p>Enabled</p> <p>>=11.00 Volts</p>		

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.	<p>Message is not received from controller for</p> <p>Message \$0F1</p> <p>Message \$1E1</p> <p>Message \$1F1</p> <p>Message \$451</p> <p>Message \$120</p> <p>Message \$12A</p> <p>Message \$135</p> <p>Message \$140</p> <p>Message \$1F3</p> <p>Message \$3C9</p> <p>Message \$3F1</p>	<p>>500.00 milliseconds</p> <p>>500.00 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>>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: 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, 1 Trip No MIL Emissio ns Neutral "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.
			Message \$4C5	>10,000.00 milliseconds	If calibratable low voltage disable mode is not Never Disabled			
			Message \$4E1	>10,000.00 milliseconds	Low voltage disable mode: OBDII			
			Message \$4E9	>10,000.00 milliseconds	If OBDII: Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>=9.00 Volts		
					If Secure: Starter motor engaged for Or Run/Crank ignition voltage	> 15,000.00 milliseconds > 8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>=6.41 Volts		
					If power mode = Accessory:			
					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 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

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_C03</p> <p>MAF_Rsp_TmpHum_2A_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 calibratable low voltage disable mode is not Never Disabled</p> <p>Low voltage disable mode: OBDII</p> <p>If OBDII: 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>	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.
					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	>=9.00 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 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	<= 5 = 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.
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	<= 5 = 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 2	U1346	This DTC monitors for a LIN bus off condition on LIN Bus 2.	Loss of Communication Method: The total number of diagnostic enabled slave nodes on LIN Bus 2 Or LIN channel Wakeup Method: LIN channel wakeup repetition counter	= Total number of slave nodes on LIN Bus 2 that have reported lost communications DTCs >= 10.00 counts	Loss of Communication Method: Diagnostic is enabled LIN channel is enabled LIN module is initialized The following criteria have been enabled for: LIN channel is requesting full communications Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Power Mode is run If calibratable low voltage disable mode is not Never Disabled Low voltage disable mode: OBDII IfOBDII:	Enabled Enabled >= 3,000.00 milliseconds >11.00 Volts <=18.00 Volts	Dependent on bus loading.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Run/Crank ignition voltage	>=11.00 Volts		
					If EOBD: Run/Crank ignition voltage	>= 9.00 Volts		
					If Secure: Starter motor engaged for Or Run/Crank ignition voltage	> 15,000.00 milliseconds > 8.41 Volts		
					If Hybrid Secure: Run/Crank ignition voltage	>=6.41 Volts		
					If power mode = Accessory			
					Off key cycle diagnostics are enabled Or Controller is an OBD controller	Enabled		
					Controller shutdown not impending			
					Power Mode is not run/ crank			
					Battery voltage	>=11.00 Volts		
					LIN channel Wakeup Method:			
					Diagnostic is enabled	Enabled		
					LIN channel is enabled	Enabled		
					LIN channel is requesting			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					full communications LIN module is initialized The following criteria have been enabled for: Accessory mode to off mode not pending Battery voltage Conroller is an OBD controller Or Battery Voltage	>= 3,000.00 milliseconds >11.00 Volts <=18.00 Volts		

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

24OBDG06A HD Part 2 ECM 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	Diagnostcis 1.00 Battey Present = TRUE RunCrank Active = TRUE Starter Motor Engaged = FALSE	50.00 failures out of 63.00	Type B, 2 Trips

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

Initial Supporting table - FastFailTempDiff

Description: EOT Sensor Cold Start Fast Fail Threshold**Value Units:** Threshold between power-up engine oil temperature and power-up engine coolant temperature (Deg C)**X Unit:** PowerUp coolant temperature (deg C)

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

Initial Supporting table - P0196_TotalAccumulatedFlow

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

Value Units: Minimum accumulated (total) air grams consumed by engine (gram)

X Unit: PowerUp coolant temperature (deg C)

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

Initial Supporting table - P0521 P06QD_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	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0
1,000.0	424.0	416.3	398.1	386.7	374.4	359.3	347.1	333.8	318.8
1,500.0	450.6	440.3	427.4	419.1	407.9	396.0	385.8	373.1	361.0
2,000.0	467.7	466.4	455.7	448.5	437.4	422.9	410.5	395.8	378.9
2,500.0	479.1	467.4	456.2	452.6	444.1	427.5	411.9	399.4	384.8
3,000.0	476.6	465.5	456.5	449.8	440.1	430.3	420.0	406.7	404.0
3,500.0	484.2	478.7	473.7	463.9	456.5	443.9	431.1	414.5	409.2
4,000.0	508.4	495.2	485.6	474.0	453.0	441.7	427.2	407.7	394.7
4,500.0	532.6	511.6	497.4	484.0	449.5	439.5	423.3	400.9	380.2
5,000.0	556.8	528.0	509.3	494.1	446.0	437.3	419.3	394.2	365.6

Initial Supporting table - P0521 P06DD_P06DE_OP_LoStatePressure

Description: Two Stage Oil Pump Oil Pressure in Low State**Value Units:** Nominal low state oil pressure (kPa)**X Unit:** Engine oil temperature (deg C)

y/x	40	50	60	70	80	90	100	110	120
1,000	324	313	300	293	287	280	272	259	252
1,500	352	333	317	312	304	294	286	277	267
2,000	385	356	344	334	322	308	299	289	277
2,500	404	380	361	354	337	319	308	295	286
3,000	411	391	372	358	343	325	310	302	292
3,500	411	396	381	363	351	334	318	306	292
4,000	436	414	397	381	360	345	330	314	301
4,500	461	431	414	399	369	356	341	322	310
5,000	487	449	430	418	378	367	352	330	319

Initial Supporting table - P06DD_P06DE_MaxEnableTorque_OP

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

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

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

Initial Supporting table - P06DD_P06DE_MinEnableTorque_OP**Description:** Two Stage Oil Pump Rationality Test Torque Min Enable Threshold**Value Units:** Min engine torque (Nm)**X Unit:** Engine speed (RPM)

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

Initial Supporting table - P06DD_P06DE_MinOilPressThresh

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

Value Units: Minimum engine oil pressure threshold (kPa)

X Unit: Engine oil temperature (deg C)

y/x	40	50	60	70	80	90	100	110	120
1,000	83	83	83	83	83	83	83	83	83
1,500	106	106	106	106	106	106	106	106	106
2,000	116	116	116	116	116	116	116	116	116
2,500	127	127	127	127	127	127	127	127	127
3,000	137	137	137	137	137	137	137	137	137
3,500	147	147	147	147	147	147	147	147	147
4,000	191	191	191	191	191	191	191	191	191
4,500	200	200	200	200	200	200	200	200	200
5,000	208	208	208	208	208	208	208	208	208

Initial Supporting table - P06DD P06DE_OP_StateChangeMin

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

Value Units: Min pressure change (kPa)

X Unit: Engine oil temperature (deg C)

y/x	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0
1,000.0	28.0	29.0	27.5	26.2	24.4	22.2	21.2	20.9	18.7
1,500.0	27.7	30.1	30.8	30.0	29.1	28.4	28.1	26.9	26.3
2,000.0	23.3	30.9	31.2	32.0	32.4	32.1	31.3	29.8	28.5
2,500.0	21.1	24.6	26.8	27.6	30.0	30.3	29.2	29.3	27.8
3,000.0	18.4	21.0	23.6	25.8	27.1	29.4	30.7	29.5	31.4
3,500.0	20.6	23.1	25.9	28.3	29.6	30.8	31.7	30.5	32.8
4,000.0	20.3	22.8	24.7	26.0	26.1	27.1	27.4	26.3	26.3
4,500.0	20.0	22.5	23.5	23.7	22.7	23.4	23.0	22.1	19.7
5,000.0	19.6	22.1	22.3	21.4	19.2	19.8	18.7	17.9	13.1

Initial Supporting table - P0128 Maximum Acculated Energy - Primary

Description: KtETHD_E_EOR_WrmllpEnrgyLimTestO

Value Units: Cooling system energy failure threshold (kJ)

X Unit: Minimum ECT for the key cycle (°C)

y/x	-20.0	-7.0	10.0	30.0	45.0	60.0	75.0
1.0	29,572.4	29,572.4	24,000.0	18,427.6	14,248.3	10,069.0	10,069.0

Initial Supporting table - P0128 Maximum Acculated Energy - Secondary

Description: KtETHD_E_EOR_WrmllpEnrgyLimTest1

Value Units: Cooling system energy failure threshold (kJ)

X Unit: Minimum ECT for the key cycle (°C)

y/x	-20.0	-7.0	10.0	30.0	45.0	60.0	75.0
1.0	23,664.2	20,776.4	17,000.0	13,223.6	10,391.3	7,559.0	7,559.0

Initial Supporting table - P0128 Maximum Acculated Energy - Tertiary

Description: KtETHD_E_EOR_WrmllpEnrgyLimTest2

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	23,664.2	20,776.4	17,000.0	13,223.6	10,391.3	7,559.0	7,559.0

Initial Supporting table - P01F0 - Heat To Coolant Min 2D

Description: KtETHD_P_CDD_HeatToCoolantMin

Value Units: Indicated Power (kW)

X Unit: Firing Fraction

Y Units: Ambient temperature (°C)

y/x	0.00	0.25	0.50	0.75	1.00
-20.0	35.0	35.0	35.0	35.0	35.0
-9.0	35.0	35.0	35.0	35.0	35.0
10.0	15.0	15.0	15.0	15.0	15.0
20.0	15.0	15.0	15.0	15.0	15.0
50.0	15.0	15.0	15.0	15.0	15.0

Initial Supporting table - P219A EWMA Coefficient

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

Value Units: Unitless Scalar
X Unit: Unitless Scalar

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

Initial Supporting table - P219A EWMA Coefficient Opt Table

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

Value Units: Unitless Scalar
X Unit: Unitless Scalar

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

Initial Supporting table - P219A Quality Factor Bank1 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	800	1,020	1,240	1,460	1,680	1,900	2,120	2,340	2,560	2,780	3,000	3,220	3,440	3,660	3,900	4,200	4,500
120	1.00	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	0.00	0.00
160	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
200	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
240	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
280	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
320	0.00	1.00	1.00	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
360	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
400	1.00	1.00	1.00	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
440	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
480	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
520	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
560	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
600	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	0.00
640	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	0.00
700	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	0.00
750	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	0.00	0.00
800	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	0.00	0.00

Initial Supporting table - P219B EWMA Coefficient

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

Value Units: Unitless Scalar
X Unit: Unitless Scalar

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

Initial Supporting table - P219B EWMA Coefficient Opt Mode

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

Value Units: Unitless Scalar
X Unit: Unitless Scalar

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

Initial Supporting table - P219B Quality Factor Bank2 Table

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

Value Units: Unitless Scalar

X Unit: Engine Speed (RPM)

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

y/x	800	1,020	1,240	1,460	1,680	1,900	2,120	2,340	2,560	2,780	3,000	3,220	3,440	3,660	3,900	4,200	4,500
120	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	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	1.00	1.00	0.00	0.00	0.00
240	0.00	1.00	1.00	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
280	0.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
320	0.00	1.00	1.00	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
360	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
400	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
440	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
480	1.00	1.00	1.00	1.00	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
520	1.00	1.00	1.00	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
560	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
600	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	0.00
640	0.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
700	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	0.00
750	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	0.00	0.00
800	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	0.00	0.00

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	8.949	9.000	9.029	9.020	8.988	8.920	8.828	8.699	8.549	8.359	8.148	7.898	7.629	7.318	6.988	6.619	6.229

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	0.000	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 - 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	2.689	2.760	2.809	2.840	2.850	2.840	2.809	2.760	2.689	2.600	2.488	2.359	2.209	2.039	1.850	1.639	1.408

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_AbnormalLo2

Description: The low limit (no Hi limit, left for excessive knock) for sensor 2 for the performance diagnostic, abnormal noise; used for per sensor and per cyl performance diagnostics. The lookup in this table as a function of RPM and APC is then filtered using KeKNKD_k_PerfAbnFilter (KeKNKD_k_PerfCylAbnFilter for per cyl), and then this filtered quantity VaKNKD_k_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	0.060	0.060	0.060	0.060	0.060	0.069	0.149	0.239	0.340	0.449	0.569	0.699	0.840	0.840	0.840	0.840	0.840

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	0.060	0.060	0.060	0.060	0.060	0.069	0.149	0.239	0.340	0.449	0.569	0.699	0.840	0.840	0.840	0.840	0.840

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	0.049	0.100	0.119	0.180	0.299	0.398	0.510	0.520	0.529	0.750	1.100	1.398	1.600	1.799	2.000	2.199	2.398

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	0.000	0.000	0.000	0.020	0.020	0.049	0.078	0.119	0.129	0.158	0.180	0.199	0.219	0.260	0.299	0.318	0.340

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_PurgOnAirMode0 = 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_PurgOffAirMode0 = 13,
 CeFADR_e_Cell14_PurgOffIdle = 14,
 CeFADR_e_Cell15_PurgOffDecel = 15

Value Units: Block Learn cell number

X Unit: Block Learn cell number

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

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

Description: This Calibration is the 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 - POOI1_CamPosErrorLimlc1

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

Value Units: Maximum Intake Cam 1 phase error (degCAM)

X Unit: Engine Oil Temperature (degC)

Y Units: Engine Speed (rpm)

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

Initial Supporting table - P0011_P0021_P05CC_P05CD_EngOilPressEnbllc

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

Value Units: Time (sec)

X Unit: Engine Coolant Temperature (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

Initial Supporting table - P0011_P0021_P05CC_P05CD_HiEngSpdHiDsbllc

Description: Minimum engine speed to disable Intake cam**Value Units:** Engine Speed (rpm)**X Unit:** Engine Oil Temp (degC)

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

Initial Supporting table - P0011_P0021_P05CC_P05CD_HiEngSpdLoEnblc

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

Value Units: Engine Speed (rpm)

X Unit: Engine Oil Temp (degC)

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

Initial Supporting table - P0011_P0021_P05CC_P05CD_LoPresHiEnblc

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

Value Units: Engine Speed (rpm)

X Unit: Engine Oil Temp (degC)

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

Initial Supporting table - P0011_P0021_P05CC_P05CD_LoPresLoDsblc

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	170	170	170	170	160	150	150	150	150	150	150	150	150	150	160	170	170

Initial Supporting table - P0011_P0021_P05CC_P05CD_LoRpmHiEnblc

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	825	825	825	825	800	800	800	800	800	800	800	800	875	925	1,175	1,325	1,825

Initial Supporting table - P0011_P0021_P05CC_P05CD_LoRpmLoDsbllc

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

Value Units: Engine Speed (rpm)

X Unit: Engine Oil Temp (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	800	800	800	800	750	750	750	750	750	750	750	750	750	750	800	800	800

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	15	15	14	13	12	11	10	9	8	7	6	5	4	4	4	4	4

Initial Supporting table - P0011_P(05CC_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	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
800	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
1,200	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
1,600	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
2,000	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
2,400	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
2,800	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
3,200	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
3,600	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
4,000	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
4,400	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
4,800	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
5,200	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
5,600	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
6,000	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
6,400	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
6,800	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4

Initial Supporting table - P0014_P0024_P05CE_P05CF_EngOilPressEnblEc

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

Value Units: Time (sec)

X Unit: Engine Coolant Temperature (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

Initial Supporting table - P0014_P0024_P05CE_P05CF_HiEngSpdHiDsblEc

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

Value Units: Engine Speed (rpm)

X Unit: Engine Oil Temp (degC)

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

Initial Supporting table - P0014_P0024_P05CE_P05CF_HiEngSpdLoEnblEc

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

Value Units: Engine Speed (rpm)

X Unit: Engine Oil Temp (degC)

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

Initial Supporting table - P0014_P0024_P05CE_P05CF_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	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180

Initial Supporting table - P0014_P0024_P05CE_P05CF_LoPresLoDsblEc

Description: Exhaust cam is disabled when oil pressure falls below this value**Value Units:** Engine Oil Pressure (kPa)**X Unit:** Engine Oil Temp (degC)

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

Initial Supporting table - P0014_P0024_P05CE_P05CF_LoRpmHiEnblEc

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

Value Units: Engine Speed (rpm)

X Unit: Engine Oil Temp (degC)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	825	825	825	825	800	800	800	800	800	800	800	800	875	925	1,175	1,325	1,825

Initial Supporting table - P0014_P0024_P05CE_P05CF_LoRpmLoDsblEc**Description:** Exhaust cam is disabled when engine speed is below this value.**Value Units:** Engine Speed (rpm)**X Unit:** Engine Oil Temp (degC)

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

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

Value Units: Engine Run Time- Seconds

X Unit: Oil Temperature- C

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	20.0	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	600.0	600.0	320.0	36.0	36.0	36.0	36.0	20.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0

Initial Supporting table - P0071: OAT Performance Drive Equilibrium Engine Off**Description:** OAT Performance Diagnostic counter increment for determining OAT-IAT equilibrium for engine off (for hybrid applications)**Value Units:** Counter Increment Value (Unitless)**X Unit:** Vehicle Speed (KPH)

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

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

Description: OAT Performance Diagnostic counter increment for determining OAT-IAT equilibrium for engine running

Value Units: Counter Increment Value (Unitless)

X Unit: Vehicle Speed (KPH)

Y Units: Engine Air Flow (Grams/Second)

y/x	0.0	20.0	30.0	45.0	60.0	75.0	90.0	105.0	120.0
0.0	-0.2	0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.5
15.0	-0.2	0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.5
25.0	-0.2	0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.5
35.0	-0.2	0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.5
45.0	-0.2	0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.5
55.0	-0.2	0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.5
65.0	-0.2	0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.5
75.0	-0.2	0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.5
85.0	-0.2	0.1	0.2	0.3	0.4	0.4	0.5	0.5	0.5

Initial Supporting table - P0101, P0106, P0121, P012B, P0236, P1101: MAPI Residual Weight Factor based on RPM
Description: P0101_P0106_P0121_P012B_P0236_P1101 MAPI Residual Weight Factor based on RPM

Value Units: Weight Factor (Unitless)

X Unit: Engine Speed (RPM)

y/x	0	400	750	1,100	1,450	1,800	2,150	2,500	2,850	3,200	3,550	3,900	4,250	4,600	4,950	5,300	6,000
1	0.000	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	750	1,100	1,450	1,800	2,150	2,500	2,850	3,200	3,550	3,900	4,250	4,600	4,950	5,300	6,000
1	0.000	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	750	1,100	1,450	1,800	2,150	2,500	2,850	3,200	3,550	3,900	4,250	4,600	4,950	5,300	6,000
1	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Initial Supporting table - P050D_P1400_CatalystLightOffExtendedEngineRunTimeExit

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

y/x	0	25	50	75	100
0.000	20	20	20	20	20
0.125	20	20	20	20	20
0.250	20	20	20	20	20
0.375	20	20	20	20	20
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	20	20	20	20	20
0.125	20	20	20	20	20
0.250	20	20	20	20	20
0.375	20	20	20	20	20
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	1	1	5	11	16	21	27	32
1	0	0	0	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	1	1	5	11	16	21	27	32

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	500	600	650	700	750	800	850	900	1,050	1,100	1,150	1,200	1,250	1,300	1,450	1,800
1	0	4	4	4	4	4	12	12	12	12	12	12	12	12	12	12	18

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	-20	-16	-12	-8	-5	0	4	8	12
1	2.50	2.19	2.00	1.81	1.75	0.88	0.75	0.69	0.56

Initial Supporting table - P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est**Description:** P0101_P0106_P010B_P01 21_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	120	150	200	280	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	750	1,100	1,450	1,800	2,150	2,500	2,850	3,200	3,550	3,900	4,250	4,600	4,950	5,300	6,000
1	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.900	0.800	0.750	0.700	0.700	0.700	0.700	0.700	0.700

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	8,191.875	8,191.875	8,191.875	8,191.875

Initial Supporting table - P0606_PSW Sequence Fail f(Loop Time)

Description: Fail threshold for PSW per operating loop.

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	5	3	5	3	5	3	5	3

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	5	3	5	3	5	5	5	5

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

Description: Sample threshold for PSW per operating loop.

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_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 - 1st_FireAftrMisfr_Acel

Description: Used for P0300 - P0308, Multiplier for establishing the expected acceleration of the cylinder after the misfire

Value Units: multiplier

X Unit: RPM

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

y/x	500	600	700	800	900	1,000	1,100	1,200	1,400	1,800	2,200	2,600	3,000	3,001	5,000	6,000	7,000
8	1.17	1.61	1.10	1.33	1.15	1.21	1.35	1.42	1.13	1.01	1.41	1.26	0.68	0.68	0.68	0.68	0.68
12	0.84	1.20	0.96	1.08	0.89	0.94	1.02	1.21	1.14	1.02	1.52	1.26	0.95	0.95	0.95	0.95	0.95
16	0.62	0.89	0.70	0.74	0.61	0.69	0.70	0.94	1.01	0.91	1.30	1.03	0.95	0.95	0.95	0.95	0.95
20	0.47	0.67	0.51	0.53	0.43	0.51	0.51	0.73	0.84	0.68	1.09	0.86	0.86	0.86	0.86	0.86	0.86
24	0.37	0.50	0.38	0.39	0.31	0.35	0.35	0.56	0.69	0.55	0.90	0.74	0.85	0.85	0.85	0.85	0.85
30	0.27	0.34	0.25	0.24	0.19	0.20	0.21	0.40	0.54	0.43	0.72	0.63	0.90	0.90	0.90	0.90	0.90
40	0.16	0.18	0.12	0.10	0.07	0.06	0.08	0.23	0.39	0.32	0.54	0.57	0.85	0.85	0.85	0.85	0.85
60	0.06	0.02	-0.02	-0.04	-0.05	-0.08	-0.03	0.08	0.25	0.21	0.36	0.44	0.74	0.74	0.74	0.74	0.74
100	-0.02	-0.10	-0.12	-0.15	-0.15	-0.18	-0.12	-0.04	0.15	0.13	0.21	0.29	0.72	0.72	0.72	0.72	0.72

Initial Supporting table - 1st_FireAftrMisfr_Jerk

Description: Used for P0300 - P0308, Multiplier for establishing the expected Jerk of the cylinder after the misfire

Value Units: multiplier

X Unit: RPM

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

y/x	500	600	700	800	900	1,000	1,100	1,200	1,400	1,800	2,200	2,600	3,000	3,001	5,000	6,000	7,000
8	-0.81	0.06	-0.02	-0.25	-0.02	-0.19	-0.26	-0.40	-0.17	-0.30	-0.50	-0.50	-0.40	-0.40	-0.40	-0.40	-0.40
12	-0.84	-0.81	-0.90	-0.86	-0.64	-0.68	-0.90	-0.69	-0.63	-0.43	-0.60	-0.60	-0.33	-0.33	-0.33	-0.33	-0.33
16	-0.73	-0.84	-1.11	-1.11	-0.89	-0.86	-0.90	-0.98	-0.86	-0.82	-0.58	-0.61	-0.62	-0.62	-0.62	-0.62	-0.62
20	-0.69	-0.80	-1.20	-1.20	-1.00	-0.90	-0.90	-1.00	-1.02	-1.11	-0.68	-0.97	-0.78	-0.78	-0.78	-0.78	-0.78
24	-0.65	-0.78	-1.26	-1.26	-1.06	-0.92	-0.90	-1.04	-1.07	-1.15	-0.79	-0.77	-1.00	-1.00	-1.00	-1.00	-1.00
30	-0.62	-0.77	-1.32	-1.32	-1.12	-0.95	-0.90	-1.08	-1.07	-1.20	-0.94	-0.97	-1.13	-1.13	-1.13	-1.13	-1.13
40	-0.59	-0.75	-1.38	-1.35	-1.17	-0.95	-0.90	-1.11	-1.07	-1.24	-1.07	-1.13	-1.00	-1.00	-1.00	-1.00	-1.00
60	-0.56	-0.72	-1.43	-1.40	-1.22	-0.96	-0.91	-1.14	-1.07	-1.27	-1.19	-1.26	-1.11	-1.11	-1.11	-1.11	-1.11
100	-0.53	-0.71	-1.48	-1.43	-1.28	-0.96	-0.92	-1.12	-1.07	-1.30	-1.27	-1.31	-1.07	-1.07	-1.07	-1.07	-1.07

Initial Supporting table - IstFireAfterMisJerkAFM

Description: Used for P0300 - P0308, Multiplier for establishing the expected jerk of the cylinder after the misfire if Active Fuel Management cylinder deact mode is active

Value Units: multiplier

X Unit: RPM

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

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
8	1	1	1	1	1	1	1	1	1
12	1	1	1	1	1	1	1	1	1
16	1	1	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1	1
24	1	1	1	1	1	1	1	1	1
30	1	1	1	1	1	1	1	1	1
40	1	1	1	1	1	1	1	1	1
60	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1

Initial Supporting table - IstFireAftMisAcelAFM

Description: Used for P0300 - P0308, Multiplier for establishing the expected acceleration of the cylinder after the misfire if Active Fuel Management cylinder deact mode is active

Value Units: multiplier

X Unit: RPM

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

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
8	1	1	1	1	1	1	1	1	1
12	1	1	1	1	1	1	1	1	1
16	1	1	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1	1
24	1	1	1	1	1	1	1	1	1
30	1	1	1	1	1	1	1	1	1
40	1	1	1	1	1	1	1	1	1
60	1	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1	1

Initial Supporting table - Abnormal Cyl Mode

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

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

X Unit: thousands of RPM (rpm/1000)

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

Initial Supporting table - Abnormal Rev Mode

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

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

X Unit: thousands of RPM (rpm/1000)

y/x	0	1	2	3	4	5	6	7	8
1	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Initial Supporting table - Abnormal SCD Mode

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

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

X Unit: thousands of RPM (rpm/1000)

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

Initial Supporting table ■ Bank_SCD_Decel

Description: Used for P0300 - P0308, 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	400	500	600	700	800	900	1,000	1,100	1,200
8	0.95	1.00	0.92	0.87	0.85	0.82	0.85	0.96	1.00
12	0.91	0.94	0.88	0.83	0.70	0.70	0.75	0.91	0.96
16	0.93	0.93	0.85	0.78	0.72	0.73	0.77	0.88	0.75
20	1.02	0.96	0.91	0.80	0.73	0.73	0.82	0.93	0.55
24	1.02	0.96	0.91	0.80	0.73	0.73	0.82	0.93	0.55
30	1.02	0.96	0.91	0.80	0.73	0.73	0.82	0.93	0.55
40	1.02	0.96	0.91	0.80	0.73	0.73	0.82	0.93	0.55
60	1.02	0.96	0.91	0.80	0.73	0.73	0.82	0.93	0.55
98	1.02	0.96	0.91	0.80	0.73	0.73	0.82	0.93	0.55

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: multplier

X Unit: RPM

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

y/x	400	500	600	700	800	900	1,000	1,100	1,200
8	2.74	2.92	3.07	2.24	1.81	1.90	1.82	1.89	1.58
12	2.37	2.42	2.17	1.77	1.69	1.55	1.55	1.72	1.47
16	2.03	1.84	1.60	1.47	1.40	1.38	1.40	1.66	1.43
20	1.81	1.55	1.41	1.30	1.25	1.27	1.30	1.63	1.42
24	1.81	1.55	1.41	1.30	1.25	1.27	1.30	1.63	1.42
30	1.81	1.55	1.41	1.30	1.25	1.27	1.30	1.63	1.42
40	1.81	1.55	1.41	1.30	1.25	1.27	1.30	1.63	1.42
60	1.81	1.55	1.41	1.30	1.25	1.27	1.30	1.63	1.42
98	1.81	1.55	1.41	1.30	1.25	1.27	1.30	1.63	1.42

Initial Supporting table - BankCylModeDecel

Description: Used for P0300 - P0308, Multiplier to LoRes Decel to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier

X Unit: RPM

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

y/x	500	600	700	800	900	1,000	1,100	1,200	1,400	1,800	2,200	2,600	3,000	3,001	5,000	6,000	7,000
8	0.86	1.16	1.07	0.99	1.09	0.90	0.97	1.04	0.97	0.88	1.09	1.13	1.26	1.26	1.26	1.26	1.26
12	0.55	0.60	0.73	0.67	0.62	0.58	0.68	0.77	0.85	0.71	0.83	0.85	1.05	1.05	1.05	1.05	1.05
16	0.50	0.47	0.54	0.51	0.54	0.47	0.56	0.61	0.72	0.55	0.54	0.56	0.73	0.73	0.73	0.73	0.73
20	0.51	0.50	0.59	0.50	0.52	0.45	0.54	0.58	0.67	0.43	0.50	0.48	0.57	0.57	0.57	0.57	0.57
24	0.51	0.53	0.62	0.49	0.50	0.42	0.49	0.57	0.64	0.42	0.52	0.50	0.52	0.52	0.52	0.52	0.52
30	0.51	0.55	0.66	0.49	0.49	0.40	0.45	0.55	0.61	0.40	0.55	0.53	0.55	0.55	0.55	0.55	0.55
40	0.52	0.57	0.70	0.48	0.47	0.38	0.41	0.53	0.57	0.39	0.57	0.54	0.55	0.55	0.55	0.55	0.55
60	0.52	0.60	0.73	0.48	0.46	0.36	0.37	0.51	0.54	0.38	0.60	0.56	0.35	0.35	0.35	0.35	0.35
98	0.53	0.62	0.77	0.47	0.44	0.35	0.37	0.50	0.52	0.38	0.62	0.58	0.40	0.40	0.40	0.40	0.40

Initial Supporting table -BankCylModeJerk

Description: Used for P0300 - P0308, Multiplier to Lores Jerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier

X Unit: RPM

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

y/x	500	600	700	800	900	1,000	1,100	1,200	1,400	1,800	2,200	2,600	3,000	3,001	5,000	6,000	7,000
8	1.85	2.29	2.04	1.90	1.79	2.19	1.54	1.90	1.63	1.47	1.66	2.65	2.67	2.67	2.67	2.67	2.67
12	1.26	1.43	1.46	1.44	1.37	1.30	1.26	1.41	1.37	1.19	1.46	2.00	2.70	2.70	2.70	2.70	2.70
16	1.01	1.04	1.26	1.19	1.11	1.00	0.95	1.17	0.97	0.94	0.88	1.20	2.00	2.00	2.00	2.00	2.00
20	0.95	0.90	1.16	1.05	0.99	0.89	0.87	1.00	0.94	0.88	0.77	1.10	1.50	1.50	1.50	1.50	1.50
24	0.89	0.82	1.10	0.97	0.91	0.83	0.82	0.90	0.94	0.72	0.75	1.14	1.29	1.29	1.29	1.29	1.29
30	0.83	0.75	1.04	0.89	0.85	0.77	0.78	0.81	0.91	0.70	0.71	0.97	1.16	1.16	1.16	1.16	1.16
40	0.79	0.68	0.98	0.82	0.78	0.72	0.74	0.73	0.88	0.68	0.66	0.87	1.09	1.09	1.09	1.09	1.09
60	0.74	0.62	0.93	0.76	0.73	0.69	0.70	0.67	0.86	0.67	0.63	0.80	1.05	1.05	1.05	1.05	1.05
98	0.71	0.58	0.89	0.72	0.70	0.67	0.68	0.62	0.85	0.69	0.59	0.71	1.04	1.04	1.04	1.04	1.04

Initial Supporting table - Catalyst_Damage_Misfire_Percentage

Description: Catalyst Damaging Misfire Percentage" Table whenever secondary conditions are met.

Value Units: percent misfire over 200 revolutions (%)

X Unit: RPM

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

y/x	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000
0	11.2	11.2	11.2	11.2	9.8	4.8	4.8	4.8
10	11.2	11.2	11.2	11.2	9.8	4.8	4.8	4.8
20	11.2	11.2	11.2	11.2	9.8	4.8	4.8	4.8
30	11.2	11.2	9.8	9.8	6.1	4.8	4.8	4.8
40	9.8	9.8	9.8	8.1	4.8	4.8	4.8	4.8
50	8.1	8.1	8.1	6.1	4.8	4.8	4.8	4.8
60	7.0	7.0	7.0	5.4	4.8	4.8	4.8	4.8
70	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
80	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
90	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
100	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8

Initial Supporting table - ClyAfterAFM_Decel

Description: Used for P0300 - P0308, Multiplier to Lores decel 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
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - $\phi_{lyBeforeAFM_Jerk}$

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 deactive cylinder on engine that supports cylinder deactivation in non even fire patterns.. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier

X Unit: RPM

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

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - 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, Multiplier to Lores decel to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier

X Unit: RPM

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

y/x	500	600	700	800	900	1,000	1,100	1,200	1,400	1,800	2,200	2,600	3,000	3,001	5,000	6,000	7,000
8	1.85	1.54	1.44	1.57	1.59	1.67	1.59	1.31	1.29	1.61	1.41	1.96	1.37	1.37	1.37	1.37	1.37
12	1.39	1.21	1.39	1.39	1.34	1.38	1.36	1.01	1.06	1.19	1.25	1.33	1.11	1.11	1.11	1.11	1.11
16	1.22	1.01	1.28	1.21	1.21	1.15	1.12	0.84	0.93	1.11	1.16	1.03	1.05	1.05	1.05	1.05	1.05
20	1.14	0.91	1.23	1.16	1.18	1.00	1.02	0.90	0.90	0.90	1.10	0.98	0.93	0.93	0.93	0.93	0.93
24	1.12	0.87	1.19	1.15	1.15	0.94	0.90	0.91	0.93	0.80	1.00	0.94	0.94	0.94	0.94	0.94	0.94
30	1.14	0.84	1.15	1.13	1.13	0.88	0.78	0.91	0.94	0.78	1.00	0.95	0.98	0.98	0.98	0.98	0.98
40	1.16	0.81	1.12	1.12	1.11	0.83	0.68	0.87	0.95	0.78	0.99	0.98	0.96	0.96	0.96	0.96	0.96
60	1.20	0.77	1.08	1.10	1.10	0.78	0.58	0.83	0.96	0.78	0.98	1.02	0.97	0.97	0.97	0.97	0.97
98	1.26	0.75	1.05	1.08	1.09	0.73	0.51	0.80	0.97	0.78	0.97	1.03	0.98	0.98	0.98	0.98	0.98

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	500	600	700	800	900	1,000	1,100	1,200	1,400	1,800	2,200	2,600	3,000	3,001	5,000	6,000	7,000
8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	1	0	0	0	0	0	0	0	-1	0	-1	-1	-1	-1	-1	-1	-1
16	1	0	0	0	0	0	0	-1	-1	-1	-1	-1	-2	-2	-2	-2	-2
20	1	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
24	1	0	0	0	0	0	0	0	-1	-1	0	-1	-1	-1	-1	-1	-1
30	1	0	0	0	0	0	0	0	-1	0	0	-1	-1	-1	-1	-1	-1
40	1	0	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1
60	0	0	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1
98	0	0	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1

Initial Supporting table - ConsecSCD_Decel

Description: Used for P0300 - P0308, Multplier to medres decel to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier

X Unit: RPM

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

y/x	400	500	600	700	800	900	1,000	1,100	1,200
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table ■ConsecSCD_Jerk

Description: Used for P0300 - P0308, Multitplier to medres Jerk to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier

X Unit: RPM

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

y/x	400	500	600	700	800	900	1,000	1,100	1,200
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.20	-0.20
12	0.00	0.00	0.00	-0.09	-0.17	-0.17	-0.10	0.00	-0.20
16	0.00	0.00	0.00	0.00	0.00	-0.03	0.00	-0.23	-0.39
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.15	-0.20
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
98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Initial Supporting table - CylAfterAFM Jerk

Description: Used for P0300 - P0308, 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
8	1	1	1	1	1	1	1	1	1
12	1	1	1	1	1	1	1	1	1
16	1	1	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1	1
24	1	1	1	1	1	1	1	1	1
30	1	1	1	1	1	1	1	1	1
40	1	1	1	1	1	1	1	1	1
60	1	1	1	1	1	1	1	1	1
98	1	1	1	1	1	1	1	1	1

Initial Supporting table - QylBeforeAFM_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
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - CylModeDecel

Description: Used for P0300-P0308. Crankshaft decel threshold. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time per cylinder (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	4,103	1,463	999	727	469	285	205	158	133	90	59	46	33
6	3,608	1,240	905	660	414	266	181	142	119	81	54	41	31
8	3,325	1,382	900	650	398	270	185	142	119	78	53	40	30
10	3,257	1,640	1,029	667	434	299	203	154	130	78	53	42	30
12	3,455	1,988	1,213	701	489	344	241	182	141	81	56	43	31
14	3,814	2,292	1,397	790	568	400	278	210	155	85	61	45	34
16	4,173	2,597	1,599	884	647	457	327	238	170	91	68	49	39
18	4,531	2,901	1,802	990	726	514	376	267	184	99	74	57	43
20	4,890	3,206	2,004	1,096	805	570	425	293	205	109	81	65	48
22	5,249	3,510	2,206	1,202	884	627	475	332	227	120	86	72	52
24	5,608	3,814	2,409	1,309	963	683	524	371	249	133	95	80	57
26	5,967	4,119	2,611	1,415	1,043	740	573	410	272	146	104	88	61
30	6,684	4,728	3,016	1,627	1,205	853	672	488	317	172	122	103	70
40	8,478	6,249	4,028	2,158	1,601	1,138	918	682	429	237	167	141	92
60	12,066	9,293	6,051	3,219	2,395	1,705	1,411	1,070	654	366	257	217	136
78	15,206	11,957	7,822	4,148	3,093	2,198	1,843	1,409	850	480	336	284	174
97	18,794	14,704	9,774	5,158	3,894	2,763	2,336	1,798	1,074	609	426	360	218

CylModeDecel - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,001	3,500	4,000	4,500	5,000	5,500	6,000	7,000
3	24	17	12	13	10	13	11	8	7	7	5	5	5
6	22	15	12	12	10	12	10	7	7	7	5	5	5
8	22	15	12	11	10	11	9	7	7	6	5	5	5
10	23	16	12	11	10	11	8	6	6	6	5	5	5
12	24	17	14	12	10	10	8	6	6	6	5	5	5
14	26	19	15	12	10	10	7	6	6	6	5	5	5
16	29	21	17	14	11	11	7	5	6	6	5	5	5
18	31	24	19	15	12	11	8	5	6	6	5	5	5
20	34	26	21	17	14	12	8	6	6	6	5	5	5
22	38	29	23	18	15	13	9	6	5	6	5	5	5
24	41	31	25	20	17	14	9	7	5	5	5	5	5

Initial Supporting table - CylModeDecel

26	44	34	27	22	18	15	10	7	6	6	5	5	5
30	51	39	31	25	20	17	11	8	6	6	5	5	5
40	68	51	42	33	27	22	14	10	8	7	5	5	5
60	101	76	62	49	39	31	20	14	10	9	6	6	6
78	131	98	80	63	50	39	24	18	13	9	7	7	7
97	164	123	101	78	62	48	30	22	15	11	9	9	9

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	12,363	1,248	734	667	453	317	188	162	136	87	55	43	30
6	12,171	1,159	735	576	386	267	166	142	124	79	50	40	29
8	12,061	1,314	748	524	373	261	165	135	111	75	48	40	28
10	11,951	1,518	780	579	397	273	190	135	120	75	49	40	26
12	11,933	1,803	1,043	667	447	306	225	150	124	77	49	43	28
14	12,216	2,210	1,326	752	523	360	261	193	135	86	54	46	30
16	12,588	2,719	1,610	873	611	433	322	236	145	96	61	50	34
18	12,961	3,092	1,893	994	708	506	382	279	155	106	68	53	40
20	13,333	3,544	2,176	1,115	804	579	443	321	184	116	75	56	46
22	13,706	3,996	2,459	1,236	900	652	504	364	212	126	82	65	51
24	14,078	4,448	2,742	1,357	996	725	565	407	240	144	95	73	57
26	14,451	4,900	3,025	1,478	1,092	797	625	450	268	160	107	81	63
30	15,196	5,804	3,549	1,720	1,285	943	747	536	323	193	131	97	75
40	17,058	8,064	4,971	2,324	1,766	1,307	1,050	750	463	274	190	138	104
60	20,783	12,583	7,815	3,533	2,731	2,036	1,658	1,178	741	437	309	219	163
78	24,042	16,538	10,304	4,591	3,563	2,681	2,188	1,554	985	580	413	290	214
97	27,721	21,058	12,949	5,798	4,515	3,339	2,796	1,986	1,263	744	532	372	273

CylModeJerk - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,001	3,500	4,000	4,500	5,000	5,500	6,000	7,000
3	24	17	11	12	8	0	0	0	0	0	0	0	0
6	21	15	11	10	8	0	0	0	0	0	0	0	0
8	19	14	10	9	8	0	0	0	0	0	0	0	0
10	18	13	10	8	7	0	0	0	0	0	0	0	0
12	19	15	11	9	6	0	0	0	0	0	0	0	0
14	22	18	13	9	6	0	0	0	0	0	0	0	0
16	26	20	14	12	7	0	0	0	0	0	0	0	0
18	30	23	16	13	8	0	0	0	0	0	0	0	0
20	33	25	18	14	9	0	0	0	0	0	0	0	0
22	37	28	20	15	11	0	0	0	0	0	0	0	0
24	40	31	22	16	12	0	0	0	0	0	0	0	0

Initial Supporting table - CylModeJerk

26	44	35	25	18	14	0	0	0	0	0	0	0	0
30	52	42	30	22	16	0	0	0	0	0	0	0	0
40	74	58	42	32	23	0	0	0	0	0	0	0	0
60	116	92	68	52	37	0	0	0	0	0	0	0	0
78	154	122	90	69	48	0	0	0	0	0	0	0	0
97	197	156	116	89	62	0	0	0	0	0	0	0	0

Initial Supporting table - DeacCylInversionDecel

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

Value Units: Delta time per cylinder (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
8	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
12	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
16	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
20	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
24	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
30	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
40	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
60	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
98	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384

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
8	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
12	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
16	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
20	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
24	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
30	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
40	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
60	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384
98	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384	-16,384

Initial Supporting table - EngineOverSpeedLimit

Description: Engine OverSpeed Limit versus gear**Value Units:** RPM**X Unit:** Enumeration of transmission gear state (enumeration)**EngineOverSpeedLimit - Part 1**

y/x	CeTGRR_e_TransGr1	CeTGRR_e_TransGr2	CeTGRR_e_TransGr3	CeTGRR_e_TransGr4	CeTGRR_e_TransGr5	CeTGRR_e_TransGr6	CeTGRR_e_TransGr9
1	5,600	5,600	5,600	5,600	5,600	5,600	5,600

EngineOverSpeedLimit - Part 2

y/x	CeTGRR_e_TransGr10	CeTGRR_e_TransGrNeut	CeTGRR_e_TransGrReverse	CeTGRR_e_TransGrPark	CeTGRR_e_TransGr7	CeTGRR_e_TransGr8	
1	5,600	4,000	5,600	4,000	5,600	5,600	

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	10.0	10.0	10.0	10.0	10.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Mapping table - 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	1.0	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	1.0	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	1.0	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	1.0	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	1.0	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	1.0	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	1.0	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	1.0	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	1.0	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 Percent (%)

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
0	11.0	11.0	11.0	10.0	8.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
13	11.0	11.0	11.0	10.0	8.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
25	12.0	12.0	12.0	12.0	8.0	6.0	4.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
38	13.0	13.0	13.0	13.0	10.0	8.6	4.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
50	13.0	13.0	13.0	13.0	10.0	8.6	4.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
63	13.0	13.0	13.0	13.0	10.0	8.6	6.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
75	13.0	13.0	13.0	13.0	10.0	8.6	6.0	5.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
88	13.0	13.0	13.0	13.0	10.0	8.6	7.0	6.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
100	13.0	13.0	13.0	13.0	10.0	8.6	7.5	7.0	6.0	5.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0

Initial Supporting table - P0420_BestFailingOSCTableB1

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

y/x	6.79	7.64	8.49	9.34	10.19	11.04	11.90	12.75	13.60	14.45	15.30	16.15	17.00	17.85	18.70	19.56	20.41
588.00	0.94	0.85	0.76	0.68	0.61	0.55	0.51	0.47	0.44	0.41	0.38	0.36	0.34	0.33	0.31	0.29	0.27
633.00	0.95	0.86	0.77	0.69	0.62	0.56	0.51	0.47	0.45	0.41	0.38	0.37	0.35	0.33	0.31	0.30	0.28
679.00	0.96	0.87	0.78	0.70	0.63	0.57	0.52	0.48	0.45	0.42	0.39	0.37	0.35	0.34	0.32	0.30	0.29
725.00	0.97	0.88	0.79	0.71	0.63	0.57	0.52	0.49	0.46	0.43	0.39	0.38	0.36	0.34	0.33	0.31	0.29
771.00	0.98	0.89	0.80	0.71	0.64	0.58	0.53	0.49	0.46	0.43	0.40	0.38	0.37	0.35	0.33	0.31	0.30
817.00	0.99	0.89	0.80	0.72	0.65	0.59	0.54	0.50	0.47	0.44	0.41	0.39	0.37	0.36	0.34	0.32	0.30
863.00	1.00	0.91	0.81	0.73	0.65	0.59	0.54	0.51	0.48	0.45	0.41	0.40	0.38	0.36	0.34	0.33	0.31
909.00	1.01	0.91	0.82	0.74	0.66	0.60	0.55	0.51	0.48	0.45	0.42	0.40	0.39	0.37	0.35	0.33	0.32
955.00	1.02	0.92	0.83	0.74	0.67	0.61	0.56	0.52	0.49	0.46	0.43	0.41	0.39	0.38	0.36	0.34	0.33

Initial Supporting table - P0420_WorstPassingOSCTableBI

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

y/x	6.79	7.64	8.49	9.34	10.19	11.04	11.90	12.75	13.60	14.45	15.30	16.15	17.00	17.85	18.70	19.56	20.41
588.00	3.59	2.79	2.06	1.42	1.24	1.09	1.00	0.84	0.75	0.67	0.61	0.54	0.48	0.43	0.39	0.35	0.31
633.00	3.66	2.86	2.13	1.48	1.30	1.16	1.06	0.91	0.81	0.74	0.67	0.60	0.54	0.49	0.45	0.41	0.37
679.00	3.73	2.93	2.18	1.53	1.35	1.21	1.11	0.96	0.86	0.79	0.72	0.66	0.60	0.55	0.51	0.47	0.43
725.00	3.79	2.99	2.23	1.58	1.40	1.26	1.16	1.01	0.91	0.84	0.77	0.71	0.65	0.60	0.56	0.52	0.48
771.00	3.85	3.05	2.27	1.62	1.44	1.30	1.20	1.05	0.95	0.88	0.81	0.74	0.68	0.63	0.59	0.55	0.51
817.00	3.91	3.11	2.31	1.66	1.48	1.34	1.24	1.09	0.99	0.92	0.85	0.78	0.72	0.67	0.63	0.59	0.55
863.00	3.96	3.16	2.34	1.69	1.51	1.37	1.27	1.12	1.02	0.95	0.88	0.82	0.76	0.71	0.67	0.63	0.59
909.00	4.01	3.21	2.37	1.72	1.54	1.40	1.30	1.15	1.05	0.98	0.91	0.85	0.79	0.74	0.70	0.66	0.62
955.00	4.05	3.25	2.41	1.76	1.58	1.44	1.34	1.19	1.09	1.02	0.95	0.88	0.83	0.78	0.74	0.70	0.66

Initial Supporting table - P0430_BestFailingOSCTableB2

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

y/x	6.79	7.64	8.49	9.34	10.19	11.04	11.90	12.75	13.60	14.45	15.30	16.15	17.00	17.85	18.70	19.56	20.41
588.00	0.96	0.87	0.78	0.70	0.63	0.57	0.53	0.49	0.46	0.44	0.42	0.41	0.39	0.37	0.35	0.34	0.32
633.00	0.97	0.88	0.79	0.71	0.64	0.58	0.53	0.49	0.47	0.44	0.43	0.41	0.39	0.38	0.36	0.34	0.33
679.00	0.98	0.89	0.80	0.72	0.65	0.59	0.54	0.50	0.47	0.45	0.43	0.42	0.40	0.38	0.37	0.35	0.33
725.00	0.99	0.90	0.81	0.73	0.65	0.59	0.54	0.51	0.48	0.46	0.44	0.42	0.41	0.39	0.37	0.36	0.34
771.00	1.00	0.91	0.82	0.73	0.66	0.60	0.55	0.51	0.48	0.46	0.45	0.43	0.41	0.40	0.38	0.36	0.34
817.00	1.01	0.92	0.82	0.74	0.67	0.61	0.56	0.52	0.49	0.47	0.46	0.44	0.42	0.40	0.39	0.37	0.35
863.00	1.02	0.92	0.83	0.75	0.67	0.61	0.56	0.53	0.50	0.48	0.46	0.44	0.43	0.41	0.39	0.38	0.36
909.00	1.03	0.93	0.84	0.75	0.68	0.62	0.57	0.53	0.50	0.48	0.47	0.45	0.43	0.42	0.40	0.38	0.36
955.00	1.04	0.94	0.85	0.76	0.69	0.63	0.58	0.54	0.51	0.49	0.47	0.46	0.44	0.42	0.41	0.39	0.37

Initial Supporting table - P0430_WorstPassingOSCTableB2

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

y/x	6.79	7.64	8.49	9.34	10.19	11.04	11.90	12.75	13.60	14.45	15.30	16.15	17.00	17.85	18.70	19.56	20.41
588.00	3.67	2.87	2.14	1.49	1.41	1.27	1.17	1.02	0.92	0.85	0.78	0.71	0.66	0.61	0.57	0.53	0.49
633.00	3.71	2.91	2.18	1.53	1.45	1.31	1.21	1.06	0.96	0.89	0.82	0.75	0.69	0.64	0.60	0.56	0.52
679.00	3.75	2.95	2.21	1.56	1.48	1.34	1.24	1.09	0.99	0.92	0.85	0.78	0.72	0.67	0.63	0.59	0.55
725.00	3.80	3.00	2.24	1.59	1.51	1.37	1.27	1.12	1.02	0.95	0.88	0.82	0.76	0.71	0.67	0.63	0.59
771.00	3.87	3.07	2.28	1.63	1.55	1.41	1.31	1.16	1.06	0.99	0.92	0.85	0.79	0.74	0.70	0.66	0.62
817.00	3.91	3.11	2.31	1.66	1.58	1.44	1.34	1.19	1.09	1.02	0.95	0.88	0.82	0.77	0.73	0.69	0.65
863.00	3.96	3.16	2.34	1.69	1.61	1.47	1.37	1.22	1.12	1.05	0.98	0.92	0.86	0.81	0.77	0.73	0.69
909.00	4.01	3.21	2.37	1.72	1.64	1.50	1.40	1.25	1.15	1.08	1.01	0.95	0.89	0.84	0.80	0.76	0.72
955.00	4.05	3.25	2.41	1.76	1.68	1.54	1.44	1.29	1.19	1.12	1.05	0.99	0.92	0.88	0.83	0.79	0.75

Initial Supporting table - Pair_SCD_Decel

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

Value Units: multiplier

X Unit: RPM

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

y/x	400	500	600	700	800	900	1,000	1,100	1,200
8	1.75	1.64	1.35	0.94	1.00	1.30	0.96	1.05	1.00
12	2.18	1.39	1.13	1.12	1.12	1.03	1.09	1.00	1.00
16	2.64	1.58	1.18	1.20	1.14	1.07	1.10	1.15	1.10
20	3.41	1.77	1.34	1.25	1.14	1.16	1.20	1.30	1.23
24	3.41	1.77	1.34	1.25	1.14	1.16	1.20	1.30	1.23
30	3.41	1.77	1.34	1.25	1.14	1.16	1.20	1.30	1.23
40	3.41	1.77	1.34	1.25	1.14	1.16	1.20	1.30	1.23
60	3.41	1.77	1.34	1.25	1.14	1.16	1.20	1.30	1.23
98	3.41	1.77	1.34	1.25	1.14	1.16	1.20	1.30	1.23

Initial Supporting tablej - 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	400	500	600	700	800	900	1,000	1,100	1,200
8	1.48	1.40	1.93	1.35	1.33	1.35	1.57	1.42	1.20
12	2.18	1.53	1.45	1.15	1.25	1.16	1.24	1.30	0.88
16	3.08	1.42	1.13	1.11	1.14	1.06	1.08	1.14	0.83
20	3.36	1.30	1.03	1.09	1.07	1.01	0.98	1.06	0.83
24	3.36	1.30	1.03	1.09	1.07	1.01	0.98	1.06	0.83
30	3.36	1.30	1.03	1.09	1.07	1.01	0.98	1.06	0.83
40	3.36	1.30	1.03	1.09	1.07	1.01	0.98	1.06	0.83
60	3.36	1.30	1.03	1.09	1.07	1.01	0.98	1.06	0.83
98	3.36	1.30	1.03	1.09	1.07	1.01	0.98	1.06	0.83

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	500	600	700	800	900	1,000	1,100	1,200	1,400	1,800	2,200	2,600	3,000	3,001	5,000	6,000	7,000
8	1.19	1.11	1.02	1.23	1.20	1.13	1.10	0.97	0.96	1.06	0.95	1.09	0.84	0.84	0.84	0.84	0.84
12	0.96	0.90	1.06	1.14	1.04	0.94	0.94	0.89	0.91	0.94	0.83	0.93	0.89	0.89	0.89	0.89	0.89
16	0.88	0.79	1.03	1.04	0.96	0.85	0.87	0.90	0.98	0.98	0.77	0.79	0.91	0.91	0.91	0.91	0.91
20	0.88	0.76	0.98	0.98	0.92	0.82	0.88	0.93	1.02	0.89	0.75	0.76	0.89	0.89	0.89	0.89	0.89
24	0.86	0.75	0.95	0.94	0.89	0.79	0.83	0.92	1.01	0.85	0.74	0.78	0.88	0.88	0.88	0.88	0.88
30	0.83	0.73	0.92	0.90	0.86	0.77	0.79	0.90	0.98	0.80	0.75	0.79	0.90	0.90	0.90	0.90	0.90
40	0.79	0.71	0.89	0.86	0.83	0.75	0.75	0.89	0.95	0.77	0.77	0.81	0.89	0.89	0.89	0.89	0.89
60	0.74	0.69	0.86	0.82	0.80	0.72	0.72	0.87	0.92	0.73	0.78	0.83	0.90	0.90	0.90	0.90	0.90
98	0.72	0.69	0.85	0.79	0.78	0.69	0.70	0.86	0.91	0.70	0.79	0.84	0.90	0.90	0.90	0.90	0.90

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	500	600	700	800	900	1,000	1,100	1,200	1,400	1,800	2,200	2,600	3,000	3,001	5,000	6,000	7,000
8	1.25	1.43	1.24	1.31	1.25	1.29	1.24	1.34	1.13	1.08	1.34	1.70	1.33	1.33	1.33	1.33	1.33
12	1.21	1.18	1.16	1.28	1.25	1.09	1.26	1.02	1.10	0.92	1.24	0.60	0.70	0.70	0.70	0.70	0.70
16	1.10	0.90	1.13	1.12	1.03	0.92	0.97	1.17	0.99	0.96	0.98	0.80	0.90	0.90	0.90	0.90	0.90
20	1.08	0.80	1.07	0.99	0.93	0.83	0.90	1.18	1.05	1.08	1.03	0.97	1.10	1.10	1.10	1.10	1.10
24	1.05	0.76	1.04	0.92	0.92	0.78	0.85	1.11	1.03	1.02	1.08	1.00	1.29	1.29	1.29	1.29	1.29
30	1.02	0.74	1.00	0.84	0.91	0.74	0.81	1.05	0.98	0.96	1.09	1.05	1.25	1.25	1.25	1.25	1.25
40	1.00	0.70	0.97	0.77	0.91	0.70	0.78	0.99	0.93	0.92	1.07	1.10	1.22	1.22	1.22	1.22	1.22
60	0.97	0.66	0.95	0.71	0.90	0.67	0.75	0.95	0.88	0.88	1.06	1.12	1.19	1.19	1.19	1.19	1.19
98	0.97	0.64	0.93	0.69	0.91	0.65	0.72	0.90	0.88	0.85	1.04	1.14	1.18	1.18	1.18	1.18	1.18

Initial Supporting table - Random_SCD_Decel

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

Value Units: multiplier

X Unit: RPM

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

y/x	400	500	600	700	800	900	1,000	1,100	1,200
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.00
16	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
20	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
24	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
30	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
40	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
60	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
98	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15

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	400	500	600	700	800	900	1,000	1,100	1,200
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.00
16	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.10
20	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
24	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
30	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
40	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
60	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
98	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15

Initial Supporting table - RandomAFM_Decl

Description: Used for P0300 - P0308, Multiplier to CylinderJDecel 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
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RandomAFM_Jerk

Description: Used for P0300 - P0308, 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
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RandomCylModDecel

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

Value Units: Multiplier

X Unit: RPM

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

y/x	500	600	700	800	900	1,000	1,100	1,200	1,400	1,800	2,200	2,600	3,000	3,001	5,000	6,000	7,000
8	1.39	1.28	1.00	1.11	1.15	1.18	1.31	1.00	1.00	1.00	1.00	1.10	1.05	1.05	1.05	1.05	1.05
12	1.33	1.21	1.21	1.20	1.23	1.20	1.36	1.10	1.21	1.13	1.00	1.10	1.15	1.15	1.15	1.15	1.15
16	1.30	1.14	1.20	1.14	1.17	1.10	1.25	1.17	1.44	1.35	1.18	1.15	1.45	1.45	1.45	1.45	1.45
20	1.28	1.09	1.16	1.09	1.13	1.01	1.20	1.18	1.51	1.28	1.31	1.43	1.46	1.46	1.46	1.46	1.46
24	1.26	1.06	1.14	1.07	1.10	1.00	1.09	1.14	1.49	1.25	1.35	1.42	1.48	1.48	1.48	1.48	1.48
30	1.25	1.03	1.12	1.03	1.08	1.00	1.00	1.10	1.44	1.22	1.40	1.44	1.52	1.52	1.52	1.52	1.52
40	1.24	1.00	1.09	1.00	1.06	1.00	1.00	1.06	1.40	1.20	1.47	1.42	1.53	1.53	1.53	1.53	1.53
60	1.26	1.00	1.08	1.00	1.04	1.00	1.00	1.00	1.37	1.17	1.52	1.43	1.55	1.55	1.55	1.55	1.55
98	1.32	1.00	1.09	1.00	1.04	1.00	1.00	1.00	1.34	1.15	1.57	1.40	1.60	1.60	1.60	1.60	1.60

Initial Supporting table - RandomCylModJerk

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

Value Units: multiplier

X Unit: RPM

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

y/x	500	600	700	800	900	1,000	1,100	1,200	1,400	1,800	2,200	2,600	3,000	3,001	5,000	6,000	7,000
8	1.53	1.35	1.00	1.00	1.00	1.11	1.19	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.69	1.33	1.14	1.12	1.14	1.12	1.39	1.19	1.08	1.00	1.00	1.00	1.35	1.35	1.35	1.35	1.35
16	1.50	1.10	1.15	1.07	1.04	1.00	1.08	1.31	1.15	1.19	1.23	1.10	1.60	1.60	1.60	1.60	1.60
20	1.45	1.00	1.11	1.01	1.00	1.00	1.00	1.25	1.24	1.15	1.15	1.40	1.50	1.50	1.50	1.50	1.50
24	1.40	1.00	1.09	1.00	1.00	1.00	1.00	1.13	1.24	1.15	1.15	1.36	1.54	1.54	1.54	1.54	1.54
30	1.35	1.00	1.08	1.00	1.00	1.00	1.00	1.04	1.18	1.15	1.15	1.24	1.41	1.41	1.41	1.41	1.41
40	1.30	1.00	1.07	1.00	1.00	1.00	1.00	1.00	1.14	1.05	1.05	1.20	1.28	1.28	1.28	1.28	1.28
60	1.26	1.00	1.07	1.00	1.00	1.00	1.00	1.00	1.10	1.05	1.05	1.16	1.21	1.21	1.21	1.21	1.21
98	1.22	1.00	1.08	1.00	1.00	1.00	1.00	1.00	1.08	1.08	1.10	1.13	1.15	1.15	1.15	1.15	1.15

Initial Supporting table - FandomRevModDecI

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	3,001	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RepetSnapDecayAdjst

Description: Used for P0300 - P0308, If misfire is present in consecutive engine cycles, this multiplier is applied to the misfire jerk threshold and compared to a crankshaft snap value after the misfire has taken place.. Table lookup as a function of engine rpm.

Value Units: multiplier

X Unit: RPM

y/x	900	1,100	1,400	1,800	2,200	2,600	3,000	4,000	5,000
1	1.00	1.00	1.31	1.00	1.08	1.04	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	3,001	3,500	4,000	4,500	5,000	5,500	6,000	7,000
3	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	135	96	85	52	37	34	21	21
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	125	86	72	49	35	32	21	21
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	120	81	65	47	34	31	21	21
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	121	77	58	45	33	30	21	21
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	129	78	54	42	32	29	23	23
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	143	88	58	44	32	28	26	26
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	158	98	66	47	37	28	29	29
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	176	109	73	52	40	30	32	32
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	194	119	81	58	44	33	35	34
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	212	129	88	63	47	35	37	37
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	230	139	96	69	50	36	40	40
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	248	149	99	74	53	36	43	43
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	283	171	107	85	56	35	49	48
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	372	227	143	113	75	52	62	62
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	548	338	215	168	113	88	90	90
78	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	709	435	279	217	146	119	115	114
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	894	546	351	272	184	154	141	140

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

Initial Supporting Table - SCD_Decel

Description: Used for P0300-P0308 Crankshaft decel threshold. SCD mode uses smaller windows 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	1,047	583	413	273	187	131	85	66	65	32,767	32,767	32,767	32,767
6	1,008	543	357	248	167	111	76	60	55	32,767	32,767	32,767	32,767
8	1,029	556	360	256	163	113	81	62	52	32,767	32,767	32,767	32,767
10	1,070	599	420	276	179	131	92	69	55	32,767	32,767	32,767	32,767
12	1,144	670	477	314	211	150	104	76	57	32,767	32,767	32,767	32,767
14	1,222	755	543	353	243	168	115	83	62	32,767	32,767	32,767	32,767
16	1,300	841	599	392	275	186	127	90	68	32,767	32,767	32,767	32,767
18	1,378	926	655	430	307	204	138	97	75	32,767	32,767	32,767	32,767
20	1,456	1,011	705	469	339	223	149	105	83	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
78	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - SCD_Jerk

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

Value Units: Change in Delta time per cylinder from last cylinder (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	865	492	354	247	202	121	77	67	60	32,767	32,767	32,767	32,767
6	759	439	283	219	173	106	71	59	53	32,767	32,767	32,767	32,767
8	748	429	267	217	162	104	68	57	50	32,767	32,767	32,767	32,767
10	805	471	304	253	169	115	79	58	51	32,767	32,767	32,767	32,767
12	925	592	430	310	200	147	99	71	58	32,767	32,767	32,767	32,767
14	1,033	732	584	372	247	179	119	85	66	32,767	32,767	32,767	32,767
16	1,147	872	688	435	297	211	138	99	73	32,767	32,767	32,767	32,767
18	1,261	1,013	792	503	347	244	158	112	80	32,767	32,767	32,767	32,767
20	1,366	1,153	897	563	398	276	178	126	87	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
78	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - SnapDecayAfterMisfire

Description: Used for P0300 - P0308, multiplier times the ddtjerk value used used to detect misfire at that speed and load to see if size of disturbance has died down as expected of real misfire. Table lookup as a function of engine rpm and trans gear ratio.

Value Units: multiplier

X Unit: RPM

Y Units: gear ratio

y/x	900	1,100	1,400	1,800	2,200	2,600	3,000	4,000	5,000
1	1.50	2.50	2.00	2.50	2.50	4.50	5.00	5.00	5.00
1	1.50	2.00	2.00	3.00	2.50	4.50	5.00	5.00	5.00
1	1.50	2.00	1.50	2.50	3.00	4.50	5.00	5.00	5.00
1	1.00	2.00	1.50	2.50	2.50	4.00	5.00	5.00	5.00
2	1.00	2.00	1.50	3.00	3.00	3.50	5.00	4.50	4.50
2	1.00	2.00	1.50	3.00	2.50	3.50	4.00	4.00	4.00
3	1.00	2.00	3.00	3.50	2.50	3.00	3.50	3.50	3.50
5	1.00	1.00	1.00	3.00	1.50	3.50	3.00	3.00	3.00
8	0.50	0.50	0.50	1.50	1.00	1.50	1.50	1.50	1.50

Initial Supporting table - TCSSRoughRoadThres

Description: Used for P0300-P0308. Only used if Rough Road source = TOSS: dispersion Value on Transmission Output Speed Sensor above which rough road is indicated present

Value Units: change in rpm per sec (rpm)

X Unit: Engine Speed (RPM)

Y Units: Transmission Speed (RPM)

y/x	600	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000
100	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
300	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
500	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
600	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
700	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
800	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
900	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,000	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,100	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,300	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Initial Supporting table - WaitToStart

Description: Used for P0300-P0308. Number of engine cycles to delay if diesel engine is cranked before wait to start lamp is extinguished. This lookup table determines the delay length by taking into account the coolant temperature.

Value Units: Number of Engine Cycles (integer)

X Unit: Engine Coolant (deg C)

y/x	-20	-10	0	10	20	30	40	50	60
1	0	0	0	0	0	0	0	0	0

Initial Supporting table - WSSRoughRoadThres

Description: Used for P0300-P0308. Only used if Wheel speed from ABS is used. If difference between wheel speed readings is larger than this limit, rough road is present

Value Units: acceleration

X Unit: Vehicle Speed (KPH)

y/x	0	12	24	36	48	60	72	85	97	109	121	133	145	157	169	181	193
1	0.40002	0.42004	0.43994	0.45996	0.47998	0.50000	0.52002	0.54004	0.56006	0.57996	0.59998	0.62000	0.64001	0.66003	0.68005	0.69995	0.71997

Initial Supporting table - ZeroTorqueAFM

Description: Used for P0300-P0308. Zero torque engine load while in Active Fuel Management. %of Max Brake Torque along the Neutral rev line, as a function of RPM and Baro

Value Units: Percent of Maximum Brake torque (%)

X Unit: RPM

Y Units: Barometric Pressure (kPa)

ZeroTorqueAFM - Part 1

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
65	-3.50	-3.50	-3.50	-2.50	-2.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00
75	-3.50	-3.50	-3.50	-2.50	-2.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00
85	-3.50	-3.50	-3.50	-2.50	-2.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00
95	-3.50	-3.50	-3.50	-2.50	-2.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00
105	-3.50	-3.50	-3.50	-2.50	-2.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00

ZeroTorqueAFM - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,001	3,500	4,000	4,500	5,000	5,500	6,000	7,000
65	-1.00	-1.00	-1.00	-1.00	-1.00	-0.15	2.35	4.85	7.35	9.85	12.35	14.85	17.35
75	-1.00	-1.00	-1.00	-1.00	-1.00	-0.15	2.35	4.85	7.35	9.85	12.35	14.85	17.35
85	-1.00	-1.00	-1.00	-1.00	-1.00	-0.15	2.35	4.85	7.35	9.85	12.35	14.85	17.35
95	-1.00	-1.00	-1.00	-1.00	-1.00	-0.15	2.35	4.85	7.35	9.85	12.35	14.85	17.35
105	-1.00	-1.00	-1.00	-1.00	-1.00	-0.15	2.35	4.85	7.35	9.85	12.35	14.85	17.35

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	-2.85	-2.85	-2.85	-2.80	-2.60	-2.25	-1.95	-1.70	-1.45	-0.70	-0.70	-0.70	-0.70
75	-2.60	-2.60	-2.60	-2.55	-2.35	-2.00	-1.70	-1.45	-1.20	-0.45	-0.45	-0.45	-0.45
85	-2.35	-2.35	-2.35	-2.30	-2.10	-1.75	-1.45	-1.20	-0.95	-0.20	-0.20	-0.20	-0.20
95	-2.10	-2.10	-2.10	-2.05	-1.85	-1.50	-1.20	-0.95	-0.70	0.05	0.05	0.05	0.05
105	-1.85	-1.85	-1.85	-1.80	-1.60	-1.25	-0.95	-0.70	-0.45	0.30	0.30	0.30	0.30

ZeroTorqueEngLoad - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,001	3,500	4,000	4,500	5,000	5,500	6,000	7,000
65	-0.70	-0.70	-0.70	-0.70	-0.70	-0.70	3.66	8.01	12.37	16.72	21.08	25.43	34.15
75	-0.45	-0.45	-0.45	-0.45	-0.45	-0.45	3.91	8.26	12.62	16.97	21.33	25.68	34.40
85	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	4.16	8.51	12.87	17.22	21.58	25.93	34.65
95	0.05	0.05	0.05	0.05	0.05	0.05	4.41	8.76	13.12	17.47	21.83	26.18	34.90
105	0.30	0.30	0.30	0.30	0.30	0.30	4.66	9.01	13.37	17.72	22.08	26.43	35.15

Initial Supporting table - Closed Loop Enable Clarification - KaFCLP U SphrIntglOfst Thrsh

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

Value Units: millivolts

X Unit: Post Catalyst Number

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

Initial Supporting table - Closed Loop Enable Clarification - KcFCLP_Cnt_O2RdyCyclesThrsh	
Description: Number of times a post oxygen sensor value must be in range before declaring it ready	
Value Units: Time (events * 12.5 milliseconds)	
y/x	1
1	10

Initial Supporting table - Closed Loop Enable Clarification - KcFULC_O2_SensorReadyEvents

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

Value Units: Time (events * 12.5 milliseconds)

y/x	1
1	10

Initial Supporting table - Closed Loop Enable Clarification - KeEOSDURichThrsh

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	75

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	950

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	500

Initial Supporting table - Closed Loop Enable Clarification - KeFULC T WRAF SensorReadyThrsh

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

Value Units: Degrees Celcius

y/x	1
1	700

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

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

Value Units: Degrees Celcius

y/x	1
1	628

Initial Supporting table - Closed Loop Enable Clarification - KeWRSI_T_PumpCurrentEnable	
Description: WRAF heater temperature threshold for enabling the sensor pump current	
Value Units: Degrees Celcius	
y/x	1
1	628

Initial Supporting table - Closed Loop Enable Clarification - KfFCLL T AdaptiveLoCoolant**Description:** LTM learning is inhibited if the engine coolant temperature is below this calibration.**Value Units:** Degrees Celcius

y/x	1
1	39

Initial Supporting table - Closed Loop Enable Clarification - KfFCLP_U_O2ReadyThrshLo

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

Value Units: millivolts

y/x	1
1	1,100

Initial Supporting table - Closed Loop Enable Clarification - KfFULC_U_O2_SensorReadyThrshLo

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

Value Units: millivolts

y/x	1
1	1,795

Initial Supporting table - Closed Loop Enable Clarification - KtFCLL p AdaptiveLowMAP Limit**Description:** Long term fuel learning is disabled below this MAP limit as a function of barometric pressure.**Value Units:** KPa**X Unit:** KPa

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

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	220.0	220.0	220.0	196.0	120.0	72.0	60.0	60.0	52.0	41.0	35.0	32.0	36.0	40.0	44.0	60.0	60.0

Initial Supporting table - Closed Loop Enable Clarification - KtFCLPtPostIntglRamplnTime

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

Value Units: Time in seconds

X Unit: Degrees Celcius

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

Initial Supporting table - Closed Loop Enable Clarification - KtFSTA_t_ClosedLoopAutostart

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

Value Units: Time in seconds

X Unit: Degrees Celcius

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
0	360.0	300.0	240.0	180.0	130.0	55.0	45.0	35.0	20.0	10.0	8.0	5.0	10.0	10.0	10.0	10.0	10.0
25	360.0	300.0	240.0	180.0	130.0	55.0	45.0	35.0	20.0	10.0	8.0	5.0	10.0	10.0	10.0	10.0	10.0
50	360.0	300.0	240.0	180.0	130.0	55.0	45.0	35.0	20.0	10.0	8.0	5.0	10.0	10.0	10.0	10.0	10.0
75	360.0	300.0	240.0	180.0	130.0	55.0	45.0	35.0	20.0	10.0	8.0	5.0	10.0	10.0	10.0	10.0	10.0
100	360.0	300.0	240.0	180.0	130.0	55.0	45.0	35.0	20.0	10.0	8.0	5.0	10.0	10.0	10.0	10.0	10.0

Initial Supporting table - Closed Loop Enable Clarification - KtFSTA_t_ClosedLoopTime

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

Value Units: Time in seconds

X Unit: Degrees Celcius

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
0	360.0	300.0	240.0	180.0	130.0	55.0	45.0	35.0	20.0	10.0	8.0	5.0	10.0	10.0	10.0	10.0	10.0
25	360.0	300.0	240.0	180.0	130.0	55.0	45.0	35.0	20.0	10.0	8.0	5.0	10.0	10.0	10.0	10.0	10.0
50	360.0	300.0	240.0	180.0	130.0	55.0	45.0	35.0	20.0	10.0	8.0	5.0	10.0	10.0	10.0	10.0	10.0
75	360.0	300.0	240.0	180.0	130.0	55.0	45.0	35.0	20.0	10.0	8.0	5.0	10.0	10.0	10.0	10.0	10.0
100	360.0	300.0	240.0	180.0	130.0	55.0	45.0	35.0	20.0	10.0	8.0	5.0	10.0	10.0	10.0	10.0	10.0

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	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30

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 EON)V 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	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5
2	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5
3	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5
4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5
5	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5
6	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5
7	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5
8	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5
9	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5
10	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5
11	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5
12	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5
13	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5
14	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5
15	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5
16	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5
17	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-174.4	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5

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	100	96	92	88	84	81	77	73	69	65	62	58	54	50	46	43	39

Initial Supporting table - P057B KtBRKI K CmpltTestPointWeight

Description:									
y/x	0.000	0.010	0.020	0.026	0.050	0.250	0.500	0.750	1.000
1	0	0	0	1	1	1	1	1	1

Initial Supporting table - P057B KtBRKI K FastTestPointWeight

Description:									
y/x	0.000	0.010	0.020	0.026	0.050	0.250	0.500	0.750	1.000
1	0	0	0	1	1	1	1	1	1

Initial Supporting table - DFCO CoolEnbIHi Temp

Description:			
y/x	-40	0	25
1	30.0	30.0	30.0

Initial Supporting table - DFCODelayAfterStartTime

Description:					
y/x	-30	20	55	70	90
1	30.0	30.0	30.0	30.0	30.0

Initial Supporting table - DFCO DrvrReqZPTEnbIOF

Description:

DFCO_DrvrReqZPTEnbIOF - Part 1

y/x	CeDTRR_e_TrqShapingRateA	CeDTRR_e_TrqShapingRateB	CeDTRR_e_TrqShapingRateC	CeDTRR_e_TrqShapingRateD	CeDTRR_e_TrqShapingRateE
CeTCOR_e_Exh_Normal	12	12	12	12	12
CeTCOR_e_Exh_Sport	12	12	12	12	12
CeTCOR_e_Exh_Track	12	12	12	12	12

DFCO_DrvrReqZPTEnbIOF - Part 2

y/x	CeDTRR_e_TrqShapingRateF	CeDTRR e TrqShapingRate G	CeDTRR_e_TrqShapingRateH	CeDTRR_e_TrqShapingRateI	CeDTRR_e_TrqShapingRateJ
CeTCOR_e_Exh_Normal	12	12	12	12	12
CeTCOR_e_Exh_Sport	12	12	12	12	12
CeTCOR_e_Exh_Track	12	12	12	12	12

Initial Supporting table - DFCO_DsbILo_Vehicle_Speed

Description:		
y/x	CeTCOR_e_NonEcoMode	CeTCOR_e_EcoMode
CeTGRR_e_TransGr1	20	20
CeTGRR_e_TransGr2	27	27
CeTGRR_e_TransGr3	27	27
CeTGRR_e_TransGr4	0	0
CeTGRR_e_TransGr5	0	0
CeTGRR_e_TransGr6	0	0
CeTGRR_e_TransGr9	0	0
CeTGRR_e_TransGr10	0	0
CeTGRR_e_TransGrNeut	0	0
CeTGRR_e_TransGrRvrs	0	0
CeTGRR_e_TransGrPark	0	0
CeTGRR_e_TransGr7	0	0
CeTGRR_e_TransGr8	0	0

Initial Supporting table - DFCO EnbIHi Vehicle Speed

Description:		
y/x	CeTCOR_e_NonEcoMode	CeTCOR_e_EcoMode
CeTGRR_e_TransGr1	23.3	23.3
CeTGRR_e_TransGr2	30.0	30.0
CeTGRR_e_TransGr3	33.0	33.0
CeTGRR_e_TransGr4	32.0	32.0
CeTGRR_e_TransGr5	0.0	0.0
CeTGRR_e_TransGr6	0.0	0.0
CeTGRR_e_TransGr9	0.0	0.0
CeTGRR_e_TransGr10	0.0	0.0
CeTGRR_e_TransGrNeut	0.0	0.0
CeTGRR_e_TransGrRvrs	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	-2,500	-2,150	-1,500	-500	-200	-150	-100	-8	0
1	500	100	50	0	0	0	0	0	0

Initial Supporting table - DFCO MinRunImmDsblOf

Description:

DFCO_MinRunImmDsblOf - Part 1

y/x	CeDTRR_e_TrqShapingRateA	CeDTRR_e_TrqShapingRateB	CeDTRR_e_TrqShapingRateC	CeDTRR_e_TrqShapingRateD	CeDTRR_e_TrqShapingRateE
CeTCOR_e_Exh_Normal	65,535	65,535	65,535	65,535	65,535
CeTCOR_e_Exh_Sport	65,535	65,535	65,535	65,535	65,535
CeTCOR_e_Exh_Track	65,535	65,535	65,535	65,535	65,535

DFCO_MinRunImmDsblOf - Part 2

y/x	CeDTRR_e_TrqShapingRateF	CeDTRR e TrqShapingRate G	CeDTRR_e_TrqShapingRateH	CeDTRR_e_TrqShapingRateI	CeDTRR_e_TrqShapingRateJ
CeTCOR_e_Exh_Normal	65,535	65,535	65,535	65,535	65,535
CeTCOR_e_Exh_Sport	65,535	65,535	65,535	65,535	65,535
CeTCOR_e_Exh_Track	65,535	65,535	65,535	65,535	65,535

Initial Supporting table - DFCO ZeroPedAxITrqDisbIOfst

Description:

DFCO_ZeroPedAxITrqDisbIOfst - Part 1

y/x	CeDTRR_e_TrqShapingRateA	CeDTRR_e_TrqShapingRateB	CeDTRR_e_TrqShapingRateC	CeDTRR_e_TrqShapingRateD	CeDTRR_e_TrqShapingRateE
CeTCOR_e_Exh_Normal	20	20	20	20	20
CeTCOR_e_Exh_Sport	20	20	20	20	20
CeTCOR_e_Exh_Track	20	20	20	20	20

DFCO_ZeroPedAxITrqDisbIOfst - Part 2

y/x	CeDTRR_e_TrqShapingRateF	CeDTRR e TrqShapingRate G	CeDTRR_e_TrqShapingRateH	CeDTRR_e_TrqShapingRateI	CeDTRR_e_TrqShapingRateJ
CeTCOR_e_Exh_Normal	20	20	20	20	20
CeTCOR_e_Exh_Sport	20	20	20	20	20
CeTCOR_e_Exh_Track	20	20	20	20	20

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	33.54	42.51	47.48	67.94	255.00	255.00	255.00	255.00	255.00

Initial Supporting table - P0068_Delta MAP Threshold f(TPS)

Description: Table of delta MAP values as a function of desired throttle position. The output of this table provides a delta MAP that if the measured minus the estimated MAP exceeds, is considered a fail.

Value Units: Delta MAP Values (kPa)

X Unit: Desired Throttle Position (Pct)

y/x	15.00	20.00	25.00	30.00	35.00	40.00	45.00	50.00	100.00
1.00	28.14	25.09	22.41	20.50	255.00	255.00	255.00	255.00	255.00

Initial Supporting table - P0068_Maximum MAF f(RPM)

Description: Table of maximum MAF values vs. engine speed. This is the maximum MAF the engine can see under all ambient conditions.

Value Units: Delta MAF Values (dm)

X Unit: Engine Speed (RPM)

y/x	600.00	1,400.00	2,200.00	3,000.00	3,800.00	4,600.00	5,400.00	6,200.00	7,000.00
1.00	30.00	68.00	112.00	155.00	207.00	262.00	298.00	305.00	305.00

Initial Supporting table - P0068_Maximum MAF f(Volts)

Description: Table of maximum MAF values vs. system voltage. The output of the air meter is clamped to lower values as system voltage drops off.

Value Units: Delta MAF Values (dm)

X Unit: System Voltage (V)

y/x	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00
1.00	69.70	180.36	376.20	511.99	511.99	511.99	511.99	511.99	511.99

Initial Supporting table - P0326_P0331_AbnormalNoise_Thresh_AFM

Description: Fail threshold for the Knock Performance Abnormal Noise Diagnostic when engine IS in AFM mode

Value Units: Filtered background engine noise. Unit-less term from the Knock Detection Fast Fourier Transform (FFT) for a selected frequency range.

X Unit: Engine Speed (RPM)

Y Units: N/A

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.064	0.064	0.064	0.064	0.068	0.100	0.152	0.243	0.718	0.851	1.855	1.855	1.855	1.855	1.855	1.855	1.855

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_EventASeq	CePISR_e_EventBSeq	CePISR_e_EventCSeq
1	200.000	500.000	500.000	1,000.000	8,191.875	8,191.875	8,191.875	8,191.875

Initial Supporting table - P0606_PSW Sequence Fail f(Loop Time)

Description: Fail threshold for PSW per operating loop.

Value Units: Fail threshold for PSW (count)

X Unit: Operating Loop (enum)

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	5	3	5	3	5	3	5	3

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventASeq	CePISR_e_EventBSeq	CePISR_e_EventCSeq
1	5	3	5	3	5	5	5	5

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

Description: Sample threshold for PSW per operating loop.

Value Units: Sample threshold for PSW (count)

X Unit: Operating Loop (enum)

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_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_EventASeq	CePISR_e_EventBSeq	CePISR_e_EventCSeq
1	4	4	4	4	4	4	4	4

Initial Supporting table - P1682 PT Relay Pull-in Run/Crank Voltage f(IAT)**Description:** The Run/Crank voltages required to pull in the PT relay as a function of induction air temperature.**Value Units:** Run/Crank Voltages required to pull in PT Relay (V)**X Unit:** Induction Air Temperature (deg C)

y/x	23.0	85.0	95.0	105.0	125.0
1	7.000	8.699	9.000	9.199	10.000

Initial Supporting table - 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	8.699	9.000	9.199	10.000

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

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

Value Units: Max Time for Last Seed Timeout (ms)

X Unit: Operating Loop Sequence (enum)

P0606_Last Seed Timeout f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_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	8,191.875	8,191.875	8,191.875	8,191.875

Initial Supporting table - P0606_PSW Sequence Fail f(Loop Time)

Description: Fail threshold for PSW per operating loop.

Value Units: Fail threshold for PSW (count)

X Unit: Operating Loop (enum)

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	5	3	5	3	5	3	5	3

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventASeq	CePISR_e_EventBSeq	CePISR_e_EventCSeq
1	5	3	5	3	5	5	5	5

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

Description: Sample threshold for PSW per operating loop.**Value Units:** Sample threshold for PSW (count)**X Unit:** Operating Loop (enum)

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_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 - 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	20.50	20.50	20.50	20.50	20.50	20.50

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	-15.00	5.00	32.00	55.00	90.00
350.00	439.00	439.00	439.00	434.28	412.25	256.54
450.00	439.00	439.00	439.00	353.08	333.68	210.57
560.00	439.00	388.61	349.08	248.10	230.94	154.38
650.00	422.36	370.44	335.83	240.40	224.49	136.36
750.00	400.06	351.40	323.93	250.50	234.14	118.05
850.00	398.50	356.58	332.39	271.68	255.33	138.64
950.00	400.59	359.12	332.62	287.61	265.17	145.41
1,050.00	392.72	351.60	323.18	289.73	262.24	150.96
1,150.00	349.22	309.95	282.61	238.46	213.69	126.20
1,350.00	285.43	248.11	222.07	176.68	155.25	115.00
1,600.00	198.80	166.04	141.72	97.85	80.07	87.00
2,150.00	140.94	109.38	87.12	44.66	31.23	25.00
2,400.00	120.41	89.25	67.68	26.87	14.88	3.20
3,100.00	85.47	54.94	34.45	-4.41	-14.11	-21.86
4,000.00	63.09	32.84	12.84	-24.15	-32.82	-42.54
4,900.00	48.80	18.55	-1.45	-38.44	-47.10	-56.85
5,800.00	33.49	3.24	-16.76	-53.56	-62.22	-72.79

Initial Supporting table - P'129F Threshold High

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

Value Units: revs / min

X Unit: revs / min [commanded pump speed]

Y Units: kiloPascals [requested fuel pressure]

y/x	200.0	300.0	400.0	500.0	600.0
1,000.0	-675.0	-675.0	-675.0	-675.0	-675.0
2,000.0	-675.0	-675.0	-675.0	-675.0	-675.0
3,000.0	-675.0	-675.0	-675.0	-675.0	-675.0
4,000.0	-675.0	-675.0	-675.0	-675.0	-675.0
5,000.0	-675.0	-675.0	-675.0	-675.0	-675.0
6,000.0	-675.0	-675.0	-675.0	-675.0	-675.0
7,000.0	-1,200.0	-1,200.0	-1,200.0	-1,200.0	-1,200.0

Initial Supporting table - P129F Threshold Low

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

Value Units: revs / min

X Unit: revs / min [commanded pump speed]

Y Units: kiloPascals [requested fuel pressure]

y/x	200.0	300.0	400.0	500.0	600.0
1,000.0	675.0	675.0	675.0	675.0	675.0
2,000.0	675.0	675.0	675.0	675.0	675.0
3,000.0	675.0	675.0	675.0	675.0	675.0
4,000.0	675.0	675.0	675.0	675.0	675.0
5,000.0	675.0	675.0	675.0	675.0	675.0
6,000.0	675.0	675.0	675.0	675.0	675.0
7,000.0	1,200.0	1,200.0	1,200.0	1,200.0	1,200.0

Initial Supporting table - P3187_Threshold

Description: P3187 Filtered Fuel Pressure Error Threshold [under-performing pump]**Value Units:** kilo Pascals**X Unit:** kPa [commanded fuel pressure]**Y Units:** grams / sec [fuel flow]

y/x	250.00	300.00	350.00	400.00	450.00	500.00	550.00	600.00	700.00
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	250.00	300.00	350.00	400.00	450.00	500.00	550.00	600.00	700.00
0.00	-260.00	-210.00	-160.00	-110.00	-60.00	-67.50	-75.00	-82.50	-90.00
1.50	-145.00	-125.00	-102.50	-81.25	-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 • P3188_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 - Minimum Non-Purge Samples for Purge Vapor Fuel

Description: Number of Fuel Trim Monitor sample counts required to allow the Purge Vapor Fuel value to inhibit the Intrusive Rich test

Value Units: Sample Counts per loop rate of 100ms (divide by 10 to get seconds)

X Unit: Long Term Fuel Trim Cell I.D. (no units) (Only PurgeOff cells are used)

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

y/x	CeFADR_e_Cell00_PurgOnAirMode 5	CeFADR_e_Cell01_PurgOnAirMode 4	CeFADR_e_Cell02_PurgOnAirMode 3	CeFADR_e_Cell03_PurgOnAirMode 2
1	65,535	65,535	65,535	65,535

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	65,535	65,535	65,535	65,535

Minimum Non-Purge Samples for Purge Vapor Fuel - Part 3

y/x	CeFADR_e_Cell08_PurgOffAirMode 5	CeFADR_e_Cell09_PurgOffAirMode 4	CeFADR_e_Cell 10_PurgOffAirMode 3	CeFADR_e_Cell11_PurgOffAirMode 2
1	65,535	65,535	65,535	65,535

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_Cell1 5_PurgOffDecel
1	65,535	65,535	65,535	65,535

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_NonSelectedCeH" 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_8electedPurgeCell	CeFADD_e_SelectedPurgeCell

P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage - Part 2

y/x	CeFADR_e_Cell04_PurgOnAirMode 1	CeFADR e_Cell05_PurgOnAirMode 0	CeFADR_e_Cell06_PurgOnIdle	CeFADR_e_Cell07_PurgOnDecel
1	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell

P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage - Part 3

y/x	CeFADR_e_Cell08_PurgOffAirMode 5	CeFADR_e_Cell09_PurgOffAirMode 4	CeFADR e_Cell10_PurgOffAirMode 3	CeFADR_e_Cell11_PurgOffAirMode 2
1	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell

P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage - Part 4

y/x	CeFADR_e_Cell12_PurgOffAirMode 1	CeFADR e_Cell13_PurgOffAirMode 0	CeFADR_e_Cell14_PurgOffIdle	CeFADR_e_Cell15_PurgOffDecel
1	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell

Initial Supporting table - Startup Engine Coolant 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 - 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	4,103	1,463	999	727	469	285	205	158	133	90	59	46	33
6	3,608	1,240	905	660	414	266	181	142	119	81	54	41	31
8	3,325	1,382	900	650	398	270	185	142	119	78	53	40	30
10	3,257	1,640	1,029	667	434	299	203	154	130	78	53	42	30
12	3,455	1,988	1,213	701	489	344	241	182	141	81	56	43	31
14	3,814	2,292	1,397	790	568	400	278	210	155	85	61	45	34
16	4,173	2,597	1,599	884	647	457	327	238	170	91	68	49	39
18	4,531	2,901	1,802	990	726	514	376	267	184	99	74	57	43
20	4,890	3,206	2,004	1,096	805	570	425	293	205	109	81	65	48
22	5,249	3,510	2,206	1,202	884	627	475	332	227	120	86	72	52
24	5,608	3,814	2,409	1,309	963	683	524	371	249	133	95	80	57
26	5,967	4,119	2,611	1,415	1,043	740	573	410	272	146	104	88	61
28	6,326	4,423	2,814	1,521	1,124	797	623	449	294	159	113	95	65
30	6,684	4,728	3,016	1,627	1,205	853	672	488	317	172	122	103	70
32	7,043	5,032	3,218	1,733	1,284	910	721	527	339	185	131	110	74
34	7,402	5,336	3,421	1,839	1,363	967	770	565	362	198	140	118	79
36	7,761	5,641	3,623	1,946	1,443	1,024	820	604	384	211	149	126	83

RufCyl_Decel - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,001	3,500	4,000	4,500	5,000	5,500	6,000	7,000
3	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - RufCyl Decel

26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
28	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
32	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
34	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
36	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - RufCyl Jerk

Description: Crankshaft jerk threshold during Idle or GPF regen. Thresholds are a function of rpm and % engine Load.

Value Units: Delta time per cylinder (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	12,363	1,248	734	667	453	317	188	162	136	87	55	43	30
6	12,171	1,159	735	576	386	267	166	142	124	79	50	40	29
8	12,061	1,314	748	524	373	261	165	135	111	75	48	40	28
10	11,951	1,518	780	579	397	273	190	135	120	75	49	40	26
12	11,933	1,803	1,043	667	447	306	225	150	124	77	49	43	28
14	12,216	2,210	1,326	752	523	360	261	193	135	86	54	46	30
16	12,588	2,719	1,610	873	611	433	322	236	145	96	61	50	34
18	12,961	3,092	1,893	994	708	506	382	279	155	106	68	53	40
20	13,333	3,544	2,176	1,115	804	579	443	321	184	116	75	56	46
22	13,706	3,996	2,459	1,236	900	652	504	364	212	126	82	65	51
24	14,078	4,448	2,742	1,357	996	725	565	407	240	144	95	73	57
26	14,451	4,900	3,025	1,478	1,092	797	625	450	268	160	107	81	63
28	14,823	5,352	3,287	1,599	1,189	870	686	493	296	176	119	89	69
30	15,196	5,804	3,549	1,720	1,285	943	747	536	323	193	131	97	75
32	15,568	6,256	3,833	1,841	1,381	1,016	807	579	351	209	143	105	81
34	15,941	6,708	4,118	1,962	1,477	1,089	868	621	379	225	155	113	87
36	16,313	7,160	4,402	2,082	1,573	1,162	929	664	407	242	166	122	92

RufCyl_Jerk - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,001	3,500	4,000	4,500	5,000	5,500	6,000	7,000
3	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - RufCyl Jerk

26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
28	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
32	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
34	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
36	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - RufSCD Decel

Description: Used for P0300-P0308. Crankshaft decel threshold while in SCD mode during Idle or GPF regen. SCD mode uses smaller windows near TDC. Thresholds are a function of rpm and % engine Load. Note: Misfire's Load term is %, but not PID\$04. PID \$04 is not robust to temperature and 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	1,047	583	413	273	187	131	85	66	65	32,767	32,767	32,767	32,767
6	1,008	543	357	248	167	111	76	60	55	32,767	32,767	32,767	32,767
8	1,029	556	360	256	163	113	81	62	52	32,767	32,767	32,767	32,767
10	1,070	599	420	276	179	131	92	69	55	32,767	32,767	32,767	32,767
12	1,144	670	477	314	211	150	104	76	57	32,767	32,767	32,767	32,767
14	1,222	755	543	353	243	168	115	83	62	32,767	32,767	32,767	32,767
16	1,300	841	599	392	275	186	127	90	68	32,767	32,767	32,767	32,767
18	1,378	926	655	430	307	204	138	97	75	32,767	32,767	32,767	32,767
20	1,456	1,011	705	469	339	223	149	105	83	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
28	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
32	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
34	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
36	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

RufSCD_Decel - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,001	3,500	4,000	4,500	5,000	5,500	6,000	7,000
3	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - RufSCD Decel

22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
28	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
32	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
34	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
36	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - RufSCD Jerk

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

Value Units: Delta time per cylinder (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	865	492	354	247	202	121	77	67	60	32,767	32,767	32,767	32,767
6	759	439	283	219	173	106	71	59	53	32,767	32,767	32,767	32,767
8	748	429	267	217	162	104	68	57	50	32,767	32,767	32,767	32,767
10	805	471	304	253	169	115	79	58	51	32,767	32,767	32,767	32,767
12	925	592	430	310	200	147	99	71	58	32,767	32,767	32,767	32,767
14	1,033	732	584	372	247	179	119	85	66	32,767	32,767	32,767	32,767
16	1,147	872	688	435	297	211	138	99	73	32,767	32,767	32,767	32,767
18	1,261	1,013	792	503	347	244	158	112	80	32,767	32,767	32,767	32,767
20	1,366	1,153	897	563	398	276	178	126	87	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
28	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
32	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
34	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
36	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

RufSCD_Jerk - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,001	3,500	4,000	4,500	5,000	5,500	6,000	7,000
3	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - RufSCD Jerk

24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
28	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
32	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
34	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
36	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - 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	0	200	400	600	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200

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	0	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000

Initial Supporting 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 Misfire_IMEP_BinID_Load_Axis and Misfire_IMEP_BinID_RPM_Axis tables

Value Units: KPa

XUnit: BinID

Misfire_IMEP_Thresh_vs_BinID - Part 1

y/x	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - P0191 - High fail limit of fuel control due to high pressure sensor skewed High

Description: High fail limit of fuel control due to high pressure sensor skewed High error as Function of desired pressure

Value Units: Ratio

X Unit: Desired Pressure (Mpa)

y/x	1.50	3.00	4.00	15.00	20.00	25.00	27.50	32.00	36.00
1.00	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.09	1.05

Initial Supporting table - P0191 - Low fail limit of fuel control due to pressure sensor skewed low**Description:** Low fail limit of fuel control due to pressure sensor skewed low error as Function of desired pressure**Value Units:** Ratio**X Unit:** Desired Pressure (Mpa)

y/x	1.50	3.00	4.00	15.00	20.00	25.00	27.50	32.00	36.00
1.00	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.92	0.95

Initial Supporting table - P02EE P02EF P02F0 P02F1 P02F2 P02F3 P02F4 P02F5 P30D4 - Maximum Injector Closing Time**Description:** Maximum injector closing time function of measured fuel rail pressure**Value Units:** Injector Closing Time (us)**X Unit:** Measured Fuel Rail Pressure (MPa)

y/x	0.40	1.00	2.00	3.00	5.00	7.00	9.00	10.00	12.00	14.00	16.00	17.00	18.00	19.00	20.00	21.00	24.00
1.00	136	129	119	111	101	92	76	72	64	60	54	56	53	55	50	49	42

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	1.00	2.00	3.00	5.00	7.00	9.00	10.00	12.00	14.00	16.00	17.00	18.00	19.00	20.00	21.00	24.00
1.00	940	940	940	940	940	940	940	940	940	940	940	940	940	940	940	940	940

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	1.00	2.00	3.00	5.00	7.00	9.00	10.00	12.00	14.00	16.00	17.00	18.00	19.00	20.00	21.00	24.00
1.00	136	129	119	111	101	92	76	72	64	60	54	56	53	55	50	49	42

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	1.00	2.00	3.00	5.00	7.00	9.00	10.00	12.00	14.00	16.00	17.00	18.00	19.00	20.00	21.00	24.00
1.00	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

al:Supporting table - 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: Measured Fuel Rail Pressure (MPa)

y/x	0.40	1.00	2.00	3.00	5.00	7.00	9.00	10.00	12.00	14.00	16.00	17.00	18.00	19.00	20.00	21.00	24.00
1.00	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

Initial Supporting table - 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
1.00	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
2.00	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
3.00	-0.09	-0.09	-0.10	-0.10	-0.11	-0.11	-0.11	-0.12	-0.12	-0.13	-0.13
5.00	-0.08	-0.08	-0.09	-0.09	-0.09	-0.10	-0.10	-0.11	-0.11	-0.11	-0.12
7.00	-0.07	-0.08	-0.08	-0.09	-0.09	-0.09	-0.10	-0.10	-0.11	-0.11	-0.11
9.00	-0.07	-0.08	-0.08	-0.09	-0.09	-0.09	-0.10	-0.10	-0.11	-0.11	-0.11
10.00	-0.07	-0.08	-0.08	-0.08	-0.09	-0.09	-0.10	-0.10	-0.10	-0.11	-0.11
12.00	-0.07	-0.08	-0.08	-0.09	-0.09	-0.09	-0.10	-0.10	-0.11	-0.11	-0.11
14.00	-0.08	-0.08	-0.08	-0.09	-0.09	-0.10	-0.10	-0.10	-0.11	-0.11	-0.12
16.00	-0.08	-0.08	-0.09	-0.09	-0.10	-0.10	-0.10	-0.11	-0.11	-0.12	-0.12
17.00	-0.03	-0.03	-0.04	-0.04	-0.05	-0.05	-0.05	-0.06	-0.06	-0.07	-0.07
18.00	-0.03	-0.03	-0.04	-0.04	-0.04	-0.05	-0.05	-0.06	-0.06	-0.06	-0.07
19.00	-0.02	-0.02	-0.03	-0.03	-0.04	-0.04	-0.04	-0.05	-0.05	-0.06	-0.06
20.00	-0.03	-0.03	-0.03	-0.04	-0.04	-0.05	-0.05	-0.05	-0.06	-0.06	-0.07
21.00	-0.03	-0.03	-0.04	-0.04	-0.04	-0.05	-0.05	-0.06	-0.06	-0.06	-0.07
24.00	-0.03	-0.04	-0.04	-0.04	-0.05	-0.05	-0.06	-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
1.00	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
2.00	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
3.00	-0.13	-0.14	-0.14	-0.15	-0.15	-0.15	-0.16	-0.16	-0.17	-0.17	-0.19
5.00	-0.12	-0.13	-0.13	-0.13	-0.14	-0.14	-0.15	-0.15	-0.15	-0.16	-0.18
7.00	-0.12	-0.12	-0.13	-0.13	-0.13	-0.14	-0.14	-0.15	-0.15	-0.15	-0.17
9.00	-0.12	-0.12	-0.13	-0.13	-0.13	-0.14	-0.14	-0.15	-0.15	-0.15	-0.17
10.00	-0.12	-0.12	-0.12	-0.13	-0.13	-0.14	-0.14	-0.14	-0.15	-0.15	-0.17
12.00	-0.12	-0.12	-0.13	-0.13	-0.13	-0.14	-0.14	-0.15	-0.15	-0.15	-0.17
14.00	-0.12	-0.12	-0.13	-0.13	-0.14	-0.14	-0.14	-0.15	-0.15	-0.16	-0.18
16.00	-0.12	-0.13	-0.13	-0.14	-0.14	-0.14	-0.15	-0.15	-0.16	-0.16	-0.18

Initial Supporting table - P10A3 P10A5 P10A7 P10A9 P10AB P10AD P10AF P10B1 - Minimum Small Pulse Compensation Limit

17.00	-0.07	-0.08	-0.08	-0.09	-0.09	-0.09	-0.10	-0.10	-0.11	-0.11	-0.13
18.00	-0.07	-0.08	-0.08	-0.08	-0.09	-0.09	-0.10	-0.10	-0.10	-0.11	-0.13
19.00	-0.06	-0.07	-0.07	-0.08	-0.08	-0.08	-0.09	-0.09	-0.10	-0.10	-0.12
20.00	-0.07	-0.07	-0.08	-0.08	-0.09	-0.09	-0.09	-0.10	-0.10	-0.11	-0.13
21.00	-0.07	-0.08	-0.08	-0.08	-0.09	-0.09	-0.10	-0.10	-0.10	-0.11	-0.13
24.00	-0.08	-0.08	-0.08	-0.09	-0.09	-0.10	-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
1.00	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
2.00	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
3.00	-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
7.00	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
9.00	-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
17.00	-0.18	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
18.00	-0.18	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
19.00	-0.17	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
20.00	-0.18	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
21.00	-0.18	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
24.00	-0.18	-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 With (ms)**P10A4 P10A6 P10A8 P10AA P10AC P10AE P10B0 P10B2 - Maximum Small Pulse Compensation Limit - Part 1**

y/x	0.00	0.00	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.04	0.04
0.40	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
1.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
2.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
3.00	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
7.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
9.00	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
17.00	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
19.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
20.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
21.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
24.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20

P10A4 P10A6 P10A8 P10AA P10AC P10AE P10B0 P10B2 - Maximum Small Pulse Compensation Limit - Part 2

y/x	0.04	0.05	0.05	0.06	0.06	0.06	0.07	0.07	0.08	0.08	0.10
0.40	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
1.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
2.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
3.00	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
7.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
9.00	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

Initial Supporting table - P10A4 P10A6 P10A8 P10AA P10AC P10AE P10B0 P10B2 - Maximum Small Pulse Compensation Limit

17.00	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
19.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
20.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
21.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
24.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20

P10A4 P10A6 P10A8 P10AA P10AC P10AE P10B0 P10B2 - Maximum Small Pulse Compensation Limit - Part 3

y/x	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	1.00	1.50
0.40	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
1.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
2.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
3.00	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
7.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
9.00	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
17.00	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
19.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
20.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
21.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
24.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20

Initial Supporting table - P228C P2C1F - High Pressure Pump Control (HPC) fail threshold of pressure too low

Description: The High Pressure Pump Control (HPC) fail threshold of pressure too low test as a function of desired fuel pressure.

Value Units: Pressure Error - Desired pressure - Actual Pressure (Mpa)

X Unit: Desired Pressure (Mpa)

y/x	2	3	4	15	20	25	28	32	36
1	0	2	3	3	3	3	3	3	3

Initial Supporting table - P228D P2C20 - High Pressure Pump Control (HPC) fail threshold for pressure too high

Description: The High Pressure Pump Control (HPC) fail threshold for pressure too high test as a function of desired fuel pressure.

Value Units: Pressure Error - Desired pressure - Actual Pressure (Mpa)

X Unit: Desired Pressure (Mpa)

y/x	1.50	3.00	4.00	15.00	20.00	25.00	27.50	32.00	36.00
1	-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_n_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
0	3,600	3,600	3,600	3,600
1	3,000	3,000	3,000	3,000

P2B01 P2B02 P2B03 P2B04 P2B05 P2B06 P2B07 P2B96 P2B08 P2B09 P2B0A P2B0B P2B0C P2B0D P2B0E P2B0F- Opening Magnitude																	
Description: Opening Magnitude threshold to detect missing injection pulse																	
Value Units: Opening Magnitude Voltage X Unit: Measured Fuel Rail Pressure																	
y/x	0.40	1.00	2.00	3.00	5.00	7.00	9.00	10.00	12.00	14.00	16.00	17.00	18.00	19.00	20.00	21.00	24.00
1.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00

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	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19

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	5.7148	5.7148	5.6797	5.6719	5.5723	5.5879	5.5508	5.5508	5.5410	5.1797	4.6504	4.1230	4.1230	4.1230	4.1230	4.1230	4.1230

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	0.0000	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_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	2.6348	2.6211	2.6074	2.5996	2.5703	2.5605	2.5273	2.4941	2.4902	2.4219	2.2539	2.2539	2.2539	2.2539	2.2539	2.2539	2.2539

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	1	1	1	1

Initial Supporting table - P0326_P0331_AbnormalNoise_Threshold

Description: Fail threshold for the Knock Performance Abnormal Noise Diagnostic when engine is NOT in AFM mode

Value Units: Filtered background engine noise. Unit-less term from the Knock Detection Fast Fourier Transform (FFT) for a selected frequency range.

X Unit: Engine Speed (RPM)

Y Units: N/A

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.064	0.064	0.064	0.064	0.068	0.100	0.152	0.243	0.718	0.851	1.855	1.855	1.855	1.855	1.855	1.855	1.855

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	0.254	0.254	0.240	0.242	0.268	0.338	0.383	0.506	0.643	0.844	0.998	1.150	1.150	1.150	1.150	1.150	1.150

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	0.127	0.127	0.129	0.129	0.131	0.146	0.189	0.221	0.326	0.426	0.541	0.541	0.541	0.541	0.541	0.541	0.541

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if the calibration check sum is incorrect or the flash memory detects an uncorrectable error via the Error Correcting Code.	The Primary Processor's calculated checksum does not match the stored checksum value. Covers all software and calibrations.	1 failure if the fault is detected during the first pass. 5.00 failures if the fault occurs after the first pass is complete.			Diagnostic runs continuously in the background.	Type A, 1 Trips
			The Primary Processor's Error Correcting Code hardware in the flash memory detects an error. Covers all software and calibrations.	254 failures detected via Error Correcting Code			Diagnostic runs continuously via the flash hardware.	
				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.
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 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	500 milliseconds	Type A, 1 Trips
			MAIN processor receives seed in wrong order			always running	18 / 17 counts intermittent. 50 ms/count in the TCM main processor	
			2 fails in a row in the MAIN processor's ALU check			Test enabel calibration: 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 200 milliseconds continuous; 50 ms/count in the TCM main processor	
			Checks for ECC (error	3 (results in MIL),		Test is Enabled:	variable,	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 RAMvariable, depends on length of time to write flash to RAM	
			MAIN processor DMA transfer from Flash to RAM has 1 failure			Test is Enabled: 1 (If 0, this test is disabled)	variable, depends on length of time to write flash to RAM	
			Safety critical software is not executed in proper order.	>= 1 incorrect sequence.		Test is Enabled: P0606 PFM.Enable f (Loop Time) (If 0, this test is disabled)	Fail Table, f(Loop Time). See supporting tables: P0606 PFM Sequence Fail f (Loop Time) / Sample Table, f (Loop Time)See supporting tables:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
							<div>P0606 PFM Sequence Sample f(Loop Time) counts</div> <div>50 ms/count in the TCM main processor</div>	

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.
Internal Control Module Monitoring Processor Performance	P060A	Indicates that the monitoring processor has detected an internal performance fault.	Checks for stack over or underflow in secondary processor by looking for corruption of known pattern at stack boundaries. Checks number of stack over/underflow since last powerup reset >=	5		KeMEMD_b_StackLimitTestEnbl == 1 Value of KeMEMD_b_StackLimitTestEnbl is: 1 . (If 0, this test is disabled)	variable, depends on length of time to corrupt stack	Type A, 1 Trips
			MAIN processor is verified by responding to a seed sent from the secondary with a key response to secondary. Checks number of incorrect keys received > or Secondary processor has not received a new within time limit	2 incorrect seeds within 8 messages, 0.2000 seconds		ignition in Run or Crank	150 ms for one seed continually failing	
			2 fails in a row in the Secondary processor's ALU check			KePISD_b_ALU_TestEnbl d == 1 Value of KePISD_b_ALU_TestEnbl d is: 1 . (If 0, this test is disabled)	25 ms	
			2 fails in a row in the Secondary processor's configuration register masks versus known good data			KePISD_b_ConfigRegTestEnbl d == 1 Value of KePISD_b_ConfigRegTestEnbl is: 1 . (If 0, this test is disabled)	12.5 to 25 ms	

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 , P060C = previous model years P16F3	P060C	<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 mult-clutch tie-up:</p> <p>Commanded Clutch PCS Pressure</p>	<p>> Cmnd Tie Up Monitor Output Lock Thresh * Clutch PCS Pressure Gain + Clutch PCS Pressure Offset</p> <p>transfer case range is 4WD Low: > Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo * Clutch PCS Pressure Gain + Clutch PCS Pressure Offset</p> <p>Else > Cmnd Tie Up Monitor Multi-Clutch Thresh * Clutch PCS Pressure Gain +</p>			when fail timer reaches 100, set DTC	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 for vehicle speed time)</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>= 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 > 2.50 seconds</p> <p>= 3 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:</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.			output shaft deceleration	< -456.6 RPM/sec Else < -169.1 RPM/sec		
			Commanded Gear AND at least one of the following: Previous Loop Commanded Gear and current loop commanded OR current commanded gear and previous loop commanded gear OR incorrect downshift fail timer if above conditions are met, increment incorrect downshift fail timer 6.25 ms update rate Alternatively, if commanded gear increment invalid commanded gear fail	< Shift Monitor Lowest Allowed Gear > Current Loop Commanded Gear (i.e a downshift) = a forward, locked gear = a forward, locked gear # a forward, locked gear >0.0 = NULL	DTCs Not Fault Active DTCs Not Test Failed This Key On	P077C, P077D P0723, P0722	when incorrect downshift fail timer reaches 4.63 sec, set DTC	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			timer 6.25 ms update rate		command shift monitor enable calibration Service Fast Learn OR (Service Fast Learn AND Vehicle Speed for vehicle speed time) High Side Driver 1 On High Side Driver 2 On DTCs Not Fault Active DTCs Not Test Failed This Key On	= 1 (1 to enable, 0 to disable) = FALSE = TRUE > 8.0 KPH > 2.50 seconds = TRUE = TRUE P077C, P077D, P0721 P0723, P0722, P172A, P172B		
			Criteria based on driver requested range: Drive: An invalid combination of drive clutches commanded on* driver requested range Incorrect drive enable calibration Incorrect drive disable calibration Reverse: An invalid combination of reverse clutches commanded on*	 Illegal Drive Clutch = Combinations = Drive = 1 (1 to enable, 0 to disable) = 0 (0 to enable, 1 to disable) = Illegal Reverse Clutch Combinations			Fault pending fail timer Clutch Connectivity Wrong > Direction FP Fail time based on driver requested range: Incorrect Drive Fail Time Incorrect Reverse Fail Time Incorrect Neutral Fail Time Incorrect Park Fail Time	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			driver requested range	= Reverse			6.25 ms update rate	
			Incorrect reverse enable calibration	= 1 (1 to enable, 0 to disable)	Current driver requested range	= previous driver requested range	>	Incorrect Direction Range Change Delay Time
			Incorrect reverse disable calibration	= 0 (0 to enable, 1 to enable)				
			Neutral:		(vehicle speed AND vehicle speed OR Fail Timer)	> -6.00 KPH > 6.00 KPH >0.0		
			An invalid combination of neutral clutches commanded on*	= Illegal Park-Neutral Clutch Combinations				
			driver requested range	= Neutral	clutch connectivity monitor enable	= 0 (1 to enable, 0 to disable)		
			Incorrect neutral enable calibration	= 1 (1 to enable, 0 to disable)	OR clutch connectivity monitor disable	= 1 (0 to enable, 1 to disable)		
			Incorrect neutral disable calibration	= 0 (0 to enable, 1 to disable)	Service Fast Learn OR (Service Fast Learn AND Vehicle Speed for vehicle speed time)	= FALSE = TRUE > 8.0 KPH > 2.50		
			Park:		High Side Driver 1 On High Side Driver 2 On	= TRUE = TRUE		
			An invalid combination of reverse clutches commanded on*	= Illegal Park-Neutral Clutch Combinations				
			driver requested range	= Park	DTCs Not Fault Active	P077C, P077D, P0721		
			Incorrect park enable calibration	= 1 (1 to enable, 0 to disable)	DTCs Not Test Failed This Key On	P0723, P0722, P172A, P172B		
			Incorrect park disable calibration	= 0 (0 to enable, 1 to disable)	* Note, clutch is considered "on" when the following conditions are met:			
					Clutch commanded	>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					pressure	Clutch Connectivity C1 On Threshold OR > Clutch Connectivity C2 On Threshold OR > Clutch Connectivity C3 On Threshold OR > Clutch Connectivity C4 On Threshold OR > Clutch Connectivity C5 On Threshold OR > Clutch Connectivity C6 On Threshold OR > Clutch Connectivity C7 On Threshold		
					Current clutch pressure command * 0.25 + 1st derivative of pressure command * 0.25 + 2nd derivative of pressure command * -0.25 + 3rd derivative of pressure command * -0.25	= 0.0 OR > -1.00 kPa		
			ratio monitor fault pending	= TRUE	If all conditions below are		increment fail timer by	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Output speed direction OR Output speed direction	= FORWARD = REVERSE	met, increment ratio monitor fault pending timer:		Ratio Monitor Fail Increment Rate (Percent per Loop) when timer reaches 100, set fault pending	
		Plus following criteria based on driver requested range:			vehicle speed OR vehicle speed (note: fault pending will remain latched if vehicle speed max thresholds are exceeded)	> 0.50 AND < 6.00 KPH OR <-0.50 AND >-6.00 KPH		
		Drive:						
		driver requested range	= Drive					Fail time based on driver requested range (once fault pending has matured):
		Incorrect drive enable calibration	= 1 (1 to enable, 0 to disable)		Monitor Armed	= TRUE		
		Incorroct drive disable calibration	= 0 (0 to enable, 1 to disable)		Measured output speed direction	= REVERSE or FORWARD		Incorrect Drive Fail Time
		Reverse:						
		driver requested range	= Reverse		Input speed default direction	= REVERSE or FORWARD		Incorrect Reverse Fail Time
		Incorrect reverse enable calibration	= 1 (1 to enable, 0 to disable)		Current driver requested range for range time	= previous driver requested range >		Incorrect Neutral Fail Time
		Incorroct reverse disable calibration	= 0 (0 to enable, 1 to enable)			Incorrect Direction Range Change Delay Time		Incorrect Park Fail Time 6.25 ms update rate
		Neutral:						
		driver requested range	= Neutral		based on PRNDL position:			
		Incorrect neural enable calibration	= 1 (1 to enable, 0 to disable)		driver requested range AND transmission measured speed ratio AND	= Reverse OR > 0.40		
		Incorroct neutral disable calibration	= 0 (0 to enable, 1 to disable)		Loop-to-loop change in measured ratio AND	> -8.00		
		Park:						
		driver requested range	= Park		(Direction By Ratio OR Direction Bv Clutch Slip)	= FORWARD OR = a FORWARD Gear		

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)	driver requested range AND transmission measured speed ratio AND Loop-to-loop change in measured speed ratio AND (Direction By Ratio OR Direction By Clutch Slip) ***** Monitor Armed Enables: if Range Shift enable cal: THEN Range Shift State OR if Attained Gear enable cal: THEN Attained Gear ALSO Engine Speed Ratio Monitor enable cal OR Ratio Monitor disable cal ***** Direction By Ratio: (vehicle speed OR vehicle speed) WHEN: Measured output speed direction AND	= Drive < -0.40 < 8.00 = REVERSE = REVERSE ***** = 0 (1 to enable, 0 to disable) = Range Shift Complete = 0 (1 to enable, 0 to disable) # Neutral AND # Park > 400 RPM = 0 (1 to enable, 0 to disable) OR = 1 (0 to enable, 1 to disable) ***** > 0.50 KPH < -0.50 KPH = reverse		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Absolute measured gear ratio THEN Direction by Ratio ELSE WHEN Measured output speed direction AND Absolute measured gear ratio THEN Direction by Ratio ***** Direction by Clutch Slip: C1 clutch slip valid C2 clutch slip valid C5 clutch slip valid C3C4 dual clutch slip valid C3C6 dual clutch slip valid C4C6 dual clutch slip valid Direction by Clutch Slip Enable cal (vehicle speed OR vehicle speed) for each clutch: current clutch slip clutch held combination matches a valid gear in:	> 3.75 AND < 3.87 = REVERSE = forward > 4.51 AND < 0.03 = FORWARD ***** = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE = 0 (1 to enable, 0 to disable) > 0.50 KPH < -0.50 KPH Ratio Monitor Slip < Threshold (if slip condition met, clutch held = 1, else held = 0) Ratio Monitor Clutch States		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					***** General enables: Transmission Type = RWD 10 Spd Automatic Service Fast Learn = FALSE OR (Service Fast Learn = TRUE AND Vehicle Speed for vehicle speed time) > 8.0 KPH > 2.50 seconds High Side Driver 1 On = TRUE High Side Driver 2 On = TRUE DTCs Not Fault Pending P0716, P0717, P07BF, P07C0, P0721, P0722, P0723, P077C, P077D, P172A, P172B, P1783, P17CE DTCs Not Fault Active P0716, P0717, P07BF, P07C0, P077C, P077D, P0721, P17CE, P1783 DTCs Not Test Failed This Key On P0721, P0722, P0723, P172A, P172B	*****		

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range (TR) Switch Circuit Low Voltage	P0707	Diagnoses the internal range sensor circuit A and wiring for a ground short circuit fault using controller specific PWM duty cycle measurement thresholds.	<p>when PWM sensor type and PWM voltage direct conditional internal range sensor A PWM duty cycle</p> <p>when PWM sensor type and PWM voltage inverse conditional internal range sensor A PWM duty cycle</p> <p>Increment fail and sample time, update rate 25 milliseconds</p> <p>Controller specific PWM duty cycle thresholds are set to meet the following controller specification for a short to ground.</p>	<p>< 8.331 % duty cycle</p> <p>> 8.331 % duty cycle</p> <p>< 0.5 Q impedance between signal and controller ground</p>	<p>diagnostic monitor enable battery voltage</p> <p>when sensor type is PWM duty cycle direct or inverse conditional for fail threshold is used conditional type check calibration</p>	<p>= 1 Boolean >9.00 volts</p> <p>= CeTRGD_e_VoltDirctPro P</p>	<p>fail time > 0.500 seconds out of sample time > 1.500 seconds</p> <p>battery voltage time > 1.000 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.
Transmission Range (TR) Switch Circuit High Voltage	P0708	Diagnoses the internal range sensor circuit A and wiring for a short to voltage circuit fault using controller specific PWM duty cycle measurement thresholds.	<p>when PWM sensor type and PWM voltage direct conditional internal range sensor A PWM duty cycle</p> <p>when PWM sensor type and PWM voltage inverse conditional internal range sensor A PWM duty cycle</p> <p>Increment fail and sample time, update rate 25 milliseconds</p> <p>Controller specific PWM duty cycle thresholds are set to meet the following controller specification for a short to power.</p>	<p>> 92.001 % duty cycle</p> <p>< 92.001 % duty cycle</p> <p>< 0.5 Q impedance between signal and controller power</p>	<p>diagnostic monitor enable battery voltage</p> <p>when sensor type is PWM duty cycle direct or inverse conditional for fail threshold is used conditional type check calibration</p> <p>ECM Message Available Communication Check Enable for ECM message</p> <p>Vehicle is in a mode that enables accessory power</p>	<p>= 1 Boolean</p> <p>>9.00 volts</p> <p>= CeTRGD_e_VoltDirctProP</p> <p>= TRUE</p> <p>= 1.00 Boolean</p> <p>= TRUE</p>	<p>fail time > 0.900 seconds out of sample time > 1.100 seconds</p> <p>battery voltage time > 1.000 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.
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	< -6.7 °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 > -70.0 °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.
					TFT Warmup Pass P0711 test fail this key on	EngineTorqueEstInaccu rate AcceleratorPedalFailure CrankSensor_FA ECT_Sensor_FA VehicleSpeedSensor_FA = FALSE = FALSE		
			current transmission fluid temperature string length = previous transmission fluid temperature transmission temperature string length + (raw transmission fluid temperature - previous raw transmission fluid temperature, update rate 100 milliseconds, increment sample count	> 80.0 °C	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 > -70.0 °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	< 47.450 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 > 4.00 seconds out of sample time > 5.00 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	>105,445.0 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 > 4.00 seconds out of fail time > 5.00 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	> 850.0 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 > 148.0 RPM > 148.0 RPM < 320.0 RPM > 148.0 RPM > 230.0 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 < 175.0 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_Sixth > CeCGSR_e_CR_First > 72.0 RPM < CeCGSR_e_CR_Tenth > CeCGSR_e_CR_Sixth > 230.0 RPM = FALSE = FALSE	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>= 0 Boolean</p> <p>= 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

[illegible]

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	= 1.00 Boolean =TRUE = FALSE != Neutral = TRUE >= 100.00 rpm = 0 Boolean < 8,191.9 RPM > 175.0 RPM = 0 Boolean < 8,191.9 RPM > 8,191.9 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 EngineTorqueEstInaccu 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 Else (Not 4WD and not Wheel Speed usage) If 4WD low is engaged and Wheel speed usage enabled</p>	<p>> 1,350.0 RPM</p> <p>P0723 Wheel Speed Calc function of output speed</p> <p>> 500.0 RPM</p> <p>> Above threshold * 2.70</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 nsitional8 N-D transitional = CeTRGR_e_PRNDL_Tra nsitionalU R-N transitional > 250.0 RPM > 250.0 RPM < 4,095.9 RPM > 148.0 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 > 36.0 RPM > 36.0 RPM = TRUE > 150.00 rpm < 140.0 RPM > 36.0 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 (GRWand 8SPD)	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>TCM 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</p> <p>service solenoid cleaning</p>	<p>*****</p> <p>= 0 Boolean</p> <p>= 0 Boolean</p> <p>>9.00 volts</p> <p>= 0 Boolean</p> <p>= 0 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 > 2 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 ***** enable C1 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR (accelerator pedal position OR engine speed) C1 clutch slip speed valid	= FALSE Boolean = TRUE ***** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 100.0 RPM > 2.00 % > 1,500.0 RPM = TRUE (all speed sensors are functional for lever node clutch slip speed calculation)	> 0.450 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C1 (GR10 CB123456R or 8 SPD CB1278R) clutch pressure control solenoid.			C1 clutch pressured map (enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear) range shift state ***** DTCs not fault pending DTCs not fault active	= 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 P172AP172B 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		

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

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 millisecond update	< 150.0 RPM < 100.00 RPM < 150.0 RPM			Base fail time: shift type is power down shift: fail time > 0.60 seconds shift type is garage shift: fail time > 0.25 shift type is another type: fail time > 0.150 seconds Add fail time offset according to shift type: open throttle upshift: Clutch Stuck On Fail Offset Time PU Shifts open throttle downshift: Clutch Stuck On Fail Offset Time PD Shifts garage shift: Clutch Stuck On Fail Offset Time GS Shifts closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test			<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>= 0 Boolean</p> <p>= 0 Boolean</p> <p>>9.00 volts</p> <p>= 0 Boolean</p> <p>= 0 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>	

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 C1 CB123456, GR10 C1 CB123456R, or 8 Speed C1 CB1278R 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 ***** range shift state diagnostic clutch test transmission output shaft speed ((C1 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable) OR C1 off going clutch command pressure)	= TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean = TRUE ***** # range shift complete = OFF GOING CLUTCH TEST > 100.0 RPM = TRUE = 0 (1 to enable, 0 to disable) < 350.0 kPa	all delay times exhaust delay by 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:	

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)	> 120.0 Nm = 0 (0 is enable, 1 is enable) = TRUE # clutch fill phase > pressure clip threshold according to shift type: closed and open throttle upshifts: pressure clip threshold is dependent on the oncoming clutch: C2 Torque-Based Pressure Clip OR C3 Torque-Based Pressure Clip OR C4 Torque-Based Pressure Clip OR C5 Torque-Based Pressure Clip OR C6 Torque-Based Pressure Clip clip thresholds for all other shift tvoes:	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 Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: C2 Oncoming Post-Torque Phase Delay + wheel slip delay OR C3 Oncoming Post-Torque Phase Delay + wheel slip delay OR	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>garage shifts: Clutch Clip Press GS Shifts closed throttle downshift: C2 Clutch Clip Press CD Shifts C3 Clutch Clip Press CD Shifts C4 Clutch Clip Press CD Shifts C5 Clutch Clip Press CD Shifts C6 Clutch Clip Press CD Shifts negative torque upshift: Clutch Clip Press NU Shifts open throttle downshift: Clutch Clip Press PD Shifts</p> <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 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</p>	<p>= TRUE</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>C4 Oncoming Post-Torque Phase Delay + wheel slip delay OR C5 Oncoming Post-Torque Phase Delay + wheel slip delay OR C6 Oncoming Post-Torque Phase Delay + wheel slip delay</p>	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					AND Attained Gear AND (stuck on enable cal for forward garge shifts AND driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller) current clutch solenoid test state ***** DTCs not fault pending	= 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) ***** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>DTCs not fault active</p> <p>DTCs not test fail this key on</p> <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</p>	<p>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>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>automatic transmission shift due to two conditions: Current value of clutch control solenoid test state is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed > clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR</p>			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<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 transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control</p>			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCstoset P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Stuck Off (GRWand 8SPD)	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>TCM 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</p> <p>service solenoid cleaning</p>	<p>*****</p> <p>= 0 Boolean</p> <p>= 0 Boolean</p> <p>>9.00 volts</p> <p>= 0 Boolean</p> <p>= 0 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 > 2 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 ***** enable C2 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR (accelerator pedal position OR engine speed) C2 clutch slip speed valid	= FALSE Boolean = TRUE ***** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 100.0 RPM > 2.00 % > 1,500.0 RPM = TRUE (all speed sensors are functional for lever node clutch slip speed calculation)	> 0.450 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C2 (GR10 CB128910R or 8SPD CB12345R) clutch pressure control solenoid.			<p>C2 clutch pressured map</p> <p>(enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear)</p> <p>range shift state</p> <p>*****</p> <p>DTCs not fault pending</p> <p>DTCs not fault active</p>	<p>= mapped to line pressure, C2 clutch pressure has reached fully applied state</p> <p>= 1 (1 to enable, 0 to disable) = FORWARD</p> <p>= a FORWARD gear</p> <p>= 0 (1 to enable, 0 to disable) = REVERSE</p> <p>= REVERSE</p> <p>= range shift complete</p> <p>*****</p> <p>P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B 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</p>		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Stuck On	P0777	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring	shift type is power down shift: C2 clutch slip speed OR shift type is garage shift: C2 clutch slip speed ELSE shift is another type: C2 clutch slip speed update fail time 6.25 milliscond update	< 50.00 RPM < 100.00 RPM < 50.00 RPM			Base fail time: shift type is power down shift: fail time > 0.60 seconds shift type is garage shift: fail time > 0.25 shift type is another type: fail time > 0.15 seconds Add fail time offset according to shift type: open throttle upshift: Clutch Stuck On Fail Offset Time PU Shifts open throttle downshift: Clutch Stuck On Fail Offset Time PD Shifts garage shift: Clutch Stuck On Fail Offset Time GS Shifts closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test			<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>= 0 Boolean</p> <p>= 0 Boolean</p> <p>>9.00 volts</p> <p>= 0 Boolean</p> <p>= 0 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>	

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 C2 CB29, GR10C2 CB128910R, or 8 Speed C2 CB12345R 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 ***** range shift state diagnostic clutch test transmission output shaft speed ((C2 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable) OR C2 off going clutch command pressure)	= TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean = TRUE ***** # range shift complete = OFF GOING CLUTCH TEST > 100.0 RPM = TRUE = 0 (1 to enable, 0 to disable) < 350 kPa	all delay times exhaust delay by shift type: closed throttle upshift: C2 exhaust delay open throttle power on up shift open throttle upshift: C2 exhaust delay open throttle power on up shift garage shifts:	

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)	> 135 Nm = 0 (0 is enable, 1 is enable) = TRUE # clutch fill phase > pressure clip threshold according to shift type: closed and open throttle upshifts: pressure clip threshold is dependent on the oncoming clutch: C1 Torque-Based Pressure Clip OR C3 Torque-Based Pressure Clip OR C4 Torque-Based Pressure Clip OR C5 Torque-Based Pressure Clip OR C6 Torque-Based Pressure Clip clip thresholds for all other shift types: garage shifts:	C2 exhaust delay garage shift closed throttle downshift: C2 exhaust delay closed throttle down shift negative torque upshift: C2 exhaust delay negative torque up shift open throttle downshift: C2 exhaust delay open throttle power down shift Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: C1 Oncoming Post-Torque Phase Delay + wheel slip delay OR C3 Oncoming Post-Torque Phase Delay + wheel slip delay OR	

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 cluth 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</p> <p>(Intrusive shift active AND shift type enable cal for garage shift AND</p>	<p>Clutch Clip Press GS Shifts closed throttle downshift: C1 Clutch Clip Press CD Shifts C3 Clutch Clip Press CD Shifts C4 Clutch Clip Press CD Shifts C5 Clutch Clip Press CD Shifts C6 Clutch Clip Press CD Shifts negative torque upshift: Clutch Clip Press NU Shifts 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, 1 will enable)</p> <p>= FALSE</p> <p>= 0 (0 will enable, 1 will enable)</p>	<p>C4 Oncoming Post-Torque Phase Delay + wheel slip delay OR C5 Oncoming Post-Torque Phase Delay + wheel slip delay OR C6 Oncoming Post-Torque Phase Delay + wheel slip delay</p>	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Attained Gear AND (stuck on enable cal for forward garge shifts AND driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller) current clutch solenoid test state ***** DTCs not fault pending	= NEUTRAL OR commanded gear = 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) ***** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>DTCs not fault active</p> <p>DTCs not test fail this key on</p> <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</p>	<p>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>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>shift due to two conditions: Current value of clutch control solenoid test state is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed > clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic</p>			

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					failure mode, allowing one of the clutch pressure control solenoid stuck on DTCstoset P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 (GRWand 8SPD)	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>TCM 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</p> <p>service solenoid cleaning</p>	<p>*****</p> <p>= 0 Boolean</p> <p>= 0 Boolean</p> <p>>9.00 volts</p> <p>= 0 Boolean</p> <p>= 0 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 > 2 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 ***** enable C3 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR (accelerator pedal position OR engine speed) C3 clutch slip speed valid	= FALSE Boolean = TRUE ***** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 100.0 RPM > 2.00 % > 1,500.0 RPM = TRUE (all speed sensors are functional for lever node clutch slip speed calculation)	> 0.450 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C3 (GR10 C23457910 or 8SPD C13567) clutch pressure control solenoid.			<p>C3 clutch pressured map</p> <p>(enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear)</p> <p>range shift state</p> <p>*****</p> <p>DTCs not fault pending</p> <p>DTCs not fault active</p>	<p>= mapped to line pressure, C3 clutch pressure has reached fully applied state</p> <p>= 1 (1 to enable, 0 to disable) = FORWARD</p> <p>= a FORWARD gear</p> <p>= 0 (1 to enable, 0 to disable) = REVERSE</p> <p>= REVERSE</p> <p>= range shift complete</p> <p>*****</p> <p>P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B 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</p>		

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

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 millisecond update	< 100.00 RPM < 100.00 RPM < 100.00 RPM			Base fail time: shift type is power down shift: fail time > 0.60 seconds shift type is garage shift: fail time > 0.35 shift type is another type: fail time > 0.15 seconds Add fail time offset according to shift type: open throttle upshift: Clutch Stuck On Fail Offset Time PU Shifts open throttle downshift: Clutch Stuck On Fail Offset Time PD Shifts garage shift: Clutch Stuck On Fail Offset Time GS Shifts closed throttle downshift:	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. As part of the pressure control solenoid stuck on diagnostic monitor, the safety startle mitigation function executes when in steady state gear, no automatic transmission shift in progress. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional. All clutch pressure control solenoid stuck on diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck on test			<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>= 0 Boolean</p> <p>= 0 Boolean</p> <p>>9.00 volts</p> <p>= 0 Boolean</p> <p>= 0 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>	

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 C3 CB38, GR10C3 C23457910, or 8 Speed C3C13567 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 ***** range shift state diagnostic clutch test transmission output shaft speed ((C3 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable) OR C3 off going clutch command pressure)	= TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean = TRUE ***** # range shift complete = OFF GOING CLUTCH TEST > 100.0 RPM = TRUE = 0 (1 to enable, 0 to disable) < 350 kPa	all delay times exhaust delay by 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:	

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)	> 120 Nm = 0 (0 is enable, 1 is enable) = TRUE # clutch fill phase > pressure clip threshold according to shift type: closed and open throttle upshifts: pressure clip threshold is dependent on the oncoming clutch: C1 Torque-Based Pressure Clip OR C2 Torque-Based Pressure Clip OR C4 Torque-Based Pressure Clip OR C5 Torque-Based Pressure Clip OR C6 Torque-Based Pressure Clip clip thresholds for all other shift types: 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 Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: C1 Oncoming Post-Torque Phase Delay + wheel slip delay OR C2 Oncoming Post-Torque Phase Delay + wheel slip delay OR	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>Clutch Clip Press GS Shifts closed throttle downshift: C1 Clutch Clip Press CD Shifts C2 Clutch Clip Press CD Shifts C4 Clutch Clip Press CD Shifts C5 Clutch Clip Press CD Shifts C6 Clutch Clip Press CD Shifts negative torque upshift: Clutch Clip Press NU Shifts open throttle downshift: Clutch Clip Press PD Shifts</p> <p>C3 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) OR (Intrusive shift active AND shift type enable cal for garage shift</p>	<p>C4 Oncoming Post-Torque Phase Delay + wheel slip delay OR C5 Oncoming Post-Torque Phase Delay + wheel slip delay OR C6 Oncoming Post-Torque Phase Delay + wheel slip delay</p> <p>= TRUE</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>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					AND Attained Gear AND (stuck on enable cal for forward garge shifts AND driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller) current clutch solenoid test state ***** DTCs not fault pending	= 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) ***** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>DTCs not fault active</p> <p>DTCs not test fail this key on</p> <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</p>	<p>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>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>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 corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute.</p> <p>OR</p>			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<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 transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control</p>			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCstoset P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 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 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 D2OR D3OR D4OR D5OR D6OR D7OR D8OR D9OR 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 D2OR D3OR D4OR D5OR D6OR D7OR D8OR D9OR 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	Diagnoses the state of the downshift switch circuit, stuck in the state "tap down" (downshift) active. Emissions neutral default, disables tap-up tap-down or manual-up manual-down.	switch state update fail time 1 100 millisecond update rate	= tap down (downshift) state active	service mode \$04 active diagnostic monitor enable run crank voltage run crank voltage time run crank voltage P1761 fault active P0826 fault active P0826 test fail this key on P0826 fault pending (P0816 fault active OR P0816 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2OR D3OR D4OR D5OR D6OR D7OR D8OR D9OR D10OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = 1 Boolean >5.00 volts > 25 milliseconds >9.00 volts = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE > 1.00 seconds = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity	fail time 1 > 1.00 seconds	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 D2OR D3OR D4OR D5OR D6OR D7OR D8OR D9OR 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.
Transmission Fluid Pressure (TFP) Sensor A Performance (8 speed specific)	P0841	This monitor diagnoses the lube hydraulic circuit pressure sensor for electrical performance faults. The monitor measures the pressure sensor response just after engine crank occurs to verify the transition from zero pressure to the expected minimum dynamic pressure, or, the monitor measures the pressure sensor response just after engine shutdown occurs to verify the transition from the minimum dynamic pressure to zero pressure.	post engine crank evaluation: when lube pressure sensor raw pressure, update post engine crank fail time	< 40.0 kPa	post engine crank evaluation: engine crank evaluation calibration enable raw lube pressure at start of evaluation (OBD power mode AND OBD power mode previous) P0842 fault active P0843 fault active system hydraulic pressure available when engine speed, update engine crank delay time engine crank delay time	= 1 Boolean < 40.0 kPa = CRANK # CRANK = FALSE Boolean = FALSE Boolean = TRUE Boolean > 200 RPM > lube pressure sensor engine crank delay time	post engine crank fail time > lube pressure sensor post engine crank final fail time 6.25 millisecond update rate	
			post engine shutdown evaluation: lube pressure sensor raw pressure	> 40.0 kPa	post engine shutdown evaluation: engine shutdown evaluation calibration enable raw lube pressure at start of evaluation ((OBD power mode OR OBD power mode) AND OBD power mode previous) P0842 fault active P0843 fault active when system hydraulic pressure available, update engine shutdown delay time engine shutdown delay time	= 1 Boolean > 40.0 kPa = OFF = ACC = RUN = FALSE Boolean = FALSE Boolean = FALSE Boolean > lube pressure sensor engine shutdown delay time	post engine shutdown fail time > 0.400 seconds 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 Fluid Pressure (TFP) Sensor A Circuit Low Voltage (8 speed specific)	P0842	Controller specific diagnostic monitor, diagnoses the lube hydraulic circuit pressure sensor for an electrical open circuit failure or an electrical short to ground circuit failure based on the raw sensor % duty cycle signal.	pressure sensor raw % duty cycle	<p>< 9.00 % duty cycle</p> <p>(< 0.5 Q impedance between signal and controller ground</p> <p>OR</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>diagnostic monitor enable calibration</p> <p>battery voltage for time</p> <p>run crank voltage for time</p>	<p>= 1 Boolean</p> <p>>9.00 volts > 0.100 seconds</p> <p>>9.00 volts > 0.100 seconds</p>	<p>fail time > 0.300 seconds in sample window of 0.500 seconds</p> <p>6.25 millisecond update 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.
Transmission Fluid Pressure (TFP) Sensor A Circuit High Voltage (8 speed specific)	P0843	Controller specific diagnostic monitor, diagnoses the lube hydraulic circuit pressure sensor for an electrical short to voltage circuit failure based on the raw sensor % duty cycle signal.	pressure sensor raw % duty cycle	<p>> 91.00 % duty cycle</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>diagnostic monitor enable calibration</p> <p>battery voltage for time</p> <p>run crank voltage for time</p>	<p>= 1 Boolean</p> <p>>9.00 volts > 0.100 seconds</p> <p>>9.00 volts > 0.100 seconds</p>	<p>fail time > 0.300 seconds in sample window of 0.500 seconds</p> <p>6.25 millisecond update rate</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 Control Circuit Open	P0960	Controller specific circuit diagnoses 9 speed CB123456, 10 speed CB123456R, 8 speed CB1278R clutch, or CVT secondary pulley solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit Increment fail time	> 200 K Q impedance between signal and controller ground	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)	> 8.00 volts and < 32.00 volts >5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time > 0.10 seconds out of sample time > 0.50 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 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)	> 8.00 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.	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)	> 8.00 volts and < 32.00 volts >5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time > 0.10 seconds out of sample time > 0.50 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 B Control Circuit Open	P0964	Controller specific circuit diagnoses 9 speed CB29, 10 speed CB128910R, 8 speed CB12345R clutch, or CVT primary pulley solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K Q impedance between signal and controller ground When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	> 8.00 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 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)	> 8.00 volts and < 32.00 volts >5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time > 0.10 seconds out of sample time > 0.50 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.	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)	> 8.00 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 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)	> 8.00 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)	> 8.00 volts and < 32.00 volts >5.00 volts = TRUE = ACCESSORY = 1 (1 is enable, 0 is disable) = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON = CeTSCR_e_HSD2 (CeTSCR_e_NoHSD will disable) = ON	fail time > 0.10 seconds out of sample time > 0.50 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)	> 8.00 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 (Emission MIL Diagnotic)	P15FD	This DTC monitors wheel speed signals for an incorrect sequence	<p>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</p> <p>and this state is continuous for</p> <p>out of a total sample time of</p>	<p>> 10.00 seconds</p> <p>>2.00 seconds</p> <p>> 12.00 seconds</p>	<p>Sequence Number Error DTC is enabled</p> <p>Power Mode</p> <p>Run/Crank Ignition Voltage</p> <p>Driven and non-driven wheel rotational status is currently being received and not failsoft.</p>	<p>Enabled</p> <p>= Run or Crank</p> <p>>=11.00 Volts</p>	Diagnostic executes in 25ms loop.	Invalid value

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Output Speed Sensor Circuit Forward Direction Error	P172A	The TOS sensor is a directional sensor, and raw TOS direction is rationalized based on attained gear and multiple speed sensors. Attained gear is a true indication of gear based on measured gear ratio, TISS/TOSS. If the raw TOS direction is not a forward gear but attained gear is a forward gear, and, TISS and intermediate speed sensors confirm consistent direction, the raw TOS direction is in error.	(raw TOS direction OR raw TIS direction OR intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	# forward # forward intermediate speed sensor 1 or 2 # predicted direction intermediate speed sensor 1 or 2 # predicted direction > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	speed sensor directional rationality =enable calibration = CeTOSR_e_Directional > 500.0 RPM > engine speed time for transmission hydraulic pressure available >9.00 volts > 0.100 seconds = FALSE >9.00 volt > 0.100 seconds > 1st gear < 10th gear = FALSE = range shift complete > 1.00 seconds	2.50 seconds	Type A, 1 Trips
			(raw TOS direction OR intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	# forward intermediate speed sensor 1 or 2 # predicted direction intermediate speed sensor 1 or 2 # predicted direction > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time	speed sensor directional rationality = enable calibration = CeTOSR_e_Directional > 500.0 RPM > engine speed time for transmission hydraulic pressure available	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	>9.00 volts > 0.100 seconds = FALSE >9.00 volt > 0.100 seconds > 1st gear < 10th gear = FALSE = range shift complete > 1.00 seconds		
			(raw TOS direction OR raw TIS direction OR intermediate speed sensor 2 direction raw) AND attained gear AND attained gear	# forward # forward intermediate speed sensor 1 or 2 # predicted direction > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnosotic 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: 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	speed sensor directional rationality = enable calibration = CeTOSR_e_Directional > 500.0 RPM > engine speed time for transmission hydraulic pressure available >9.00 volts > 0.100 seconds = FALSE >9.00 volt > 0.100 seconds > 1st gear < 10th gear = FALSE	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					range shift state (auto trans shift complete) enable time	= range shift complete > 1.00 seconds		
			(raw TOS direction OR raw TIS direction) AND attained gear AND attained gear	# forward # forward > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	speed sensor directional rationality = enable calibration = CeTOSR_e_Directional > 500.0 RPM > engine speed time for transmission hydraulic pressure available >9.00 volts > 0.100 seconds = FALSE >9.00 volt > 0.100 seconds > 1st gear < 10th gear = FALSE = range shift complete > 1.00 seconds	2.50 seconds	
			raw TOS direction attained gear	# forward > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional	speed sensor directional rationality = enable calibration = CeTOSR_e_Directional	2.50 seconds	

[illegible]

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	= 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	= FALSE = TRUE = TRUE = FALSE = TRUE	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria	= 1 Boolean > 5.00 volts > 12.5 milliseconds = FALSE	ECM range sensor fault time > 10.0 seconds UPDATE ECM range sensor latent fault fail count SET ECM range sensor fault = TRUE	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	= 100 counts	met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE IF ECM P2802 fault active OR ECM P2803 fault active SET ECM range sensor fault occur = TRUE	= TRUE > 18.0 KPH > 120.0 seconds = TRUE = TRUE	ECM range sensor latent fault fail count > 100 counts 25 millisecond update rate	
			TCM range sensor fault TCM range sensor fault occur RunCrankVoltageMet (*default gear option active OR (*default gear option active AND TCM range sensor latent fault fail count)) UPDATE TCM range sensor fault time *default gear option active occurs when emission MIL active due to transmission default gear	= FALSE = TRUE = TRUE = FALSE = TRUE = 255 counts	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE IF TCM P0707 fault active OR TCM P0708 fault active SET TCM range sensor fault occur = TRUE	= 1 Boolean > 5.00 volts > 12.5 milliseconds = FALSE = TRUE > 18.0 KPH > 120.0 seconds = TRUE = TRUE	TCM range sensor fault time > 409.0 seconds UPDATE TCM range sensor latent fault fail count SET TCM range sensor fault = TRUE TCM range sensor latent fault fail count > 255 counts 25 millisecond update rate	
			TOSS fault TOSS fault occur RunCrankVoltageMet (*default gear option active occurs when emission MIL active due to transmission default gear	= FALSE = TRUE = TRUE = FALSE	test enable calibration RunCrankVoltageMet = TRUE when: run crank voltage for run crank voltage time vehicle speed trip criteria met when: vehicle speed trip criteria met RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE IF TCM P0707 fault active OR TCM P0708 fault active SET TCM range sensor fault occur = TRUE	= 1 Boolean > 5.00 volts > 12.5 milliseconds = FALSE = TRUE > 18.0 KPH > 120.0 seconds = TRUE = TRUE	TOSS fault time > 10.0 seconds UPDATE TOSS latent fault fail count	

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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 = 1 Boolean > 5.00 volts > 12.5 milliseconds = FALSE = TRUE > 18.0 KPH > 120.0 seconds = TRUE = TRUE	tie-up fault time > 10.0 seconds UPDATE tie-up latent fault fail count SET tie-up fault = TRUE tie-up latent fault fail count > 100 counts 25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 = 200 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	= FALSE	trans range latent fault fail count > 200 counts	
			*default gear option active occurs when emission MIL active due to transmission default gear		RunCrankVoltageMet vehicle speed for vehicle speed time THEN SET vehicle speed trip criteria met = TRUE	= TRUE > 18.0 KPH > 120.0 seconds	25 millisecond update rate	
					IF [(P0717 or P07C0 or P07BF fault active or P077D or P077C fault active or P723 test fail this key on or P0723 or P077D or P077C or P0722 fault pending or P0716 or P07C0 or P07BF or P0717 fault pending or P172B or P172A or P0721 fault pending or P1783 or P17CE fault active or	= 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.
					P1783 or P17CE fault pending or P172A or P172B test fail this key on or P0721 fault active) AND (safety disable 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 disable 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	

24OBDG06A HD Part 2 TCM Summary Tables

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24OBDG06A HD Part 2 TCM Summary Tables

[illegible]

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>	<p>alive rolling count error counter update fail time 100 millisecond update rate</p>	> 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 diagnsotic alive rolling count data value, if the diagnsotic 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	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.
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.	$\text{delta1} = \text{ABS}(\text{transmission input speed} - (\text{transmission output speed} * \text{gear ratio commanded}))$ update fail time 25 millisecond update rate	> 10.0 RPM	diagnostic monitor enable speed sensor configuration calibration is single OR dual ratio calibration is function of command gear and intermediate speed 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_SingleSpdSnsr 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 ***** > 240.0 RPM > 36.0 RPM = nueutral idle mode ON = range shift complete = 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.
Input Speed Sensor Direction Not Plausible - Forward	P1783	The TIS sensor is a directional sensor, and raw TIS direction is rationalized based on attained gear and multiple speed sensors. Attained gear is a true indication of gear based on measured gear ratio, TISS/TOSS. If the raw TIS direction is not reverse but attained gear is reverse, or, if the raw TIS direction is not forward but attained gear is a forward gear, the raw TIS direction is in error.	raw TIS direction AND attained gear	# FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	speed sensor directional rationality = enable calibration = CeTOSR_e_Directional > 500.0 RPM > engine speed time for transmission hydraulic pressure available seconds >9.00 volts > 0.100 seconds = FALSE >9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds	2.50 seconds	Type A, 1 Trips
			raw TIS direction AND attained gear AND attained gear	# FORWARD > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time	speed sensor directional rationality = enable calibration = CeTOSR_e_Directional > 500.0 RPM > engine speed time for transmission hydraulic pressure available seconds	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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: 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 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 2 direction raw AND TIS direction AND attained gear	intermediate speed sensor 1 or 2 # predicted direction # FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed	speed sensor directional rationality = enable calibration = CeTOSR_e_Directional > 500.0 RPM > engine speed	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 2 direction raw AND raw TIS direction AND attained gear AND attained gear	intermediate speed sensor 1 or 2 # predicted direction # FORWARD > 1st gear < 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active	speed sensor directional rationality = enable calibration = CeTOSR_e_Directional > 500.0 RPM > engine speed time for transmission hydraulic pressure available seconds >9.00 volts > 0.100 seconds = FALSE >9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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) AND TIS direction AND attained gear	intermediate speed sensor 1 or 2 # predicted direction intermediate speed sensor 1 or 2 # predicted direction # FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	speed sensor directional rationality = enable calibration = CeTOSR_e_Directional > 500.0 RPM > engine speed time for transmission hydraulic pressure available seconds >9.00 volts > 0.100 seconds = FALSE >9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds	2.50 seconds	
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND	intermediate speed sensor 1 or 2 # predicted direction intermediate speed sensor 1 or 2 # predicted direction	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional	speed sensor directional rationality = enable calibration = CeTOSR_e_Directional > 500.0 RPM ≥	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			raw TIS direction AND attained gear AND attained gear	# FORWARD > 1st gear < 10th gear	engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	engine speed time for transmission hydraulic pressure available seconds >9.00 volts > 0.100 seconds = FALSE >9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete > 1.00 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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: 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 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: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active	speed sensor directional rationality = enable calibration = CeTOSR_e_Directional > 500.0 RPM > engine speed time for transmission hydraulic pressure available seconds >9.00 volts > 0.100 seconds = FALSE >9.00 volt > 0.100 seconds = REVERSE = FALSE = range shift complete	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.
Input Speed Sensor Direction Error	P17CE	The diagnostic monitor determines if the direction transmission input shaft speed sensor value is coherent based on the on period time of the directional sensor and raw speed sensor value. When the on period time indicates a transitional state, the direction must also be transitional as measured by very slow raw signal RPM. When the on period time indicates a non-transitional state, forward or reverse, the direction must also be transition, not forward and not reverse.	input shaft speed sesnor raw direction when transitional period = FALSE AND input shaft speed sesnor raw direction when transitional period = FALSE OR input shaft speed sesnor raw when transitional period = TRUE update fail and sample time, update rate defined in Secondary Parameters	# FORWARD # REVERSE > 225.0 RPM	determine update rate: 6.26 millisecond update rate calibration, TRUE, update rate = 6.25 millisecond FALSE, update rate = 25 millisecond service mode \$04 active diagnostic monitor enable input shaft speed sesnor count sample period senor type calibration (senor type is directional) P17CE fault active OR P17CE test fail this key on transitional period detected = FALSE when: on period OR on period when direction unknown OR on period on period when direction is reverse OR on period on period when direction is forward transitional period detected = TRUE when: on period on period when direction unknown	= 1 Boolean = FALSE = 1 Boolean # 0 counts = CeTISR_e_Directional = FALSE = FALSE > 0.4434 seconds < 0.2773 seconds < 0.2363 seconds > 0.1240 seconds < 0.0811 seconds > 0.0088 seconds < 0.4434 seconds > 0.2773 seconds	fail time > 3.500 seconds out of sample time > 5.000 seconds update rate defined in Secondary Parameters	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.
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	280 failures out of 280 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.
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 (GRWand 8SPD)	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>TCM 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</p> <p>service solenoid cleaning</p>	<p>*****</p> <p>= 0 Boolean</p> <p>= 0 Boolean</p> <p>>9.00 volts</p> <p>= 0 Boolean</p> <p>= 0 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 > 2 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 ***** enable C4 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR (accelerator pedal position OR engine speed) C4 clutch slip speed valid	= FALSE Boolean = TRUE ***** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 100.0 RPM > 2.00 % > 1,500.0 RPM = TRUE (all speed sensors are functional for lever node clutch slip speed calculation)	> 0.450 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C4 (GR10 C23467810R or 8SPD C23468) clutch pressure control solenoid.			C4 clutch pressured map (enable forward gear cal AND driver direction request AND Attained Gear) OR (enable reverse gear cal AND driver direction request AND Attained Gear) range shift state ***** DTCs not fault pending DTCs not fault active	= mapped to line pressure, C4 clutch pressure has reached fully applied state = 1 (1 to enable, 0 to disable) = FORWARD = a FORWARD gear = 0 (1 to enable, 0 to disable) = REVERSE = REVERSE = range shift complete ***** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF P0723 P0722 P077D P077C P176C P176D P176B P17D6 P2534 P0707 P0708 P0716 P0717 P07C0 P07BF P077D P077C 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		

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

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 millisecond update	< 150.00 RPM < 100.00 RPM < 150.00 RPM			Base fail time: shift type is power down shift: fail time > 0.60 seconds shift type is garage shift: fail time > 0.25 seconds 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>= 0 Boolean</p> <p>= 0 Boolean</p> <p>>9.00 volts</p> <p>= 0 Boolean</p> <p>= 0 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>	

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 C4 C4, GR10C4 C23467810R, or 8 Speed C4 C23468 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 ***** range shift state diagnostic clutch test transmission output shaft speed ((C4 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable) OR C4 off going clutch command pressure)	= TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean = TRUE ***** # range shift complete = OFF GOING CLUTCH TEST > 100.0 RPM = TRUE = 0 (1 to enable, 0 to disable) < 350 kPa	all delay times exhaust delay by 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:	

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)	> 135 Nm = 0 (0 is enable, 1 is enable) = TRUE # clutch fill phase > pressure clip threshold according to shift type: closed and open throttle upshifts: pressure clip threshold is dependent on the oncoming clutch: C1 Torque-Based Pressure Clip OR C2 Torque-Based Pressure Clip OR C3 Torque-Based Pressure Clip OR C5 Torque-Based Pressure Clip OR C6 Torque-Based Pressure Clip clip thresholds for all other shift types:	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 Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: C1 Oncoming Post-Torque Phase Delay + wheel slip delay OR C2 Oncoming Post-Torque Phase Delay + wheel slip delay OR	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>garage shifts: Clutch Clip Press GS Shifts closed throttle downshift: C1 Clutch Clip Press CD Shifts C2 Clutch Clip Press CD Shifts C3 Clutch Clip Press CD Shifts C5 Clutch Clip Press CD Shifts C6 Clutch Clip Press CD Shifts negative torque upshift: Clutch Clip Press NU Shifts open throttle downshift: Clutch Clip Press PD Shifts</p> <p>C4 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) OR (Intrusive shift active AND shift type enable cal for garage shift</p>	<p>= TRUE</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>C3 Oncoming Post-Torque Phase Delay + wheel slip delay OR C5 Oncoming Post-Torque Phase Delay + wheel slip delay OR C6 Oncoming Post-Torque Phase Delay + wheel slip delay</p>	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					AND Attained Gear AND (stuck on enable cal for forward garge shifts AND driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller) current clutch solenoid test state ***** DTCs not fault pending	= 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) ***** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>DTCs not fault active</p> <p>DTCs not test fail this key on</p> <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</p>	<p>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>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>automatic transmission shift due to two conditions: Current value of clutch control solenoid test state is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed > clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR</p>			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<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 transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control</p>			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCstoset P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid D Control Circuit Open	P2718	Controller specific circuit diagnoses 9 speed C4, 10 speed C23467810R, 8 speed C23468 clutch, or CVT input clutch solenoid for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K 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)	> 8.00 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 > 0.10 seconds out of sample time > 0.50 seconds 6.25 millisecond update rate > 1.00 seconds > 25 milliseconds > 12.5 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid D Control Circuit Low	P2720	Controller specific circuit diagnoses 9 speed C4, 10 speed C23467810R, 8 speed C23468 clutch, or CVT input clutch, solenoid for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short	< 0.5 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)	> 8.00 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 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)	> 8.00 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 > 0.10 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 (8SPD)	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 millisecond update Closest attained gear	> 200.0 RPM # 3rd gear	***** 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	***** = 0 Boolean = 0 Boolean >9.00 volts = 0 Boolean = 0 Boolean >9.00 volts = TRUE Boolean = TRUE Boolean	fail time > 1.00 seconds, update fail count, fail count > 2 counts 6.25 millisecond update battery voltage time > 0.100 seconds run crank voltage time > 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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			service fast learn active service solenoid cleaning procedure active hydraulic pressure available ***** enable C5 clutch slip speed fail compare when: ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable cal is FALSE (startle mitigation) clutch steady state adaptive active (transmission output shaft speed OR (accelerator pedal position OR engine speed)	= FALSE Boolean = FALSE Boolean = TRUE ***** = FALSE = TRUE # initial startle mitigation gear = FALSE = 0 (0 to enable, 1 to disable) = FALSE > 100.0 RPM > 2.00 % > 1,500.0 RPM = TRUE (all speed	> 0.450 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to C5 (8SPD C45678R) clutch pressure control solenoid.			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	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 P172AP172B 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		

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

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 millisecond update	< 50.00 RPM < 100.00 RPM < 50.00 RPM			Base fail time: shift type is power down shift: fail time > 0.60 seconds shift type is garage shift: fail time > 0.25 seconds 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>= 0 Boolean</p> <p>= 0 Boolean</p> <p>>9.00 volts</p> <p>= 0 Boolean</p> <p>= 0 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>	

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 C5 C57R, GR10C5 C1356789, or 8 Speed C5 C45678R 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 ***** range shift state diagnostic clutch test transmission output shaft speed ((C5 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable) OR C5 off going clutch command pressure)	= TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean = TRUE ***** # range shift complete = OFF GOING CLUTCH TEST > 100.0 RPM = TRUE = 0 (1 to enable, 0 to disable) < 350 kPa	all time delays exhaust delay by 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:	

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)	> 120 Nm = 0 (0 is enable, 1 is enable) = TRUE # clutch fill phase > pressure clip threshold according to shift type: closed and open throttle upshifts: pressure clip threshold is dependent on the oncoming clutch: C1 Torque-Based Pressure Clip OR C2 Torque-Based Pressure Clip OR C3 Torque-Based Pressure Clip OR C4 Torque-Based Pressure Clip OR C6 Torque-Based Pressure Clip clip thresholds for all other shift types: 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 Post-torque phase delay for powered upshifts is dependent on the oncoming clutch: C1 Oncoming Post-Torque Phase Delay + wheel slip delay OR C2 Oncoming Post-Torque Phase Delay + wheel slip delay OR	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>Clutch Clip Press GS Shifts closed throttle downshift: C1 Clutch Clip Press CD Shifts C2 Clutch Clip Press CD Shifts C3 Clutch Clip Press CD Shifts C4 Clutch Clip Press CD Shifts C6 Clutch Clip Press CD Shifts negative torque upshift: Clutch Clip Press NU Shifts 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>*****</p> <p>conditions needed to trigger test:</p> <p>(current shift type AND shift type enable cal for current shift type) OR (Intrusive shift active AND shift type enable cal for garage shift</p>	<p>C3 Oncoming Post-Torque Phase Delay + wheel slip delay OR C4 Oncoming Post-Torque Phase Delay + wheel slip delay OR C6 Oncoming Post-Torque Phase Delay + wheel slip delay</p> <p>= TRUE</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>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					AND Attained Gear AND (stuck on enable cal for forward garge shifts AND driver requested direction AND commanded gear) OR (stuck on enable cal for reverse garage shifts AND driver requested direction AND commanded gear)) clutch stuck off intrusive shift active startle mitigation active (see note on startle mitigation below) (new clutch controller has been initalized OR transitioning to a different clutch controller) current clutch solenoid test state ***** DTCs not fault pending	= 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) ***** P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B P0716 P0717 P07C0 P07BF		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>DTCs not fault active</p> <p>DTCs not test fail this key on</p> <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</p>	<p>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>		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>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 corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute.</p> <p>OR</p>			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<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 transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control</p>			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCstoset P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 CVTCC 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)	> 8.00 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 > 0.10 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)	> 8.00 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 CVT TCC Control solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Q impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	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)	> 8.00 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 > 0.10 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 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)	> 8.00 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 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)	> 8.00 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 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)	> 8.00 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 Calibration Incorrect	P27A7	The diagnostic monitor verifies that the pressure control solenoid A (GF9 line or GR10 C1 C123456R clutch or CVT secondary pulley) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid A electrical characteristics of the device currently installed in the transmission valve body assembly.	<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.
Transmission Range Sensor A/B Correlation	P2805	Internal range sensor A is wired independently to the TCM while internal range sensor B is wired independently to the ECM. The monitor diagnoses the internal range sensor A PWM duty cycle by comparing the raw sensor A value against the raw sensor B adjusted value, to verify signals are consistent, or determine the TCM internal range sensor A does not correlate to the ECM internal range sensor B. The ECM transmits internal range sensor B raw PWM to the TCM over the serial data bus.	ABS((TCM internal range sensor A + ECM internal range sensor B raw adjusted for high or low time) - 100 %)) Increment fail and sample time, update rate 25 milliseconds	> 4.999 % duty cycle	diagnostic monitor enable P0707 fault active P0708 fault active U0100 fault active ECM internal range sensor B available from ECM ECM internal range sensor B fault active battery voltage ABS(TCM internal range sensor A current loop value - TCM internal range sensor A previous loop value), update TCM internal range sensor A stability time, update rate 25 milliseconds ABS(ECM internal range sensor B current loop value - ECM internal range sensor B previous loop value), update ECM internal range sensor B stability time, update rate 25 milliseconds TCM internal range sensor A stability time met OR ECM internal range sensor B stability time met ECM internal range sensor B raw adjusted for	= 1 Boolean = FALSE = FALSE = FALSE = TRUE = FALSE >9.00 volts < 4.999 % duty cycle < 4.999 % duty cycle = ABS(ECM internal range sensor B raw -	PWM fail time > 1.000 seconds out of sample time > 1.500 seconds battery voltage time > 1.000 seconds TCM internal range sensor A stability time > 1.000 seconds ECM internal range sensor B stability time > 1.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					high or low time Vehicle is in a mode that enables accessory power	0.000 %) = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid G Performance /Stuck Off - RWD 8 speed specific	P2808	The diagnostic monitor detects the transmission torque converter control valve solenoid failed hydraulically off. The monitor executes when the transmission torque converter is commanded to a "lock" mode during which the torque converter will be controlled to near zero (0.0) RPM slip speed, or, an "on" mode during which the torque converter will be controlled to target slip speed using slip speed error. The transmission torque converter control valve solenoid is considered failed hydraulically off when the "lock" mode slip speed is excessive, or, when the "on" mode slip speed error is excessive.	if use (TCC slip speed error OR TCC control mode) TCC slip speed error = TCC slip speed - TCC command slip speed else if TCC control mode torque convert slip = engine speed - transmission input shaft speed then update fail time 25 millisecond update rate	= 0 Boolean = ON mode (controlled slip mode) > P2808 TCC stuck off fail TCC slip speed see supporting table = LOCK > 130.0 RPM	diagnostic monitor enable TCC command capacity TCC command capacity time TCC command pressure TCC command pressure time (TCC control mode previous TCC control mode previous TCC control mode previous) AND (TCC control mode current OR TCC control mode current) (TCC stuck off enable OR TCC stuck on enable) hydraulic pressure available: engine speed engine speed time service fast learn active battery voltage battery voltage time run crank voltage run crank voltage time	= 1 Boolean > 0.00 % > 0.00 seconds > 600.0 kPa > 2.00 seconds # TCC control mode current # ON mode (controlled slip mode) # LOCK = ON mode (controlled slip mode) = LOCK = 1 Boolean = 1 Boolean > 500.0 RPM > engine speed time for transmission hydraulic pressure available see supporting table = FALSE >9.00 volts > 0.100 seconds >9.00 volts > 0.100 seconds	fail time > 2.500 seconds increment fail count fail count > 3 counts 25 millisecond update rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(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 P2808 test fail this key on DTCs not fault active DTCs not fault pending	= 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_Second < 25.00 RPM = FALSE AcceleratorPedalFailure EngineTorqueEstInaccu rate P281B, P281D, P281E, P0716, P0717, P07BF, P07C0 P0722, P0723, P077C, P077D 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 G Stuck On - RWD 8 speed specific	P2809	The diagnostic monitor detects the transmission torque converter control valve solenoid failed hydraulically on. 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 Default Valve has transitioned low to high, causing a severe derivative engine speed and TCC slip change (crash).	<p>TCC Slip (during TCC crash, extreme rate of change derivative)</p> <p>When Stuck on crash detected monitor TCC Slip - torque convert slip speed = ABS(engine speed - transmission input shaft speed)</p> <p>WHILE TCC Slip AND TCC Slip THEN Increment TCC Stuck On fail timer</p> <p>25 millisecond update rate</p>	<p>< 85 ROM</p> <p>< P2809 TCC Stuck On Crash Decel RPM/second see supporting tables</p> <p>> -50.0 RPM < 50.0 RPM</p>	<p>Diagnostic monitor enable</p> <p>accelerator pedal position signal available</p> <p>hydraulic pressure available: Engine speed</p> <p>service fast learn active battery voltage run crank voltage</p> <p>P281B fault active P281D fault active P281E fault active</p> <p>P0716 fault active P0717 fault active P07BF fault active P07C0 fault active P0722 fault active P0723 fault active P077C fault active P077D fault active</p> <p>P0722 fault pending P0723 fault pending P0716 fault pending P0717 fault pending P07BF fault pending P07C0 fault pending *****</p> <p>PRNDL PRNDL Commanded gear Commanded gear</p> <p>(PTO active OR PTO disable calibration)</p>	<p>= 1 (1 enable, 0 disable)</p> <p>= TRUE</p> <p>= TRUE</p> <p>> 500.0 RPM</p> <p>= FALSE >9.00 volts >9.00 volts</p> <p>= FALSE = FALSE = FALSE</p> <p>= FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE</p> <p>= FALSE = FALSE = FALSE = FALSE = FALSE = FALSE</p> <p># NEUTRAL # REVERSE # NEUTRAL # REVERSE</p> <p>= FALSE = 1 Boolean</p>	<p>fail time > 1.500 seconds increment fail count fail count > 3 counts</p> <p>25 millisecond update 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.
					transmission fluid temperature transmission fluid temperature engine torque engine torque P2809 test fail this key on vehicle speed engine speed engine speed accelerator pedal position 4WD low state (driver shift mode active OR driver shift mode calibration) (clutch control solenoid stuck on OR stuck OFF intrusive shift active) P0746 fault pending P0747 fault pending P0776 fault pending P0777 fault pending P0796 fault pending P0797 fault pending P2714 fault pending P2715 fault pending P2723 fault pending P2724 fault pending P2732 fault pending P2733 fault pending P2820 fault pending P2821 fault pending vehicle speed accelerator pedal position	> -6.66 °C < 130.00 °C > 55.0 Nm < 250.0 Nm = FALSE < 45.0 KPH > 400.0 RPM < 5,500.0 RPM < 95.0 % = FALSE = FALSE = 0 Boolean = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE < 8.0 KPH > 4.0 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					accelerator pedal position hysteresis ***** When: Default valve state AND Previous default valve state set count down time Otherwise: Decrement count down time Default valve state OR count down time OR P2809 fault time	> 1.0 % ***** = HIGH = LOW to HIGH transition P2809 Default Valve = Transition Window = LOW to HIGH transition > 0.0 seconds > 0.0 seconds		

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.	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)	> 8.00 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 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)	> 8.00 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.	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)	> 8.00 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 H Stuck Off (8 SPD)	P2817	<p>Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. This diagnostic monitor detects the default valve control solenoid failed hydraulically off.</p> <p>When the default disable valve is hydraulically off in drive, hydraulic fluid will be routed to C2, C3, and C4, while pressure is drained from C5. This can be detected as a C5 stuck off condition, and a shift to 6th is performed to differential between the two faults by monitoring ratio.</p>	<p>command gear AND (hydraulic delay time to attain 6th gear OR attained gear) AND 6th gear attained gear slip clutch slip valid (no speed sensor faults with node/ lever calculation)</p> <p>update fail time</p>	<p>= 6th gear > 0.400 seconds</p> <p>= 6th gear</p> <p>< 20.0 RPM = TRUE</p>	<p>system-level enables:</p> <p>use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage) battery voltage time</p> <p>use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage) run crank voltage time</p> <p>TCM 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</p> <p>service solenoid cleaning procedure active</p> <p>hydraulic pressure available</p>	<p>= 0 Boolean</p> <p>= 0 Boolean</p> <p>>9.00 volts > 0.100 seconds</p> <p>= 0 Boolean</p> <p>= 0 Boolean</p> <p>>9.00 volts 0.100 seconds</p> <p>= TRUE Boolean</p> <p>= TRUE Boolean</p> <p>= FALSE Boolean</p> <p>= FALSE Boolean</p> <p>= TRUE</p>	<p>fail time > 0.200 seconds and update fail count when fail count > 2 counts</p> <p>6.25 millisecond update</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>*****</p> <p>diagnostic monitor specific conditions</p> <p>attained gear command gear 3rd gear ratio 4th gear ratio update ratio time ratio time</p> <p>when the above conditions are met command 6th gear to verify default disable valve is hydraulically stuck off</p> <p>*****</p> <p>DTCs not fault pending</p> <p>*****</p> <p>DTCs not fault active</p>	<p>*****</p> <p>= 3rd gear = 4th gear < 2.189 unitless > 1.758</p> <p>> 0.000 seconds</p> <p>*****</p> <p>P17CE P1783 P178F P17C6 P17C4 P17C7 P17D3 P17C5 P0721 P172AP172B 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>		

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	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 H Stuck On (8 Speed)	P2818	<p>Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. This diagnostic monitor detects the default valve control solenoid failed hydraulically on.</p> <p>When the default disable valve is hydraulically on, hydraulic fluid will be routed to the Torque Converter Clutch (TCC) control solenoid. The failure can be detected by commanding the TCC solenoid on while in park, or not in park at very low vehicle speeds, and monitoring torque converter slip speed. If the torque converter slip drops at the torque converter gains opacity, the Default Valve is stuck on.</p>	when TCC average slip speed update DefaultVlaveStuckOnFailTime	< 30.00 RPM	<p>(Intrusive Default Valve TCC pressure request AND TCC command pressure Set Default Valve TCC pressure request)</p> <p>(Vehicle speed set DriveStuckOnTest)</p> <p>BEGIN DVParkEnable: (ParkTest calibration AND transmission range) OR ParkTest calibration engine torque engine torque attained gear slip transmission range (command gear AND attained gear) OR (command gear AND attained gear AND 2nd gear enable calibration vehicle speed (vehicle speed OR DefaultVlaveStuckOnFailTime (DVStuckOnTestRun OR DVStuckOnIntrusiveTestActive) when all of the above conditions are met set DVParkEnable else set DVParkEnable END DVParkEnable DVStuckOnTestTimeOut hydraulic pressure</p>	<p>= TRUE Boolean</p> <p><</p> <p>Default Valve Stuck On TCC Pressure Request</p> <p>=</p> <p>Default Valve Stuck On TCC Pressure Request</p> <p>< 5.0 KPH</p> <p>= FALSE Boolean</p> <p>= 1 Boolean</p> <p>= PARK</p> <p>= 1 Boolean</p> <p>> 50.0 Nm</p> <p>< 250.0 Nm</p> <p>< 50 RPM</p> <p>< DriveI0</p> <p>= 1st gear</p> <p>= 1st gear</p> <p>= 2nd gear</p> <p>= 2nd gear</p> <p>= 1 Boolean</p> <p>> 5.0 KPH</p> <p>< 16.0 KPH</p> <p>> 0 seconds</p> <p>= FALSE Boolean</p> <p>= TRUE Boolean</p> <p>= TRUE Boolean</p> <p>= FALSE Boolean</p> <p>< 5 counts</p>	<p>DefaultVlaveStuckOnFailTime > 0.20 seconds, update fail count, fail count > 3 counts</p> <p>6.25 milliseconds update</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					available battery voltage battery voltage time run crank voltage run crank voltage time DVParkEnable DefaultValveState engine speed engine speed transmission fluid temperature transmission fluid temperature P2818 test fail this key on P2818 test pass this key on when the above conditions are met set DVStuckOnTestInitDelay (count down time) when: ABS(TCC diagnosis slip speed) OR DVStuckOnIntrusiveTestA ctive) DVStuckOnTestInitDelay (when: DVStuckOnIntrusiveTestA ctive set DVStuckOnIntrusiveTCC PressReq) set DVStuckOnIntrusiveTestA ctive set DVStuckOnTestRun	= TRUE Boolean >9.00 volts > 0.100 seconds >9.00 volts > 0.100 seconds = TRUE Boolean = LOW (DV solenoid command is OFF) > 400 RPM < 3,000 RPM > -7.00 °C < 100.00 °C = FALSE Boolean = FALSE Boolean = 0.000 seconds < Default Valve Stuck On TCC Slip Speed for intrusive = TRUE Boolean = 0.0 seconds = FALSE Boolean = Default Valve Stuck On TCC Pressure Request = TRUE Boolean		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>when TCC pressure AND TCC PCS pressure (HWIO interface), update TCC response delay time TCC response delay time</p> <p>TCC average slip samples</p> <p>*****</p> <p>DTCs not Fault Active:</p> <p>DTCs not Fault Pending:</p> <p>DTCs notTFTKO:</p>	<p>= TRUE</p> <p>> Default Valve Stuck On TCC Pressure Request > 0.0 kPa</p> <p>> Default Valve Stuck On Test Pressure Response Delay > 10 counts (time = counts * 6.25 msec)</p> <p>*****</p> <p>P2808, P2809, P2812, P2814, P2815, P0716, P0717, P07C0, P07BF</p> <p>P0716, P0717, P07C0, P07BF</p> <p>P0716, P0717, P07C0, P07BF</p>		

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)	> 8.00 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 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)	> 8.00 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 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)	> 8.00 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 Solenoid J Stuck On (8 speed)	P2821	The diagnostic monitor detects the Park Clutch Prime (PCP) Valve failed in the hydraulic on state. The diagnostic monitor executes during an engine crank event to monitor C3 (C13567) clutch slip to determine the hydraulic state of the PCP Valve. If C3 clutch slip is low during the engine crank the PCP Valve is stuck on hydraulically since transmission fluid is applied inappropriately through the PCP Valve to C3 in the failure mode. The C2 (CB12345R) on/off pressure control solenoid is multiplexed to the C2 (CB12345R) boost valve and the PCP Valve so the state of the C2 (CB12345R) on/off pressure control solenoid must be known for the monitor to execute.	ABS(C3 (C13567) clutch slip) update fail time	< 40.0 RPM	<p>when Propulsion System State update CrankTime</p> <p>when High Side Drive OR High Side Driver 2 OR P0968 C3 (C13567) open circuit fault active OR P0970 C3 (C13567) circuit ground short fault active OR P0971 C3 (C13567) circuit ground short fault active OR P2738 Line Pressure circuit ground short fault active set ElecFault else set ElecFault</p> <p>when transmission fluid temperature P2821 test fail this key on P2821 test pass this key on command range command gear ElecFault C3 (C13567) clutch slip valid set PCPValveStuckOnEnable else set PCPValveStuckOnEnable</p> <p>when PCPValveStuckOnTest</p>	<p>= Engine Crank</p> <p>= FALSE Boolean = FALSE Boolean = TRUE Boolean</p> <p>= TRUE Boolean</p> <p>= TRUE Boolean</p> <p>= TRUE Boolean</p> <p>= TRUE Boolean</p> <p>= TRUE Boolean</p> <p>= FALSE Boolean</p> <p>= FALSE Boolean</p> <p>= FALSE Boolean</p> <p>= FALSE Boolean</p> <p>= FALSE Boolean</p> <p>= FALSE Boolean</p> <p>= FALSE Boolean</p> <p>= FALSE Boolean</p>	<p>fail time > 0.250 seconds, update fail count fail count > 2 counts</p> <p>6.25 milliscond update</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					PCPVlaveStuckOnEnable Propulsion System State CrankTime transmission input speed set PCPValveStuckOnTest begin C3 (C13567) capacity possible: when C3 (C13567) Clutch Pressure DigitalCommand of ON/ OFF Default Valve Default Valve State set PCPC3TstPressCmnd next 03(013567) CapacityPossible PCPC3TstPressCmnd (EngineSpeed OR TransInputSpeed) OR Trans_AuxPumpAvail) when all of the above conditions are met update C3(C13567) CapPosTransTime when C3(C13567) CapPosTransTime set C3(C13567) CapacityPossible end C3 (C13567) capacity possible C2 (CB12345R) on/off pressure control solenoid state C3(C13567) CaoacitvPossible	= TRUE Boolean = Engine Crank < 0.100 seconds < 5.0 RPM = TRUE Boolean = MaxClutchPress (full clutch torque capaicty) = TRUE Boolean (Default Valve command ON) = HIGH (Default Valve command ON) = TRUE Boolean = FALSE Boolean = TRUE Boolean > 300 RPM = TRUE Boolean C3 (C13567) Cap Poss > Trans Time Thres = TRUE = FALSE (hydraulic command state = OFF) = TRUE Boolean		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					transmission input speed	> 160.0 RPM		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid J Control Circuit Open (T93 Controller only)	P2824	Controller specific circuit diagnoses 10 speed Default Disable Control Circuit for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit	> 200 K 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)	> 8.00 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 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)	> 8.00 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 J Control Circuit High	P2827	Controller specific circuit diagnoses 9 speed Clutch Valve Control Circuit, 10 speed Default Disable Control Circuit, or 8 speed Boost Valve Control Circuit for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage	< 0.5 Q impedance between signal and controller voltage source When malfunction criteria threshold is met, increment fail time and increment sample time, otherwise increment only sample time	battery voltage (run crank voltage OR accessory voltage active OR Power Mode) diagnostic monitor enable calibration (solenoid is mapped to high side driver 1 (CeTSCR_e_HSD1) AND high side driver 1) OR (solenoid is mapped to high side driver 2 (CeTSCR_e_HSD2) AND high side driver 2) OR (solenoid is mapped to high side driver 3 (CeTSCR_e_HSD3) AND high side driver 3)	> 8.00 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.
Engine Stall Prevention Active Signal Message Counter Incorrect	P30BD	The diagnostic monitor detects an alive rolling count error in the CAN frame containing the engine stall protection signal value.	<p>The signal value of the Alive Rolling Count (ARC) of the following signals received over serial data is incorrect for:</p> <p>Torque Converter Clutch (TCC) stall saver active ARC</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 (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>>= 3,000.00 milliseconds</p> <p>>= 11.00 volts</p> <p><= 18.00 volts</p>	Executes in 12.5ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 controller main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 controller main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communicati on Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures	≥ 10.00 counts in a sliding window of 50 samples	General Enable Criteria: Starter motor engaged for Or Run/Crank ignition voltage All below criteria have been met for CAN channel is requesting full communications Normal CAN transmission on Bus is enabled Accessory mode to off mode not pending Battery voltage Controller is an OBD controller Or Battery Voltage Controller type: OBD Controller If power mode = Run/ Crank: Run/Crank ignition voltage If power mode = Accessory: Off key cycle diagnostics are enabled	$> 15,000.00$ milliseconds > 11.00 Volts $\geq 3,000.00$ milliseconds > 11.00 Volts ≤ 18.00 Volts ≥ 11.00 Volts Disabled	Samples every 100.00 milliseconds	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on With ECM/PCM A	U0100	This DTC monitors for a loss of communication with the ECM/PCM A.	Message is not received from controller for Message \$0BE:	>500.00 milliseconds	General Enable Criteria: All below criteria have been met for	>= 3,000.00 milliseconds	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips
			Message \$0C9:	>500.00 milliseconds	If message is on Bus A: U0073 not active			
			Message \$18E:	>500.00 milliseconds	If message is on Bus B: U0074 not active			
			Message \$1A1:	>500.00 milliseconds	If message is on Bus S: U0076 not active			
			Message \$1A3:	>10,000.00 milliseconds	CAN channel is requesting full communications			
			Message \$1AA:	>10,000.00 milliseconds	Normal CAN transmission on Bus is enabled			
			Message \$1BA:	>500.00 milliseconds	If bus type is Sensor Bus, sensor bus relay is on			
			Message \$1DF:	>500.00 milliseconds	Accessory mode to off mode not pending			
			Message \$287:	>500.00 milliseconds	Battery voltage			
			Message \$3D1:	>10,000.00 milliseconds	Controller is an OBD controller Or			
			Message \$3E9:	>10,000.00 milliseconds	Battery Voltage			
			Message \$3FC:	>10,000.00 milliseconds	Controller type: OBD Controller			
			Message \$4A3:	>10,000.00	If power mode = Run/ Crank:			
				>10,000.00	Power Mode is run			

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Message \$4C1:	milliseconds	If calibratable low voltage disable mode is not Never Disabled			
			Message \$4F1:	>10,000.00 milliseconds	If OBDII: Run/Crank ignition voltage	>=11.00 Volts		
			Message \$589:	>10,000.00 milliseconds	If Secure: Starter motor engaged for Or Run/Crank ignition voltage	> 15,000.00 milliseconds > 11.00 Volts >=8.00 Volts		
				>10,000.00 milliseconds	If Hybrid Secure: Run/Crank ignition voltage	Disabled		
					If power mode = Accessory: Off key cycle diagnostics are enabled Or Controller is an OBD controller Controller shutdown is not impending 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	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 Message \$0C1:</p> <p>Message \$0C5:</p> <p>Message \$1E5:</p> <p>Message \$1E9:</p> <p>Message \$2F9:</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>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	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.
					<p>If calibratable low voltage disable mode is not Never Disabled</p> <p>If OBDII: 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: 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>> 15,000.00 milliseconds</p> <p>> 11.00 Volts</p> <p>>=8.00 Volts</p> <p>Disabled</p> <p>>=11.00 Volts</p>		

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.	<p>Message is not received from controller for Message \$0F1:</p> <p>Message \$12A:</p> <p>Message \$1F1:</p> <p>Message \$1F3:</p> <p>Message \$4E1:</p> <p>Message \$4E9:</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>>= 3,000.00 milliseconds</p> <p>>11.00 Volts</p> <p><=18.00 Volts</p>	Diagnostic runs in 12.5 ms 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.
					<p>If calibratable low voltage disable mode is not Never Disabled</p> <p>If OBDII: 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: 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>> 15,000.00 milliseconds</p> <p>> 11.00 Volts</p> <p>>=8.00 Volts</p> <p>Disabled</p> <p>>=11.00 Volts</p>		

24OBDG06A HD Part 2 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.
					<p>If calibratable low voltage disable mode is not Never Disabled</p> <p>If OBDII: 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: 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>> 15,000.00 milliseconds</p> <p>> 11.00 Volts</p> <p>>=8.00 Volts</p> <p>Disabled</p> <p>>=11.00 Volts</p>		

24OBDG06A HD Part 2 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	Diagnostic 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	4.000	2.000	0.500	0.250	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_DirectionInknown	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionReverse
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionInknown

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_DirectionInknown	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionInknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionInknown

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_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionInknown

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_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionInknown

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_DirectionInknown	CeTNSR_e_DirectionInknown	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionInknown	

Initial Supporting table - P176B delay to allow transmission input, intermediate and output speeds to stabilize for fail evaluation**Description:** delay to allow transmission input, intermediate and output speeds to stabilize for fail evaluation**Value Units:** seconds**X Unit:** intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P176B holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE

X Unit: intermediate speed sensor select

Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	0	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	0	1
CeCGSR_e_CR_Ninth	1	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	3	3

Initial Supporting table - P176B intermediate speed sensor fail time threshold		
Description: P176B intermediate speed sensor fail time threshold		
Value Units: seconds X Unit: intermediate speed sensor select		
y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM

X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	160.0	192.0

Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation		
Description: minimum transmission input speed to enable fail evaluation		
Value Units: transmission input speed RPM X Unit: intermediate speed sensor select		
y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	160.0	192.0

Initial Supporting table - P176B ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio

X Unit: commanded gear

Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2 C_ClchSpdSnsr 1	1.0000	1.0000	2.9762	1.6863	1.3736	1.0000	0.8104	0.6515	1.0000	1.0000
CeTSRR_e_C2 C_ClchSpdSnsr 2	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	CeTNSR_e_InternalSpdSnsr1	CeTNSR_e_InternalSpdSnsr2	CeTNSR_e_InternalSpdSnsr3
1	225	0	0

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	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C1 exhaust delay garage shift**Description:** P0747 C1 clutch hydraulic circuit exhaust time in garage shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - C1 exhaust delay negative torque up shift**Description:** P0747 C1 clutch hydraulic circuit exhaust time in negative torque up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C1 exhaust delay open throttle power down shift					
Description: P0747 C1 clutch hydraulic circuit exhaust time in open throttle power down shift					
Value Units: seconds					
y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C1 exhaust delay open throttle power on up shift**Description:** P0747 C1 clutch hydraulic circuit exhaust time in open throttle power on up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C1 Torque-Based Pressure Clip

Description: Pressure clip values for C1 based on clutch torque. Clutch torque calculated from engine torque using torque lever ratios, which are hardware and shift specific.

Value Units: Clutch Pressure (kPa)

X Unit: C1 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	350
1	360	410	460	560	710

Initial Supporting table - C2 exhaust delay closed throttle down shift**Description:** P0777 C2 clutch hydraulic circuit exhaust time in closed throttle down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C2 exhaust delay garage shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in garage shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - C2 exhaust delay negative torque up shift**Description:** P0777 C2 clutch hydraulic circuit exhaust time in negative torque up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C2 exhaust delay open throttle power down shift**Description:** P0777 C2 clutch hydraulic circuit exhaust time in open throttle power down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C2 exhaust delay open throttle power on up shift**Description:** P0777 C2 clutch hydraulic circuit exhaust time in open throttle power on up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C2 Torque-Based Pressure Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C2 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	350
1	800	800	800	800	800

Initial Supporting table - C3 exhaust delay closed throttle down shift**Description:** P0797 C3 clutch hydraulic circuit exhaust time in closed throttle down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C3 exhaust delay closed throttle lift foot up shift**Description:** P0797 C3 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C3 exhaust delay garage shift**Description:** P0797 C3 clutch hydraulic circuit exhaust time in garage shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - C3 exhaust delay negative torque up shift**Description:** P0797 C3 clutch hydraulic circuit exhaust time in negative torque up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C3 exhaust delay open throttle power down shift**Description:** P0797 C3 clutch hydraulic circuit exhaust time in open throttle power down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C3 exhaust delay open throttle power on up shift**Description:** P0797 C3 clutch hydraulic circuit exhaust time in open throttle power on up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C3 Torque-Based Pressure Clip**Description:****Value Units:** Clutch Pressure (kPa)**X Unit:** C3 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	350
1	335	385	435	535	685

Initial Supporting table - C4 exhaust delay closed throttle down shift**Description:** P2715 C4 clutch hydraulic circuit exhaust time in closed throttle down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C4 exhaust delay closed throttle lift foot up shift**Description:** P2715 C4 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C4 exhaust delay garage shift**Description:** P2715 C4 clutch hydraulic circuit exhaust time in garage shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - C4 exhaust delay negative torque up shift**Description:** P2715 C4 clutch hydraulic circuit exhaust time in negative torque up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C4 exhaust delay open throttle power down shift**Description:** P2715 C4 clutch hydraulic circuit exhaust time in open throttle power down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C4 exhaust delay open throttle power on up shift**Description:** P2715 C4 clutch hydraulic circuit exhaust time in open throttle power on up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C4 Torque-Based Pressure Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C4 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	350
1	399	449	499	599	749

Initial Supporting table - C5 exhaust delay closed throttle down shift**Description:** P2724 C5 clutch hydraulic circuit exhaust time in closed throttle down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C5 exhaust delay closed throttle lift foot up shift**Description:** P2724 C5 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C5 exhaust delay garage shift**Description:** P2724 C5 clutch hydraulic circuit exhaust time in garage shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - C5 exhaust delay negative torque up shift**Description:** P0747 C1 clutch hydraulic circuit exhaust time in negative torque up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C5 exhaust delay open throttle power down shift**Description:** P2724 C5 clutch hydraulic circuit exhaust time in open throttle power down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C5 exhaust delay open throttle power on up shift**Description:** P2724 C5 clutch hydraulic circuit exhaust time in open throttle power on up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C5 Torque-Based Pressure Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C5 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	350
1	265	425	525	625	725

Initial Supporting table - C6 Torque-Based Pressure Clip**Description:****Value Units:** Clutch Pressure (kPa)**X Unit:** C6 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	350
1	350	450	575	700	800

Initial Supporting table - Clutch Clip Press GS Shifts**Description:** Oncoming clutch clip pressure for garage shifts**Value Units:** kPa**X Unit:** Oncoming Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	450	750	850	400	400	400

Initial Supporting table - Clutch Clip Press NU Shifts**Description:** Oncoming clutch clip pressure for negative torque up shifts**Value Units:** kPa**X Unit:** Oncoming Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	350	750	450	350	450	450

Initial Supporting table - Clutch Clip Press PD Shifts**Description:** Oncoming clutch clip pressure for open throttle power down shifts**Value Units:** kPa**X Unit:** Oncoming Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	325	250	250	350	350	500

Initial Supporting table - Clutch Stuck On Fail Offset Time CD Shifts**Description:** Used for closed throttle down shifts to add additional fail time based on oil temperature**Value Units:** time (seconds)**X Unit:** transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - Clutch Stuck On Fail Offset Time GS Shifts**Description:** Used for garage shifts to add additional fail time based on oil temperature**Value Units:** time (seconds)**X Unit:** transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - Clutch Stuck On Fail Offset Time PD Shifts**Description:** Used for open throttle power down shifts to add additional fail time based on oil temperature**Value Units:** time (seconds)**X Unit:** transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - Clutch Stuck On Fail Offset Time PU Shifts**Description:** Used for powered up shifts to add additional fail time based on oil temperature**Value Units:** time (seconds)**X Unit:** transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	1	0	0	0	0

Initial Supporting table - Clutch Stuck On Fail Offset Time STGR Shifts**Description:** Used for clutch staging shifts to add additional fail time based on oil temperature**Value Units:** time (seconds)**X Unit:** transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - Clutch Stuck On Shift Type Enable**Description:** Calibration to enable the clutch stuck on test for each shift type**XUnit:** Shift Type**Y Units:** Boolean

y/x	CeTSER_e_STGR	CeTSER_e_GSCR	CeTSER_e_NUCR	CeTSER_e_PUCR	CeTSER_e_CDCR	CeTSER_e_PDCR	CeTSER_e_CLAR
1	0	0	1	1	1	1	0

Initial Supporting table - Default Valve Stuck On Test Pressure Response Delay

Description: Delay after TOO commanded pressure reaches test threshold value before incrementing default valve solenoid stuck on fail timer. This delay is based on transmission fluid temperature

Value Units: time (seconds)

X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	2	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	4.000	2.000	0.500	0.250	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	4.000	2.000	0.500	0.250	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_DirectionInknown	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionReverse
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionInknown

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_DirectionInknown	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionInknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionInknown

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_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionInknown

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_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionInknown

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_DirectionInknown	CeTNSR_e_DirectionInknown	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionInknown	

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	0	0	0

P0606 PFM.Enable f(Loop Time) - Part 2

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

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 - P176B delay to allow transmission input, intermediate and output speeds to stabilize for fail evaluation**Description:** delay to allow transmission input, intermediate and output speeds to stabilize for fail evaluation**Value Units:** seconds**X Unit:** intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P176B holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE

X Unit: intermediate speed sensor select

Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	0	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	0	1
CeCGSR_e_CR_Ninth	1	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	3	3

Initial Supporting table - P176B intermediate speed sensor fail time threshold**Description:** P176B intermediate speed sensor fail time threshold**Value Units:** seconds**X Unit:** intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM

X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	160.0	192.0

Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	160.0	192.0

Initial Supporting table - P176B ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio

X Unit: commanded gear

Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2 C_ClchSpdSnsr 1	1.0000	1.0000	2.9762	1.6863	1.3736	1.0000	0.8104	0.6515	1.0000	1.0000
CeTSRR_e_C2 C_ClchSpdSnsr 2	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	CeTNSR_e_InternalSpdSnsr1	CeTNSR_e_InternalSpdSnsr2	CeTNSR_e_InternalSpdSnsr3
1	225	0	0

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_FwdCmdd	CeCGSR-NeutCmdd	CeCGSR_RvrsCmdd	CeCGSR-ParkCmdd
1	1	1	0	1

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 - 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	4.000	2.000	0.500	0.250	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_DirectionInknown	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionReverse
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionInknown

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_DirectionInknown	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionInknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionInknown

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_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionInknown

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_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionInknown

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_DirectionInknown	CeTNSR_e_DirectionInknown	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionInknown	CeTNSR_e_DirectionInknown	

Initial Supporting table - P176B delay to allow transmission input, intermediate and output speeds to stabilize for fail evaluation**Description:** delay to allow transmission input, intermediate and output speeds to stabilize for fail evaluation**Value Units:** seconds**X Unit:** intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P176B holding clutch states

Description: inditaces when the clutch states allow transmission intermediate speed sensor evaluation, when rotating components can trigger speed sesnor, holding clutches will not allow evaluation while clutches not holding will allow evaluation

Value Units: TRUE or FALSE

X Unit: intermediate speed sensor select

Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	0	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	0	1
CeCGSR_e_CR_Ninth	1	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	3	3

Initial Supporting table - P176B intermediate speed sensor fail time threshold**Description:** P176B intermediate speed sensor fail time threshold**Value Units:** seconds**X Unit:** intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P176B minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P176B ratio calibration when REVERSE or P176B ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM

X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	160.0	192.0

Initial Supporting table - P176B minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	160.0	192.0

Initial Supporting table - P176B ratio calibration when not REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is not REVERSE

Value Units: ratio

X Unit: commanded gear

Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2 C_ClchSpdSnsr 1	1.0000	1.0000	2.9762	1.6863	1.3736	1.0000	0.8104	0.6515	1.0000	1.0000
CeTSRR_e_C2 C_ClchSpdSnsr 2	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	CeTNSR_e_InternalSpdSnsr1	CeTNSR_e_InternalSpdSnsr2	CeTNSR_e_InternalSpdSnsr3
1	225	0	0

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_FwdCmdd	CeCGSR-NeutCmdd	CeCGSR_RvrsCmdd	CeCGSR-ParkCmdd
1	1	1	0	1

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 Clutch Clip Press CD Shifts**Description:** C1 oncoming clutch clip pressure for closed throttle down shifts**Value Units:** kPa**X Unit:** clutch torque Nm**Y Units:** unitless

y/x	0.0	50.0	100.0	200.0	300.0
1	400.0	400.0	400.0	400.0	400.0

Initial Supporting table - C1 exhaust delay closed throttle down shift**Description:** P0747 C1 clutch hydraulic circuit exhaust time in closed throttle down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C1 exhaust delay closed throttle lift foot up shift**Description:** P0747 C1 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C1 exhaust delay garage shift**Description:** P0747 C1 clutch hydraulic circuit exhaust time in garage shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - C1 exhaust delay negative torque up shift**Description:** P0747 C1 clutch hydraulic circuit exhaust time in negative torque up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C1 exhaust delay open throttle power down shift**Description:** P0747 C1 clutch hydraulic circuit exhaust time in open throttle power down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C1 exhaust delay open throttle power on up shift**Description:** P0747 C1 clutch hydraulic circuit exhaust time in open throttle power on up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C1 Oncoming Post-Tornue 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☐ **Units:** unitless

y/x	-40.0	-20.0	0.0	30.0	110.0
1	-0.250	-0.250	-0.250	-0.250	-0.250

Initial Supporting table - C1 Torque-Based Pressure Clip

Description: Pressure clip values for C1 based on clutch torque. Clutch torque calculated from engine torque using torque lever ratios, which are hardware and shift specific.

Value Units: Clutch Pressure (kPa)

X Unit: C1 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	350
1	360	410	460	560	710

Initial Supporting table - C2 Clutch Clip Press CD Shifts					
EMISSIONS STDS: CAL--SULEV230; FED-BIN2'					
Description: C2 oncoming clutch clip pressure for closed throttle down shifts					
Value Units: kPa					
X Unit: clutch torque Nm					
Y Units: unitless					
y/x	0.0	50.0	100.0	200.0	300.0
1	800.0	800.0	800.0	800.0	800.0

Initial Supporting table - C2 exhaust delay closed throttle down shift**Description:** P0777 C2 clutch hydraulic circuit exhaust time in closed throttle down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C2 exhaust delay garage shift**Description:** P0777 C2 clutch hydraulic circuit exhaust time in garage shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - C2 exhaust delay negative torque up shift**Description:** P0777 C2 clutch hydraulic circuit exhaust time in negative torque up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C2 exhaust delay open throttle power down shift**Description:** P0777 C2 clutch hydraulic circuit exhaust time in open throttle power down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C2 exhaust delay open throttle power on up shift**Description:** P0777 C2 clutch hydraulic circuit exhaust time in open throttle power on up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	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	-40.0	-20.0	0.0	30.0	110.0
1	-0.250	-0.250	-0.250	-0.250	-0.250

Initial Supporting table - C2 Torque-Based Pressure Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C2 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	350
1	800	800	800	800	800

Initial Supporting table - C3 (C13567) Cap Poss Trans Time Thres**Description:** C3 (C13567) Capacity Possible Transition Time Threshold**Value Units:** seconds**X Unit:** transmission fluid temperature °C**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	1.300	1.100	0.600	0.300	0.250

Initial Supporting table - C3 Clutch Clip Press CD Shifts**Description:** C3 oncoming clutch clip pressure for closed throttle down shifts**Value Units:** kPa**X Unit:** clutch torque Nm**Y Units:** unitless

y/x	0.0	50.0	100.0	200.0	300.0
1	500.0	500.0	500.0	500.0	500.0

Initial Supporting table - C3 exhaust delay closed throttle down shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in closed throttle down shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C3 exhaust delay closed throttle lift foot up shift					
Description: P0797 C3 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift					
Value Units: seconds					
X Unit: transmission fluid temperature °C					
y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C3 exhaust delay garage shift**Description:** P0797 C3 clutch hydraulic circuit exhaust time in garage shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - C3 exhaust delay negative torque up shift**Description:** P0797 C3 clutch hydraulic circuit exhaust time in negative torque up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C3 exhaust delay open throttle power down shift**Description:** P0797 C3 clutch hydraulic circuit exhaust time in open throttle power down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C3 exhaust delay open throttle power on up shift**Description:** P0797 C3 clutch hydraulic circuit exhaust time in open throttle power on up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

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	-40.0	-20.0	0.0	30.0	110.0
1	-0.250	-0.250	-0.250	-0.250	-0.250

Initial Supporting table - C3 Torque-Based Pressure Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C3 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	350
1	335	385	435	535	685

Initial Supporting table - C4 Clutch Clip Press CD Shifts**Description:** C4 oncoming clutch clip pressure for closed throttle down shifts**Value Units:** kPa**X Unit:** clutch torque Nm**Y Units:** unitless

y/x	0.0	50.0	100.0	200.0	300.0
1	850.0	850.0	850.0	850.0	850.0

Initial Supporting table - C4 exhaust delay closed throttle down shift**Description:** P2715 C4 clutch hydraulic circuit exhaust time in closed throttle down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C4 exhaust delay closed throttle lift foot up shift**Description:** P2715 C4 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C4 exhaust delay garage shift**Description:** P2715 C4 clutch hydraulic circuit exhaust time in garage shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - C4 exhaust delay negative torque up shift**Description:** P2715 C4 clutch hydraulic circuit exhaust time in negative torque up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C4 exhaust delay open throttle power down shift**Description:** P2715 C4 clutch hydraulic circuit exhaust time in open throttle power down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C4 exhaust delay open throttle power on up shift**Description:** P2715 C4 clutch hydraulic circuit exhaust time in open throttle power on up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	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	-40.0	-20.0	0.0	30.0	110.0
1	-0.250	-0.250	-0.250	-0.250	-0.250

Initial Supporting table - C4 Torque-Based Pressure Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C4 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	350
1	399	449	499	599	749

Initial Supporting table - C5 Clutch Clip Press CD Shifts**Description:** C5 oncoming clutch clip pressure for closed throttle down shifts**Value Units:** kPa**X Unit:** clutch torque Nm**Y Units:** unitless

y/x	0.0	50.0	100.0	200.0	300.0
1	703.0	703.0	703.0	703.0	703.0

Initial Supporting table - C5 exhaust delay closed throttle down shift**Description:** P2724 C5 clutch hydraulic circuit exhaust time in closed throttle down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C5 exhaust delay closed throttle lift foot up shift					
Description: P2724 C5 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift					
Value Units: seconds					
X Unit: transmission fluid temperature °C					
y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C5 exhaust delay garage shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in garage shift

Value Units: seconds
X Unit: transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - C5 exhaust delay negative torque up shift**Description:** P0747 C1 clutch hydraulic circuit exhaust time in negative torque up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C5 exhaust delay open throttle power down shift**Description:** P2724 C5 clutch hydraulic circuit exhaust time in open throttle power down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C5 exhaust delay open throttle power on up shift**Description:** P2724 C5 clutch hydraulic circuit exhaust time in open throttle power on up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	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	-40.0	-20.0	0.0	30.0	110.0
1	-0.250	-0.250	-0.250	-0.250	-0.250

Initial Supporting table - C5 Torque-Based Pressure Clip**Description:****Value Units:** Clutch Pressure (kPa)**X Unit:** C5 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	350
1	265	425	525	625	725

Initial Supporting table - C6 Clutch Clip Press CD Shifts**Description:** C6 oncoming clutch clip pressure for closed throttle down shifts**Value Units:** kPa**X Unit:** clutch torque Nm**Y Units:** unitless

y/x	0.0	50.0	100.0	200.0	300.0
1	655.0	655.0	655.0	655.0	655.0

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	-40.0	-20.0	0.0	30.0	110.0
1	-0.250	-0.250	-0.250	-0.250	-0.250

Initial Supporting table - C6 Torque-Based Pressure Clip

Description:

Value Units: Clutch Pressure (kPa)
X Unit: C6 Oncoming Clutch Torque (Nm)

y/x	0	50	100	200	350
1	350	450	575	700	800

Initial Supporting table - Clutch Clip Press GS Shifts**Description:** Oncoming clutch clip pressure for garage shifts**Value Units:** kPa**X Unit:** Oncoming Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	450	750	850	400	400	400

Initial Supporting table - Clutch Clip Press NU Shifts**Description:** Oncoming clutch clip pressure for negative torque up shifts**Value Units:** kPa**X Unit:** Oncoming Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	350	750	450	350	450	450

Initial Supporting table - Clutch Clip Press PD Shifts**Description:** Oncoming clutch clip pressure for open throttle power down shifts**Value Units:** kPa**X Unit:** Oncoming Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	325	250	250	350	350	500

Initial Supporting table - Clutch Connectivity C1 On Threshold**Description:** Pressure command above which C1 will be considered commanded on**Value Units:** kPa**X Unit:** transmission fluid temperature °C**Y Units:** C1 clutch

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C2 On Threshold

Description: Pressure command above which C2 will be considered commanded on

Value Units: kPa
X Unit: transmission fluid temperature °C
Y Units: C2 clutch

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C3 On Threshold**Description:** Pressure command above which C3 will be considered commanded on**Value Units:** kPa**X Unit:** transmission fluid temperature °C**Y Units:** C3 clutch

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C4 On Threshold**Description:** Pressure command above which C4 will be considered commanded on**Value Units:** kPa**X Unit:** transmission fluid temperature °C**Y Units:** C4 clutch

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C5 On Threshold**Description:** Pressure command above which C5 will be considered commanded on**Value Units:** kPa**X Unit:** transmission fluid temperature °C**Y Units:** C5 clutch

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C6 On Threshold**Description:** Pressure command above which C6 will be considered commanded on**Value Units:** kPa**X Unit:** transmission fluid temperature °C**Y Units:** C6 clutch

y/x	-40	-20	0	20	120
1	175	175	175	175	175

Initial Supporting table - Clutch Connectivity C7 On Threshold**Description:** Pressure command above which C7 will be considered commanded on**Value Units:** kPa**X Unit:** transmission fluid temperature °C**Y Units:** C7 clutch

y/x	-40	-20	0	20	120
1	300	300	300	300	300

Initial Supporting table - Clutch Connectivity Wrong Direction FP					
Description: Fault pending time for cluch connectivity detecting wrong direction					
Value Units: time (sec) X Unit: transmission oil temperature (deg C)					
y/x	-40	-20	0	20	120
1	1	1	1	1	1

Initial Supporting table - Clutch PCS Pressure Gain**Description:** Gain value to convert clutch pressure command to regulator valve command**Value Units:** Gain (unitless)**X Unit:** Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	1	1	1	2	1	0

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	67	67	67	67	67	0

Initial Supporting table - Clutch Stuck On Fail Offset Time CD Shifts**Description:** Used for closed throttle down shifts to add additional fail time based on oil temperature**Value Units:** time (seconds)**X Unit:** transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - Clutch Stuck On Fail Offset Time GS Shifts**Description:** Used for garage shifts to add additional fail time based on oil temperature**Value Units:** time (seconds)**X Unit:** transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - Clutch Stuck On Fail Offset Time PD Shifts					
Description: Used for open throttle power down shifts to add additional fail time based on oil temperature					
Value Units: time (seconds) X Unit: transmission fluid temperature °C					
y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - Clutch Stuck On Fail Offset Time PU Shifts**Description:** Used for powered up shifts to add additional fail time based on oil temperature**Value Units:** time (seconds)**X Unit:** transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	1	0	0	0	0

Initial Supporting table - Clutch Stuck On Fail Offset Time STGR Shifts					
Description: Used for clutch staging shifts to add additional fail time based on oil temperature					
Value Units: time (seconds) X Unit: transmission fluid temperature °C					
y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - Clutch Stuck On Shift Type Enable**Description:** Calibration to enable the clutch stuck on test for each shift type**XUnit:** Shift Type**Y Units:** Boolean

y/x	CeTSER_e_STGR	CeTSER_e_GSCR	CeTSER_e_NUCR	CeTSER_e_PUCR	CeTSER_e_CDCR	CeTSER_e_PDCR	CeTSER_e_CLAR
1	0	0	1	1	1	1	0

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

Description: Maximum pressure command allowed for each combination of clutches which can lead to a multi-clutch tie up**Value Units:** Pressure (kPa)**X Unit:** Commanded Gear**Y Units:** Clutch

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5
CeTRMR_e_C1_Clutch	195	195	4,096	195	208	195	195
CeTRMR_e_C2_Clutch	274	274	274	4,096	275	274	274
CeTRMR_e_C3_Clutch	144	144	144	144	4,096	703	144
CeTRMR_e_C4_Clutch	88	88	88	88	403	4,096	88
CeTRMR_e_C5_Clutch	185	185	185	185	185	198	4,096
CeTRMR_e_C6_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 2

y/x	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3
CeTRMR_e_C1_Clutch	195	195	4,096	4,096	4,096	4,096	208
CeTRMR_e_C2_Clutch	274	274	4,096	275	274	274	4,096
CeTRMR_e_C3_Clutch	144	144	144	4,096	703	144	4,096
CeTRMR_e_C4_Clutch	88	88	88	403	4,096	88	403
CeTRMR_e_C5_Clutch	185	185	185	185	198	4,096	185
CeTRMR_e_C6_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

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	195	195	195	286	208	208	195
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	416	275	275	274
CeTRMR_e_C3_Clutch	703	144	144	4,096	4,096	4,096	1,464
CeTRMR_e_C4_Clutch	4,096	88	88	4,096	953	403	4,096
CeTRMR_e_C5_Clutch	198	4,096	185	604	4,096	185	4,096
CeTRMR_e_C6_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 4

y/x	CeCGSR_e_NeutralC 4C6	CeCGSR_e_NeutralC 1C2C3C6	CeCGSR_e_Park_wN C	CeCGSR_e_Park_wN C1	CeCGSR_e_Park_wN C2	CeCGSR_e_Park_wN C3	CeCGSR_e_Park_wN C4
CeTRMR_e_C1_Clutch	195	195	195	4,096	195	208	195
CeTRMR_e_C2_Clutch	274	274	274	274	4,096	275	274
CeTRMR_e_C3_Clutch	703	144	144	144	144	4,096	703
CeTRMR_e_C4_Clutch	4,096	88	88	88	88	403	4,096
CeTRMR_e_C5_Clutch	198	185	185	185	185	185	198
CeTRMR_e_C6_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 5

y/x	CeCGSR_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	195	195	195	4,096	208	195	195
CeTRMR_e_C2_Clutch	274	274	274	4,096	4,096	4,096	4,096
CeTRMR_e_C3_Clutch	144	144	144	144	4,096	703	144

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

CeTRMR_e_C4_Clutch	88	88	88	88	403	4,096	88
CeTRMR_e_C5_Clutch	4,096	185	185	185	185	198	4,096
CeTRMR_e_C6_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096
Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 6							
y/x	CeCGSR_e_Park_wN C2C6	CeCGSR_e_Park_wN C3C4	CeCGSR_e_Park_wN C3C5	CeCGSR_e_Park_wN C3C6	CeCGSR_e_Park_wN C4C5	CeCGSR_e_Park_wN C4C6	CeCGSR_e_Park_wN C1C2C3C6
CeTRMR_e_C1_Clutch	195	286	208	208	195	195	195
CeTRMR_e_C2_Clutch	4,096	416	275	275	274	274	274
CeTRMR_e_C3_Clutch	144	4,096	4,096	4,096	1,464	703	144
CeTRMR_e_C4_Clutch	88	4,096	953	403	4,096	4,096	88
CeTRMR_e_C5_Clutch	185	604	4,096	185	4,096	198	185
CeTRMR_e_C6_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096
Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 7							
y/x	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW	CeCGSR_e_SecondL ckd	CeCGSR_e_SecondF W	CeCGSR_e_Third	CeCGSR_e_Fourth
CeTRMR_e_C1_Clutch	4,096	4,096	4,096	4,096	4,096	286	195
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C3_Clutch	144	4,096	4,096	703	703	4,096	1,464
CeTRMR_e_C4_Clutch	88	403	403	4,096	4,096	4,096	4,096
CeTRMR_e_C5_Clutch	4,096	185	185	198	198	604	4,096
CeTRMR_e_C6_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh

Cmnd Tie Up Monitor Multi-Clutch Thresh - Part 8							
y/x	CeCGSR_e_Fifth	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth	
CeTRMR_e_C1_Clutch	208	565	4,096	4,096	4,096	4,096	
CeTRMR_e_C2_Clutch	4,096	416	275	274	4,096	4,096	
CeTRMR_e_C3_Clutch	4,096	4,096	4,096	2,078	4,096	4,096	
CeTRMR_e_C4_Clutch	953	4,096	1,371	4,096	4,096	4,096	
CeTRMR_e_C5_Clutch	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	
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

Description: Maximum pressure command allowed for each combination of clutches which can lead to a multi-clutch tie up when transfer case is in 4WD low range

Value Units: Pressure (kPa)

X Unit: Commanded Gear

Y Units: Clutch

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 1

y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5
CeTRMR_e_C1_Clutch	72	72	4,096	72	77	72	72
CeTRMR_e_C2_Clutch	101	101	101	4,096	102	101	101
CeTRMR_e_C3_Clutch	53	53	53	53	4,096	260	53
CeTRMR_e_C4_Clutch	33	33	33	33	149	4,096	33
CeTRMR_e_C5_Clutch	69	69	69	69	69	73	4,096
CeTRMR_e_C6_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 2

y/x	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3
CeTRMR_e_C1_Clutch	72	72	4,096	4,096	4,096	4,096	77
CeTRMR_e_C2_Clutch	101	101	4,096	102	101	101	4,096
CeTRMR_e_C3_Clutch	53	53	53	4,096	260	53	4,096
CeTRMR_e_C4_Clutch	33	33	33	149	4,096	33	149
CeTRMR_e_C5_Clutch	69	69	69	69	73	4,096	69
CeTRMR_e_C6_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

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	72	72	72	106	77	77	72
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	154	102	102	101
CeTRMR_e_C3_Clutch	260	53	53	4,096	4,096	4,096	542
CeTRMR_e_C4_Clutch	4,096	33	33	4,096	353	149	4,096
CeTRMR_e_C5_Clutch	73	4,096	69	224	4,096	69	4,096
CeTRMR_e_C6_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 4

y/x	CeCGSR_e_NeutralC 4C6	CeCGSR_e_NeutralC 1C2C3C6	CeCGSR_e_Park_wN C	CeCGSR_e_Park_wN C1	CeCGSR_e_Park_wN C2	CeCGSR_e_Park_wN C3	CeCGSR_e_Park_wN C4
CeTRMR_e_C1_Clutch	72	72	72	4,096	72	77	72
CeTRMR_e_C2_Clutch	101	101	101	101	4,096	102	101
CeTRMR_e_C3_Clutch	260	53	53	53	53	4,096	260
CeTRMR_e_C4_Clutch	4,096	33	33	33	33	149	4,096
CeTRMR_e_C5_Clutch	73	69	69	69	69	69	73
CeTRMR_e_C6_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 5

y/x	CeCGSR_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	72	72	72	4,096	77	72	72
CeTRMR_e_C2_Clutch	101	101	101	4,096	4,096	4,096	4,096
CeTRMR_e_C3_Clutch	53	53	53	53	4,096	260	53

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

CeTRMR_e_C4_Clutch	33	33	33	33	149	4,096	33
CeTRMR_e_C5_Clutch	4,096	69	69	69	69	73	4,096
CeTRMR_e_C6_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096
Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 6							
y/x	CeCGSR_e_Park_wN C2C6	CeCGSR_e_Park_wN C3C4	CeCGSR_e_Park_wN C3C5	CeCGSR_e_Park_wN C3C6	CeCGSR_e_Park_wN C4C5	CeCGSR_e_Park_wN C4C6	CeCGSR_e_Park_wN C1C2C3C6
CeTRMR_e_C1_Clutch	72	106	77	77	72	72	72
CeTRMR_e_C2_Clutch	4,096	154	102	102	101	101	101
CeTRMR_e_C3_Clutch	53	4,096	4,096	4,096	542	260	53
CeTRMR_e_C4_Clutch	33	4,096	353	149	4,096	4,096	33
CeTRMR_e_C5_Clutch	69	224	4,096	69	4,096	73	69
CeTRMR_e_C6_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096
Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 7							
y/x	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW	CeCGSR_e_SecondL ckd	CeCGSR_e_SecondF W	CeCGSR_e_Third	CeCGSR_e_Fourth
CeTRMR_e_C1_Clutch	4,096	4,096	4,096	4,096	4,096	106	72
CeTRMR_e_C2_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C3_Clutch	53	4,096	4,096	260	260	4,096	542
CeTRMR_e_C4_Clutch	33	149	149	4,096	4,096	4,096	4,096
CeTRMR_e_C5_Clutch	4,096	69	69	73	73	224	4,096
CeTRMR_e_C6_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	4,096

Initial Supporting table - Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo

Cmnd Tie Up Monitor Multi-Clutch Thresh 4WD Lo - Part 8

y/x	CeCGSR_e_Fifth	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth	
CeTRMR_e_C1_Clutch	77	209	4,096	4,096	4,096	4,096	
CeTRMR_e_C2_Clutch	4,096	154	102	101	4,096	4,096	
CeTRMR_e_C3_Clutch	4,096	4,096	4,096	770	4,096	4,096	
CeTRMR_e_C4_Clutch	353	4,096	508	4,096	4,096	4,096	
CeTRMR_e_C5_Clutch	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	
CeTRMR_e_C7_Clutch	4,096	4,096	4,096	4,096	4,096	4,096	

Initial Supporting table - Cmnd Tie Up Monitor Output Lock Thresh

Description: Maximum pressure command allowed for each invalid combination of clutches which can lead to an output tie-up

Value Units: Pressure (kPa)

X Unit: Possible Output Tie-up Combination (unitless)

Y Units: Clutch

y/x	CeTCLR_e_TUM_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	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C3_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C4_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C5_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C6_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096
CeTRMR_e_C7_Clutch	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096	-4,096

Initial Supporting table - Default Valve Stuck On TCC Pressure Request**Description:** Default Valve Stuck On Intrusive TCC Pressure Request**Value Units:** kPa**X Unit:** engine torque Nm**Y Units:** unitless

y/x	-40.0	100.0	200.0	300.0	500.0
1	500.0	500.0	500.0	500.0	500.0

Initial Supporting table - Default Valve Stuck On TCC Slip Speed for intrusive**Description:** Default Valve Stuck On TCC Slip Speed for intrusive TCC pressure request**Value Units:** TCC slip speed**X Unit:** transmission fluid temperature °C**Y Units:** unitless

y/x	-40.00	-20.00	0.00	30.00	110.00
1	175	175	175	175	175

Initial Supporting table - Default Valve Stuck On Test Pressure Response Delay

Description: Delay after TOO commanded pressure reaches test threshold value before incrementing default valve solenoid stuck on fail timer. This delay is based on transmission fluid temperature

Value Units: time (seconds)

X Unit: transmission fluid temperature °C

y/x	-40.0	-20.0	0.0	30.0	110.0
1	1.500	1.200	0.900	0.600	0.250

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	1	1
CeTRMR_e_C2_Clutch	1	1
CeTRMR_e_C3_Clutch	1	1
CeTRMR_e_C4_Clutch	1	1
CeTRMR_e_C5_Clutch	1	1
CeTRMR_e_C6_Clutch	1	1
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.I Ac	CeTRMR_e_IllegalPN_1Ad	CeTRMR_e_IllegalPN_1Af
CeTRMR_e_C1.Clutch	1	1	1	1	1
CeTRMR_e_C2_Clutch	1	1	1	1	1
CeTRMR_e_C3_Clutch	1	1	1	1	1
CeTRMR_e_C4_Clutch	1	1	1	1	1
CeTRMR_e_C5_Clutch	1	1	1	1	1
CeTRMR_e_C6_Clutch	1	1	1	1	1
CeTRMR_e_C7_Clutch	1	1	1	1	1

Illegal Park-Neutral Clutch Combinations - Part 2

y/x	CeTRMR.e_IllegalPN.I M	CeTRMR.e_IllegalPN.I Me	CeTRMR.e_IllegalPN.I Md	CeTRMR_e_IllegalPN_1Mf	CeTRMR_e_IllegalPN_2A
CeTRMR_e_C1.Clutch	1	1	1	1	1
CeTRMR_e_C2_Clutch	1	1	1	1	1
CeTRMR_e_C3_Clutch	1	1	1	1	1
CeTRMR_e_C4_Clutch	1	1	1	1	1
CeTRMR_e_C5_Clutch	1	1	1	1	1
CeTRMR_e_C6_Clutch	1	1	1	1	1
CeTRMR_e_C7_Clutch	1	1	1	1	1

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.Cl .Clutch	1	1	1	1	1
CeTRMR_e_C2_Clutch	1	1	1	1	1
CeTRMR_e_C3_Clutch	1	1	1	1	1
CeTRMR_e_C4_Clutch	1	1	1	1	1
CeTRMR_e_C5_Clutch	1	1	1	1	1
CeTRMR_e_C6_Clutch	1	1	1	1	1
CeTRMR_e_C7_Clutch	1	1	1	1	1

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.Cl .Clutch	1	1	1	1	
CeTRMR_e_C2_Clutch	1	1	1	1	

Initial Supporting table - Illegal Park-Neutral Clutch Combinations

CeTRMR_e_C3_Clutch	1	1	1	1	
CeTRMR_e_C4_Clutch	1	1	1	1	
CeTRMR_e_C5_Clutch	1	1	1	1	
CeTRMR_e_C6_Clutch	1	1	1	1	
CeTRMR_e_C7_Clutch	1	1	1	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	1	1	1	1	1	1
CeTRMR_e_C3.Clutch	1	1	1	1	1	1
CeTRMR_e_C4.Clutch	1	1	1	1	1	1
CeTRMR_e_C5.Clutch	1	1	1	1	1	1
CeTRMR_e_C6.Clutch	1	1	1	1	1	1
CeTRMR_e_C7.Clutch	1	1	1	1	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	1	1	1	1	1	1
CeTRMR_e_C3.Clutch	1	1	1	1	1	1
CeTRMR_e_C4.Clutch	1	1	1	1	1	1
CeTRMR_e_C5.Clutch	1	1	1	1	1	1
CeTRMR_e_C6.Clutch	1	1	1	1	1	1
CeTRMR_e_C7.Clutch	1	1	1	1	1	1

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_1 0
CeTRMR_e_C1.Clutch	1	1	1	1	1	1
CeTRMR_e_C2.Clutch	1	1	1	1	1	1
CeTRMR_e_C3.Clutch	1	1	1	1	1	1
CeTRMR_e_C4.Clutch	1	1	1	1	1	1
CeTRMR_e_C5.Clutch	1	1	1	1	1	1
CeTRMR_e_C6.Clutch	1	1	1	1	1	1
CeTRMR_e_C7.Clutch	1	1	1	1	1	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	1	1	1	1

Initial Supporting table - Incorrect Drive Fail Time					
Description: Fail Time as a function of temperature for incorrectly commanded drive condition					
Value Units: time (sec) X Unit: transmission oil temperature (deg C)					
y/x	-40	-20	0	20	120
1	0	0	0	0	0

Initial Supporting table - Incorrect Neutral Fail Time

Description: Fail Time as a function of temperature for incorrectly commanded neutral condition

Value Units: time (sec)
X Unit: transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	0	0	0	0	0

Initial Supporting table - Incorrect Park Fail Time					
Description: Fail Time as a function of temperature for incorrectly commanded park condition					
Value Units: time (sec) X Unit: transmission oil temperature (deg C)					
y/x	-40	-20	0	20	120
1	0	0	0	0	0

Initial Supporting table - Incorrect Reverse Fail Time**Description:** Fail Time as a function of temperature for incorrectly commanded reverse condition**Value Units:** time (sec)**X Unit:** transmission oil temperature (deg C)

y/x	-40	-20	0	20	120
1	0	0	0	0	0

Initial Supporting table - lube pressure sensor engine crank delay time**Description:** 8 speed P0841 engine crank delay time**Value Units:** seconds**X Unit:** °C**Y Units:** unitless

y/x	-40.00	-20.00	0.00	20.00	130.00
1	60.000	60.000	60.000	60.000	60.000

Initial Supporting table - lube pressure sensor engine shutdown delay time**Description:** 8 speed P0841 engine shutdown delay time**Value Units:** seconds**X Unit:** °C**Y Units:** unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	20.000	8.000	2.000	1.000	1.000

Initial Supporting table - lube pressure sensor post engine crank final fail time**Description:** 8 speed P0841 fail time**Value Units:** seconds**X Unit:** °C**Y Units:** unitless

y/x	-40.00	-20.00	0.00	20.00	130.00
1	0.400	0.400	0.400	0.400	0.400

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	1	1	1	1
CeTSER_e_C3_Clutch	1	1	1	1	1
CeTSER_e_C4_Clutch	1	1	1	1	1
CeTSER_e_C5_Clutch	1	1	1	1	1
CeTSER_e_C6_Clutch	1	1	1	1	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	1
CeTSER_e_C3_Clutch	1	1	1	1	1
CeTSER_e_C4_Clutch	1	1	1	1	1
CeTSER_e_C5_Clutch	1	1	1	1	1
CeTSER_e_C6_Clutch	1	1	1	1	1

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	1	1	1	1
CeTSER_e_C3_Clutch	1	1	1	1	1
CeTSER_e_C4_Clutch	1	1	1	1	1
CeTSER_e_C5_Clutch	1	1	1	1	1
CeTSER_e_C6_Clutch	1	1	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	1	1	1	1	
CeTSER_e_C2_Clutch	1	1	1	1	
CeTSER_e_C3_Clutch	1	1	1	1	
CeTSER_e_C4_Clutch	1	1	1	1	
CeTSER_e_C5_Clutch	1	1	1	1	

Initial Supporting table - Ratio Monitor Clutch States				
CeTSER_e_C6_Clutch	h	h	h	1

Initial Supporting table - Ratio Monitor Fail Increment Rate (Percent per Loop)					
Description: Ratio Monitor Fail Increment Rate					
Value Units: Percent Increment Per Loop					
X Unit: Transmission Oil Temperature (deg C)					
y/x	-40	-20	0	20	120
1	0	0	0	0	0

Initial Supporting table - Ratio Monitor Slip Threshold**Description:** Threshold slip value below which the clutch is considered holding**Value Units:** clutch slip (RPM)**X Unit:** Clutch

y/x	CeTRMR_e_ClchSlipC1	CeTRMR_e_ClchSlipC2	CeTRMR_e_ClchSlipC5	CeTRMR_e_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	54	20
CeTGRR_e_Gear2	83	31
CeTGRR_e_Gear3	119	44
CeTGRR_e_Gear4	146	54
CeTGRR_e_Gear5	194	72
CeTGRR_e_Gear6	246	91
CeTGRR_e_Gear7	292	108
CeTGRR_e_Gear8	378	140
CeTGRR_e_Gear9	378	140
CeTGRR_e_Gear10	378	140

Initial Supporting table - wheel slip delay	
Description:	
y/x	1
1	-0.199

Initial Supporting table - C1 exhaust delay closed throttle down shift**Description:** P0747 C1 clutch hydraulic circuit exhaust time in closed throttle down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C1 exhaust delay closed throttle lift foot up shift					
Description: P0747 C1 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift					
Value Units: seconds					
X Unit: transmission fluid temperature °C					
y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C1 exhaust delay garage shift**Description:** P0747 C1 clutch hydraulic circuit exhaust time in garage shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - C1 exhaust delay negative torque up shift**Description:** P0747 C1 clutch hydraulic circuit exhaust time in negative torque up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C1 exhaust delay open throttle power down shift**Description:** P0747 C1 clutch hydraulic circuit exhaust time in open throttle power down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C1 exhaust delay open throttle power on up shift**Description:** P0747 C1 clutch hydraulic circuit exhaust time in open throttle power on up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C2 exhaust delay closed throttle down shift**Description:** P0777 C2 clutch hydraulic circuit exhaust time in closed throttle down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C2 exhaust delay garage shift						
Description: P0777 C2 clutch hydraulic circuit exhaust time in garage shift						
Value Units: seconds						
X Unit: transmission fluid temperature °C						
y/x	-40.00	-20.00	0.00	30.00	110.00	
1	0.250	0.250	0.250	0.250	0.250	

Initial Supporting table - C2 exhaust delay negative torque up shift**Description:** P0777 C2 clutch hydraulic circuit exhaust time in negative torque up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C2 exhaust delay open throttle power down shift**Description:** P0777 C2 clutch hydraulic circuit exhaust time in open throttle power down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C2 exhaust delay open throttle power on up shift**Description:** P0777 C2 clutch hydraulic circuit exhaust time in open throttle power on up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C3 exhaust delay closed throttle down shift					
Description: P0797 C3 clutch hydraulic circuit exhaust time in closed throttle down shift					
Value Units: seconds					
X Unit: transmission fluid temperature °C					
y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C3 exhaust delay closed throttle lift foot up shift					
Description: P0797 C3 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift					
Value Units: seconds					
X Unit: transmission fluid temperature °C					
y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C3 exhaust delay garage shift**Description:** P0797 C3 clutch hydraulic circuit exhaust time in garage shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - C3 exhaust delay negative torque up shift**Description:** P0797 C3 clutch hydraulic circuit exhaust time in negative torque up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C3 exhaust delay open throttle power down shift**Description:** P0797 C3 clutch hydraulic circuit exhaust time in open throttle power down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C3 exhaust delay open throttle power on up shift**Description:** P0797 C3 clutch hydraulic circuit exhaust time in open throttle power on up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C4 exhaust delay closed throttle down shift**Description:** P2715 C4 clutch hydraulic circuit exhaust time in closed throttle down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C4 exhaust delay closed throttle lift foot up shift**Description:** P2715 C4 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C4 exhaust delay garage shift**Description:** P2715 C4 clutch hydraulic circuit exhaust time in garage shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - C4 exhaust delay negative torque up shift**Description:** P2715 C4 clutch hydraulic circuit exhaust time in negative torque up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C4 exhaust delay open throttle power down shift**Description:** P2715 C4 clutch hydraulic circuit exhaust time in open throttle power down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C4 exhaust delay open throttle power on up shift**Description:** P2715 C4 clutch hydraulic circuit exhaust time in open throttle power on up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C5 exhaust delay closed throttle down shift**Description:** P2724 C5 clutch hydraulic circuit exhaust time in closed throttle down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C5 exhaust delay closed throttle lift foot up shift**Description:** P2724 C5 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C5 exhaust delay garage shift**Description:** P2724 C5 clutch hydraulic circuit exhaust time in garage shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - C5 exhaust delay negative torque up shift**Description:** P0747 C1 clutch hydraulic circuit exhaust time in negative torque up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.500	0.500	0.500	0.500	0.500

Initial Supporting table - C5 exhaust delay open throttle power down shift**Description:** P2724 C5 clutch hydraulic circuit exhaust time in open throttle power down shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - C5 exhaust delay open throttle power on up shift**Description:** P2724 C5 clutch hydraulic circuit exhaust time in open throttle power on up shift**Value Units:** seconds**X Unit:** transmission fluid temperature °C

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.850	0.850

Initial Supporting table - Clutch Clip Press GS Shifts**Description:** Oncoming clutch clip pressure for garage shifts**Value Units:** kPa**X Unit:** Oncoming Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	450	750	850	400	400	400

Initial Supporting table - Clutch Clip Press NU Shifts**Description:** Oncoming clutch clip pressure for negative torque up shifts**Value Units:** kPa**X Unit:** Oncoming Clutch

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	350	750	450	350	450	450

Initial Supporting table - Clutch Clip Press PD Shifts						
Description: Oncoming clutch clip pressure for open throttle power down shifts						
Value Units: kPa X Unit: Oncoming Clutch						
y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTS ER_e_C6_Clutch
1	325	250	250	350	350	500

Initial Supporting table - Clutch Stuck On Fail Offset Time CD Shifts					
Description: Used for closed throttle down shifts to add additional fail time based on oil temperature					
Value Units: time (seconds) X Unit: transmission fluid temperature °C					
y/x	-40	-20	0	30	110
1	0	0	0	0	0

Initial Supporting table - Clutch Stuck On Fail Offset Time GS Shifts**Description:** Used for garage shifts to add additional fail time based on oil temperature**Value Units:** time (seconds)**X Unit:** transmission fluid temperature °C

y/x	-40	-20	0	30	110
1	0	0	0	0	0