Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Door Open Switch Signal - Door Ajar Switch Signal Not Plausible	B2A00	Compares the Door Ajar and Door Open Switch for mismatch	Door Open Switch AND Door Ajar switch	=OPEN = CLOSED	Ignition Not Fault Active	= Run/Crank OR = Accessory U0422	240 failure out of 240 samples 12.5 ms loop	Special Type C No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Electric Park Brake Availability Status Message Counter Incorrect	C1280	Detects error on ARC & PV reported by CHCM / ECM about signal $22A from EBCM on HS GMLAN	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1 OR The primary signal value does not equal the protection value	Current ARC ≠ Previous ARC +1 Primary Value ≠ Protection Value	Battery voltage A diagnostic code clear event or diagnostic re-enable event is not in progress for:	within proper operating range for 3,000 msec > 3,000 msec	8 failures out of 10 samples 100 ms loop	DTC Type C No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Electric Park Brake Application Status Message Counter Incorrect	C1281	Detects error on ARC & PV reported by CHCM / ECM about signal $22A from EBCM on HS GMLAN	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1 OR The primary signal value does not equal the protection value	Current ARC ≠ Previous ARC +1 Primary Value ≠ Protection Value	Battery voltage A diagnostic code clear event or diagnostic re-enable event is not in progress for:	within proper operating range for 3,000 msec for a time > 3,000 msec	8 failures out of 10 samples 100 ms loop	DTC Type C No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Actuator Solenoid Circuit Open – Bank 1	P0010	Controller specific output driver circuit diagnoses the CAM phaser oil control valve solenoid high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	≥ 200 K Ω impedance between signal and controller ground.	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft System Performance – Bank 1	P0011	Detects a VVT system error by comparing the desired and actual cam positions when VVT is activated.	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive.	(Intake cam Bank 1) Cam Position Error > (**P0011_CamPosErrorLimIc1**) 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_CamPosErrorLimIc1**) deg AND < (**CalculatedPerfMaxIc1**) deg < 3.00 deg for (**P0011_P05CC_StablePositionTimeIc1**) seconds P0010 P2088 P2089	100.00 failures out of 125.00 samples 100 ms /sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Camshaft Actuator Solenoid Circuit Open – Bank 1	P0013	Controller specific output driver circuit diagnoses the CAM phaser oil control valve solenoid high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	≥ 200 K Ω impedance between signal and controller ground.	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Camshaft System Performance – Bank 1	P0014	Detects a VVT system error by comparing the desired and actual cam positions when VVT is activated.	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive.	(Exhaust cam Bank 1) Cam Position Error > (**P0014_CamPosErrorLimEc1**) deg	**Exhaust Cam Phsr Enable** System Voltage Engine Running Power Take Off (PTO) active Desired cam position Desired AND Measured cam position Desired cam position variation No Active DTCs	= TRUE > 11.00 Volts = TRUE = FALSE > 0 deg > (**P0014_CamPosErrorLimEc1**) deg AND < (**CalculatedPerfMaxEc1**) deg < 3.00 deg for (**P0014_P05CE_StablePositionTimeEc1**) seconds P0013 P2090 P2091	100.00 failures out of 125.00 samples 100 ms /sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP)- Camshaft Position (CMP) Correlation Bank 1 Sensor A (mid-park phaser)	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	4 cam sensor pulses less than or greater than nominal position in one cam revolution.	-7.1 Crank Degrees 8.3 Crank Degrees	Crankshaft and camshaft position signals are synchronized Engine is Spinning Cam phaser is in "parked" position No Active DTCs: Time since last execution of diagnostic Delay diagnostic if Engine RPM and Cam is Enabled for	 CrankSensor_FA P0340, P0341 < 1.0 seconds > 8,200.00 Engine Speed < 3.00 seconds	2 failures out of 3 tests. A failed test is 4 failures out of 5 samples. After the first failed test, there is a delay until the camshaft phaser control logic verifies and reports that the camshaft is actually parked. One sample per cam rotation	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft - Sprocket Correlation Diagnostic	P0016 and P0017	On engines with a dual intermediate sprocket between the crankshaft and the camshafts, this diagnostic detects a timing misalignment between the crankshaft, sprocket and camshafts that will cause the bank 1 camshafts to be misaligned.	Bank 1 Cam Sensor A pulses more than -7.0 crank degrees before or 9.0 crank degrees after nominal position in one cam revolution + Bank 1 Cam Sensor B pulses more than -7.0 crank degrees before or 9.0 crank degrees after nominal position in one cam revolution.	>= 8	Crankshaft and camshaft position signals are synchronized Engine is Spinning Cam phaser is in "parked" position No Active DTCs:	CrankSensor_FA P0340, P0341 P0365, P0366	2 failures out of 3 tests. A failed test is 1 out of 10 samples. There is a delay after the first failed test to allow the camshaft position to return to the park position. This time is defined by the table **P0016, P0017, P0018, P0019: Cam Correlation Oil Temperature Threshold** . One sample per cam rotation	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP)- Camshaft Position (CMP) Correlation Bank 1 Sensor B (mid-park phaser)	P0017	Detects cam to crank misalignment by monitoring if the cam sensor pulse for bank 1 sensor B occurs during the incorrect crank position, diagnostic passes when the cam sensor pulse is in the expected range	.4 cam sensor pulses less than or greater than nominal position in one cam revolution..	 -8.4 Crank Degrees 9.2 Crank Degrees	Crankshaft and camshaft position signals are synchronized Engine is Spinning Cam phaser is in "parked" position No Active DTCs: Time since last execution of diagnostic Delay diagnostic if Engine RPM and Cam is Enabled for	 CrankSensor_FA P0365, P0366 < 1.0 seconds > 8,200.00 < 3.00	2 failures out of 3 tests. A failed test is 4 failures out of 5 samples. After the first failed test, there is a delay until the camshaft phaser control logic verifies and reports that the camshaft is actually parked. One sample per cam rotation	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank 1 Sensor 1	P0030	Controller specific output driver circuit diagnoses the heater output low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	≥ 200 K Ω impedance between output and controller ground.	Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controllers P0031 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank1 Sensor1	P0031	Controller specific output driver circuit diagnoses the heater output low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	≤ 0.5 Ω impedance between output and controller ground.	Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controllers P0030 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank1 Sensor1	P0032	Controller specific output driver circuit diagnoses the heater output low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	≤ 0.5 Ω impedance between output and controller power.	Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbo/Super Charger Bypass Valve A Control Circuit	P0033	Controller specific output driver circuit diagnostic, diagnosing the 'compressor recirculation valve 'A' actuator' low sided driver for an open circuit failure, when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	Voltage measurement outside of controller specific acceptable range during driver 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 Ω impedance between output and controller ground	Diagnostic enabled ********** Powertrain relay voltage ********** Engine does not crank Diagnostic system not disabled	True ********** >= 11.0 Volts **********	80 failures out of 100 samples PWM CRV: 100ms / sample eCRV: 12.5ms / sample	Type A, 1 Trips Note: In certain controllers P0034 may also set turbo/ super charger bypass valve control circuit low

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbo/Super Charger Bypass Valve A Control Circuit Low	P0034	Controller specific output driver circuit diagnostic, diagnosing the 'compressor recirculation valve 'A' actuator' low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. In series application, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. In certain controllers this diagnosis runs only when the HWIO-output is driven by the application S/W.	≤ 0.5 Ω impedance between output and controller ground	Diagnostic Enabled ********** Powertrain relay voltage ********** Engine does not crank Diagnostic system not disabled	True ********** >= 11.0 Volts **********	80 failures out of 100 samples PWM CRV: 100ms / sample eCRV: 12.5ms / sample	Type A, 1 Trips Note: In certain controllers P0033 may also set turbo/ super charger bypass balve control circuit

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbo/Super Charger Bypass Valve A Control Circuit High	P0035	Controller specific output driver circuit diagnostic, diagnosing the 'compressor recirculation valve 'A' actuator' low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. In series application, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. In certain controllers this diagnosis runs only when the HWIO-output is driven by the application S/W.	≤ 0.5 Ω impedance between output and controller power.	Diagnostic enabled ********** Powertrain relay voltage ********** Engine does not crank Diagnostic system not disabled	True ********** >= 11.0 Volts **********	80 failures out of 100 samples PWM CRV: 100ms / sample eCRV: 12.5ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank 1 Sensor 2	P0036	Controller specific output driver circuit diagnoses the heater output low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	≥ 200 K Ω impedance between output and controller ground.	Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controllers P0037 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank1 Sensor2	P0037	Controller specific output driver circuit diagnoses the heater output low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	≤ 0.5 Ω impedance between output and controller ground.	Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controllers P0036 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank1 Sensor2	P0038	Controller specific output driver circuit diagnoses the heater output low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	≤ 0.5 Ω impedance between output and controller power.	Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
HO2S Heater Resistance Bank 1 Sensor 1	P0053	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. This fault is set if the heater resistance is outside the expected range.	Heater Resistance outside of the expected range of	7.1 < ohms < 14.4	No Active DTC's Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P262B IAT_SensorFA < 8.0 ºC > 28,800 seconds ≥ -30.0 ºC < 32.0 volts < 0.06 seconds	Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
HO2S Heater Resistance Bank 1 Sensor 2) (For Single Bank Exhaust Only	P0054	Detects an oxygen sensor heater having an incorrect or out of range resistance value. This test calculates the heater's resistance (using voltage and current) at engine start after a soak condition and compares it to the expected values for the released sensor. This fault is set if the heater resistance is outside the expected range.	Heater Resistance outside of the expected range of	6.7 < ohms < 14.0	No Active DTC's Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P262B IAT_SensorFA < 8.0 ºC > 28,800 seconds ≥ -30.0 ºC < 32.0 volts < 0.06 seconds	Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
MAP / MAF / Throttle Position Correlation	P0068	Detect when MAP and MAF do not match estimated engine airflow as established by the TPS	Difference between MAP and estimated MAP exceeds threshold (kPa), or P0651 (5 Volt Ref), or P0107 (MAP circuit low), or P0108 (MAP circuit high) have failed this key cycle, then MAP portion of diagnostic fails	Table, f(TPS). See supporting tables: **P0068_Delta MAP Threshold f(TPS)**	Engine Speed Run/Crank voltage	> 800 RPM > 6.41 Volts	Continuously fail MAP and MAF portions of diagnostic for 0.1875 s Continuous in MAIN processor	Type A, 1 Trips
			Absolute difference between MAF and estimated MAF exceed threshold (grams/sec), or P0102 (MAF circuit low), or P0103 (MAF circuit hi) have failed this key cycle, or maximum MAF versus RPM (Table) is greater than or equal to maximum MAF versus battery voltage, then MAF portion of diagnostic fails	Table, f(TPS). See supporting tables: **P0068_Delta MAF Threshold f(TPS)** Table, f(RPM). See supporting tables: **P0068_Maximum MAF f(RPM)** Table, f(Volts). See supporting tables: **P0068_Maximum MAF f(Volts)**			

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 (OAT wired to ECM)	P0071	Detects an Outside Air Temperature (OAT) sensor that is stuck in range. There are two components to the test: an engine off component, and an engine running component. If the engine has been off for a long enough period of time, and the coolant temperature and Intake Air Temperature (IAT) values are similar, then the air temperature values in the engine compartment of the vehicle are considered to have equalized. In this case, the engine off component of the diagnostic can be enabled. If the IAT and the OAT values are similar, then the OAT Performance Diagnostic passes. If the IAT and OAT values are not similar, the diagnostic will continue to monitor the IAT and the OAT as the vehicle starts to move. For applications that have ability to move without engaging the internal combustion	**Engine Off:** If IAT >= OAT: IAT - OAT If IAT < OAT: OAT - IAT If either of the following conditions are met, this diagnostic will pass: If IAT >= OAT: IAT - OAT If IAT < OAT: OAT - IAT	> 15.0 deg C > 15.0 deg C <= 15.0 deg C <= 15.0 deg C	Time between current ignition cycle and the last time the engine was running Engine is not running Vehicle Speed Coolant Temperature - IAT IAT - Coolant Temperature OAT-to-IAT engine off equilibrium counter The "OAT-to-IAT engine off equilibrium counter" is a counter that is incremented or decremented based on vehicle speed when the engine is off. When this counter is high enough, the vehicle has reached an equilibrium where IAT and OAT can be compared. The value that is added or subtracted to the counter every 100 msec is contained in table **P0071: OAT Performance Drive Equilibrium Engine Off** No Active DTCs:	>= 28,800.0 seconds >= 12.4 MPH < 15.0 deg C < 15.0 deg C >= 300.0 counts VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA EngineModeNotRunTimer Error	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. While the "OAT-to-IAT engine off equilibrium counter" is counting, IAT and OAT are monitored for similarity. If they are similar, the OAT Performance Diagnostic passes. If the counter reaches an equilibrium and the IAT and OAT values are not similar, the OAT Performance Diagnostic will fail.	**Engine Running:** If IAT >= OAT: IAT - OAT If IAT < OAT: OAT - IAT If either of the following conditions are met, this diagnostic will pass: If IAT >= OAT: IAT - OAT If IAT < OAT: OAT - IAT	> 15.0 deg C > 15.0 deg C <= 15.0 deg C <= 15.0 deg C	Time between current ignition cycle and the last time the engine was running Engine is running Vehicle Speed Engine air flow OAT-to-IAT engine running equilibrium counter The "OAT-to-IAT engine running equilibrium counter" is a counter that is incremented or decremented based on vehicle speed and engine air flow when the engine is running. When this counter is high enough, the vehicle has reached an equilibrium where IAT and OAT can be compared. The value that is added or subtracted to the counter every 100 msec is contained in table **P0071: OAT Performance Drive Equilibrium Engine Running** No Active DTCs:	>= 28,800.0 seconds >= 12.4 MPH >= 10.0 grams/second >= 300.0 counts VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA EngineModeNotRunTimer Error	Executed every 100 msec until a pass or fail decision is made	

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

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)	Continuous		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	>= 427,757 Ohms (~-60 deg C)	Continuous		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	Detects a noisy or erratic signal in the OAT circuit by monitoring the OAT sensor and failing the diagnostic when the OAT signal has a noisier output than is expected. When the value of the OAT signal in °C is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of OAT readings. The result of this summation is called a “string length”. Since the OAT signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic OAT signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current OAT reading - OAT reading from 100 milliseconds previous)	> 100 deg C 10 consecutive OAT readings		Continuous	4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	>= 92 ° <= 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 or TFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) andCam or Crank Sensor Not FA and IAT,IAT2,ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In	True >= 11 Volts > 0.300 MPa Enabled when a code clear is not active or not exiting device control Engine is not cranking >= 70.0 KPA >= -10.0 degC -10 <= 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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
High Pressure Pump Control Solenoid Enable Low Side Open Circuit	P0090	Controller specific output driver circuit diagnoses High Pressure pump Control Solenoid low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground	Engine Speed Battery Voltage	>= 50 RPM >= 11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	Type A, 1 Trips

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.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	<= 0.1 Amps between signal and controller ground	Engine Speed Battery Voltage	>= 50 RPM >= 11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
High Pressure Pump Cntrl Solenoid Enable Low Side Short to Power	P0092	Controller specific output driver circuit diagnoses diagnoses High Pressure pump Control Solenoid low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 1.1 or 15 Amps selectable thershold based on High pressure Pump .	Engine Speed Battery Voltage	>= 50 RPM >= 11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		ignition cycle if the enable conditions are met.	AND ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT3 - Power Up IAT2) > ABS(Power Up IAT3 - Power Up IAT)	> 25 deg C	No Active DTCs:	PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error		

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 humidity)	P0097	Detects a continuous short to ground in the Intake Air Temperature 2 (IAT2) signal circuit or an IAT2 sensor that is outputting a frequency signal that is too low. The diagnostic monitors the IAT2 sensor output frequency and fails the diagnostic when the IAT2 frequency is too low. The IAT2 sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. The temperature value is 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 temperature value. A lower frequency is equivalent to a lower temperature. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	Raw IAT 2 Input	< 13 Hertz (~-60 deg C)	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit 2 High (applications with humidity)	P0098	Detects an Intake Air Temperature 2 (IAT2) sensor that is outputting a frequency signal that is too high. The diagnostic monitors the IAT2 sensor output frequency and fails the diagnostic when the IAT2 frequency is too high. The IAT2 sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. The temperature value is 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 temperature value. A higher frequency is equivalent to a higher temperature. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	Raw IAT 2 Input	> 390 Hertz (~150 deg C)	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor 2 Intermittent In-Range (applications with humidity)	P0099	Detects a noisy or erratic signal in the Intake Air Temperature 2 (IAT2) circuit by monitoring the IAT2 sensor and failing the diagnostic when the IAT2 signal has a noisier output than is expected. When the value of the IAT2 signal in °C is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of IAT2 readings. The result of this summation is called a “string length”. Since the IAT2 signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic IAT2 signal. The diagnostic will fail if the string length is too high. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current IAT 2 reading - IAT 2 reading from 100 milliseconds previous)	> 100.00 deg C 10 consecutive IAT 2 readings	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
High Pressure Start Diagnostic	P00C6	The DTC Diagnoses the high side fuel pressure during engine cranking.	The ECM detects that the fuel pressure is not rising or has fallen beyond acceptable limits during engine cranking Pressure Rise Test: Sensed High Pressure Fuel Rail Pressure value Pressure Fall Test: Sensed High Pressure Fuel Rail Pressure value	< **P00C6 - Minimum pressure in MPa that will exit High Pressure Start mode and allow fuel delivery** (see Supporting Table) <= **P00C6 - Minimum acceptable value of fuel rail pressure after High Pressure Start** (see Supporting Table)	High Pressure Rise Diagnostic During Start High Pressure Fail Diagnostic During Start Low side feed fuel pressure Engine Run Time Run/Crank Voltage Engine Coolant For each engine start, only 1 diagnostic is performed. The pressure rise test will run if HIgh side fuel pressure is less than KtFHPC_p_HighPressStart, otherwise, the pressure fall diagnostic will run The pressure fall runs when the engine is cranking.	True False >= 0 KPA < = 0 sec > 8 Volts -42 <= °C <= 132 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	Pressure Rise Test: Crank Time >= **P00C6 - High Pressure Pump Control Mode timeout** (see Supporting Table) 6.25 ms per sample Pressure Fall Test: Injected cylinder events >= **P00C6 - maximum acceptable counts of fuel rail pressure below KtFHPD_p_HPS_PressFallLoThrsh after High Pressure Start** (see Supporting Table) 4 samples per engine rotation	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 >= -10.0 DegC		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Pressure Measurement System - Multiple Sensor Correlation (single turbo)	P00C7	Detects an inconsistency between pressure sensors in the induction system in which a particular sensor cannot be identified as the failed sensor. If the engine has been off for a sufficient amount of time, the pressure values in the induction system will have equalized. The Manifold Pressure (MAP), Turbocharger Boost Pressure and Barometric Pressure (BARO) sensors values are checked to see if they are within the normal expected atmospheric pressure range. If they are, then MAP, Turbocharger Boost Pressure and BARO are compared to see if their values are similar. If two of these three sensors are similar, but the third is not, then a performance diagnostic for the specific sensor with the dissimilar value will fail. If there is no combination of two of	ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure) AND ABS(Turbocharger Boost Pressure - Baro Pressure) OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure) AND ABS(Turbocharger Boost Pressure - Baro Pressure) OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure) AND ABS(Turbocharger Boost Pressure - Baro Pressure) OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold	> 10.0 kPa <= 10.0 kPa <= 10.0 kPa <= 10.0 kPa > 10.0 kPa <= 10.0 kPa <= 10.0 kPa <= 10.0 kPa > 10.0 kPa > 10.0 kPa	Time between current ignition cycle and the last time the engine was running Engine is not rotating Manifold Pressure Manifold Pressure Baro Pressure Baro Pressure Turbocharger Boost Pressure Turbocharger Boost Pressure No Active DTCs: No Pending DTCs:	> 10.0 seconds >= 50.0 kPa <= 115.0 kPa >= 50.0 kPa <= 115.0 kPa >= 50.0 kPa <= 115.0 kPa EngineModeNotRunTimer Error MAP_SensorFA AAP_SnsrFA AAP2_SnsrFA MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP	4 failures out of 5 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.
		these three sensors that is similar, then the failed sensor cannot be uniquely identified. The Multiple Pressure Sensor Correlation Diagnostic will fail in this case.	Pressure) AND ABS(Turbocharger Boost Pressure - Baro Pressure)	> 10.0 kPa > 10.0 kPa				

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 thershold based on High pressure Pump.	Engine Speed Battery Voltage	>= 50 RPM >= 11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Press Regulator Solenoid Supply Voltage Control High Side Circuit Short to power	P00CA	Controller specific output driver circuit diagnoses High Pressure pump Control Solenoid high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 0.1 Amps between signal and controller power	Engine Speed Battery Voltage	>= 50 RPM >= 11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		ignition cycle if the enable conditions are met.	AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT3) > ABS(Power Up IAT2 - Power Up IAT)	> 25 deg C	No Active DTCs:	PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit 3 Low (applications with manifold temperature and humidity)	P00EA	Detects a continuous short to ground in the Intake Air Temperature 3 (IAT3) signal circuit by monitoring the IAT3 sensor output resistance and failing the diagnostic when the IAT3 resistance is too low. The IAT3 sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. A lower resistance is equivalent to a higher temperature.	Raw IAT 3 Input	< 56.52 Ohms (~150 deg C)	Engine Run Time	> 0.00 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit 3 High (applications with manifold temperature and humidity)	P00EB	Detects a continuous open circuit in the Intake Air Temperature 3 (IAT3) signal circuit by monitoring the IAT3 sensor output resistance and failing the diagnostic when the IAT3 resistance is too high. The IAT3 sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. A higher resistance is equivalent to a lower temperature.	Raw IAT 3 Input	> 162,529 Ohms (~-60 deg C)	Engine Run Time	> 0.00 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor 3 Intermittent In-Range	P00EC	Detects a noisy or erratic signal in the Intake Air Temperature 3 (IAT3) circuit by monitoring the IAT3 sensor and failing the diagnostic when the IAT3 signal has a noisier output than is expected. When the value of the IAT3 signal in °C is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of IAT3 readings. The result of this summation is called a “string length”. Since the IAT3 signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic IAT3 signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current IAT 3 reading - IAT 3 reading from 100 milliseconds previous)	> 80.00 deg C 10 consecutive IAT 3 readings	Continuous		4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Humidity Sensor Circuit Low	P00F4	Detects a continuous short to ground in the humidity signal circuit or a humidity sensor that is outputting a duty cycle that is too low. The diagnostic monitors the humidity sensor duty cycle output and fails the diagnostic when the humidity duty cycle is too low. 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. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	Humidity Duty Cycle	<= 5.0 %	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Humidity Sensor Circuit High	P00F5	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. 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. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	Humidity Duty Cycle	>= 95.0 %	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow System Performance (single turbo)	P0101	Detects a performance failure in the Mass Air Flow (MAF) sensor, such as when a MAF value is stuck in range. This diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from other sensors. The other sensors are the Manifold Pressure (MAP) sensor, Turbocharger Boost Pressure sensor and Throttle Position sensor (TPS). These modeled values are compared against the actual sensor values to see if they are similar. If they are similar, then the model passes. If they are not similar, then that model is considered to be failed. Certain combinations of model passes and model failures can be interpreted to be caused by a performance issue with the MAF sensor. In this case, the MAF Performance diagnostic	See table **P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix** for combinations of model failures that can set this DTC. MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered MAP1 model fails when ABS(Measured MAP – MAP Model 1) Filtered MAP2 model fails when ABS(Measured MAP – MAP Model 2) Filtered MAP3 model fails when ABS(Measured MAP – MAP Model 3) Filtered TIAP1 model fails when ABS(Measured TIAP – TIAP Model 1) Filtered TPS model fails when Filtered Throttle Model Error TIAP Correlation model fails when High Engine Air Flow is TRUE AND	> 20.0 grams/sec > 25.0 kPa > 23.0 kPa > 24.0 kPa > 30.0 kPa > 225 kPa*(g/s)	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria (Coolant Temp OR OBD Max Coolant Achieved Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables.	>= 400 RPM <= 6,100 RPM >= -9 Deg C = TRUE) <= 125 Deg C = FALSE) >= -20 Deg C <= 125 Deg C >= 0.50 Modeled Air Flow Error multiplied by **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM** and **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est** MAP Model 1 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM**	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		will fail.	Measured TIAP - measured MAP - offset as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Offset** OR Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Offset** TIAP Correlation is valid when High Engine Air Flow has been TRUE for a period of time OR Low Engine Air Flow has been TRUE for a period of time High Engine Air Flow is TRUE when Mass Air Flow - -	> 30.0 kPa > 30.0 kPa > 0.8 seconds > 0.8 seconds > a threshold in gm/sec as a function of engine speed. See table	No Active DTCs: No Pending DTCs:	MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** MAP Model 3 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP3 Residual Weight Factor based on RPM** TIAP Model 1 Error multiplied by **P0101, P0106, P0121, P0236, P1101: TIAP Residual Weight Factor based on RPM** Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTempSensorFA TC_BoostPresSnsrCktFA AmbientAirDefault 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.
				P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min Air Flow		MnfdTempSensorCktFP		
			AND Manifold Pressure	> a threshold in kPa as a function of engine speed. See table **P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min MAP**				
			AND Filtered Mass Air Flow - Mass Air Flow	< 1.3 gm/sec				
			Low Engine Air Flow is TRUE when Mass Air Flow	< a threshold in gm/sec as a function of engine speed. See table **P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max Air Flow**				
			AND Manifold Pressure	< a threshold in kPa as a function of engine speed. See table **P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max MAP**				
			AND Mass Air Flow - Filtered Mass Air Flow	< 2.0 gm/sec				

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	P0102	Detects a continuous short to ground in the MAF sensor circuit or a MAF sensor that is outputting a frequency that is too low. The diagnostic monitors the MAF sensor frequency output and fails the diagnostic when the MAF frequency is too low. The MAF sensor monitors the temperature of a circuit in the air flow of the engine. The temperature of this circuit is related to the air velocity across the sensor. The MAF sensor converts this air velocity to a mass air flow value. The mass air flow value is converted by the sensor to a frequency value in Hertz. A digital square wave signal is transmitted by the sensor to the ECM. The ECM calculates the frequency of the square wave signal and converts that frequency to a mass air flow value in grams/second through a transfer function.	MAF Output	<= 538 Hertz (~ 0.00 gm/sec)	Engine Run Time Engine Speed Ignition Voltage Above criteria present for a period of time	> 1.0 seconds >= 300 RPM >= 10.0 Volts >= 1.0 seconds	200 failures out of 250 samples 1 sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow Sensor Circuit High Frequency	P0103	Detects a MAF sensor that is outputting a frequency signal that is too high. The diagnostic monitors the MAF sensor frequency output and fails the diagnostic when the MAF frequency is too high. The MAF sensor monitors the temperature of a circuit in the air flow of the engine. The temperature of this circuit is related to the air velocity across the sensor. The MAF sensor converts this air velocity to a mass air flow value. The mass air flow value is converted by the sensor to a frequency value in Hertz. A digital square wave signal is transmitted by the sensor to the ECM. The ECM calculates the frequency of the square wave signal and converts that frequency to a mass air flow value in grams/second through a transfer function.	MAF Output	>= 10,716 Hertz (~ 333.5 gm/sec)	Engine Run Time Engine Speed Ignition Voltage Above criteria present for a period of time	> 1.0 seconds >= 300 RPM >= 10.0 Volts >= 1.0 seconds	200 failures out of 250 samples 1 sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Manifold Absolute Pressure Sensor Performance (single turbo)	P0106	Detects a performance failure in the Manifold Pressure (MAP) sensor, such as when a MAP value is stuck in range. If the engine has been off for a sufficient amount of time, the pressure values in the induction system will have equalized. The MAP sensor value is checked to see if it is within the normal expected atmospheric pressure range. If it is not, then the MAP performance diagnostic will fail. If the MAP sensor value is within the normal expected atmospheric range, then MAP, Turbocharger Boost Pressure, and Barometric Pressure (BARO) are compared to see if their values are similar. If the Turbocharger Boost Pressure and BARO sensor values are similar, but the MAP value is not similar, then a MAP performance diagnostic will fail.	**Engine Running:** See table **P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix** for combinations of model failures that can set this DTC. MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered MAP1 model fails when ABS(Measured MAP – MAP Model 1) Filtered MAP2 model fails when ABS(Measured MAP – MAP Model 2) Filtered MAP3 model fails when ABS(Measured MAP – MAP Model 3) Filtered TIAP1 model fails when ABS(Measured TIAP – TIAP Model 1) Filtered TPS model fails when Filtered Throttle Model Error TIAP Correlation model fails when High Engine Air Flow is TRUE	> 20.0 grams/sec > 25.0 kPa > 23.0 kPa > 24.0 kPa > 30.0 kPa > 225 kPa*(g/s)	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria (Coolant Temp OR OBD Max Coolant Achieved Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables.	>= 400 RPM <= 6,100 RPM >= -9 Deg C = TRUE) <= 125 Deg C = FALSE) >= -20 Deg C <= 125 Deg C >= 0.50 Modeled Air Flow Error multiplied by **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM** and **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est** MAP Model 1 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM** MAP Model 2 Error	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		The engine running portion of this diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from other sensors. The other sensors are the Mass Air Flow (MAF) sensor, Turbocharger Boost Pressure sensor and Throttle Position sensor (TPS). 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.	AND Measured TIAP - measured MAP - offset as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Offset** OR Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Offset** TIAP Correlation is valid when High Engine Air Flow has been TRUE for a period of time OR Low Engine Air Flow has been TRUE for a period of time High Engine Air Flow is TRUE when Mass Air Flow -	> 30.0 kPa > 30.0 kPa > 0.8 seconds > 0.8 seconds > a threshold in gm/sec as a function of engine speed See table	No Active DTCs: No Pending DTCs:	multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** MAP Model 3 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP3 Residual Weight Factor based on RPM** TIAP Model 1 Error multiplied by **P0101, P0106, P0121, P0236, P1101: TIAP Residual Weight Factor based on RPM** Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTempSensorFA TC_BoostPresSnsrCktFA AmbientAirDefault 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.
				P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min Air Flow		MnfdTempSensorCktFP		
			AND Manifold Pressure	> a threshold in kPa as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min MAP**				
			AND Filtered Mass Air Flow - Mass Air Flow	< 1.3 gm/sec				
			Low Engine Air Flow is TRUE when Mass Air Flow	< a threshold in gm/sec as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max Air Flow**				
			AND Manifold Pressure	< a threshold in kPa as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max MAP**				
			AND Mass Air Flow - Filtered Mass Air Flow	< 2.0 gm/sec				
			<u>Engine Not Rotating:</u> Manifold Pressure	< 50.0 kPa	Time between current ignition cycle and the last time the engine was		4 failures out of 5 samples	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			OR Manifold Pressure OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure) AND ABS(Turbocharger Boost Pressure - Baro Pressure)	 > 115.0 kPa > 10.0 kPa > 10.0 kPa <= 10.0 kPa	running Engine is not rotating No Active DTCs: No Pending DTCs:	> 10.0 seconds EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA AAP2_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP	1 sample every 12.5 msec	

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 (Gen III)	P0107	Detects a continuous short to ground in the Manifold Absolute Pressure (MAP) signal circuit by monitoring the MAP sensor output voltage and failing the diagnostic when the MAP voltage is too low. The MAP sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	MAP Voltage	< 3.0 % of 5 Volt Range (This is equal to 7.5 kPa)	Continuous		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 (Gen III)	P0108	Detects a continuous short to power or open circuit in the Manifold Absolute Pressure (MAP) signal circuit by monitoring the MAP sensor output voltage and failing the diagnostic when the MAP voltage is too high. The MAP sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	MAP Voltage	> 86.0 % of 5 Volt Range (This is equal to 372.0 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		ignition cycle if the enable conditions are met.	AND ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT3 - Power Up IAT) > ABS(Power Up IAT3 - Power Up IAT2)	> 25 deg C	No Active DTCs:	PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error		

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	P0112	Detects a continuous short to ground in the Intake Air Temperature (IAT) signal circuit by monitoring the IAT sensor output resistance and failing the diagnostic when the IAT resistance is too low. The IAT sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. A lower resistance is equivalent to a higher temperature.	Raw IAT Input	< 58.00 Ohms (~150 deg C)	Engine Run Time	> 0.00 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit High	P0113	Detects a continuous open circuit in the Intake Air Temperature (IAT) signal circuit by monitoring the IAT sensor output resistance and failing the diagnostic when the IAT resistance is too high. The IAT sensor is a thermistor in which the resistance across the sensor can be equated to a temperature. A higher resistance is equivalent to a lower temperature.	Raw IAT Input	> 142,438 Ohms (~-60 deg C)	Engine Run Time	> 0.00 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temp Sensor Circuit Low	P0117	Circuit Continuity This DTC detects a short to ground in the ECT (Engine Coolant temperature) signal circuit or the ECT sensor. This is accomplished by monitoring the resistance of the circuit. If the resistance goes out of the expected range the DTC is set.	ECT Resistance (@ 150ºC)	< 55 Ohms			5 failures out of 6 samples 1 sec/ 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.
Engine Coolant Temp Sensor Circuit High	P0118	Circuit Continuity This DTC detects a short to high or open in the ECT (Engine Coolant temperature) signal circuit or the ECT sensor. This is accomplished by monitoring the resistance of the circuit. If the resistance goes out of the expected range the DTC is set.	ECT Resistance (@ -60ºC)	> 134,000 Ohms	Engine run time OR IAT min	> 15.0 seconds ≥ -9.0 °C	5 failures out of 6 samples 1 sec/ 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.
Engine Coolant Temperature (ECT) Sensor Circuit Intermittent	P0119	Circuit Erratic This DTC detects large step changes in the ECT (Engine Coolant temperature) signal circuit or the ECT sensor. Allowable high and low limits are calculated for the next sample based on the previous sample and sensor time constant. If the sensor responds faster than should be possible the DTC is set.	ECT temperature step change: 1) postive step change is greater than calculated high limit OR 2) negitive step change is lower than calculated low limit. The calculated high and low limits for the next reading use the following calibrations: 1) Sensor time constant 2) Sensor low limit 3) Sensor high limit *****Generic Example***** If the last ECT reading was 90 Deg C, the Time constant was calibrated at 10 seconds, the low limit was calibrated to -80 Deg C and the high limit was calibrated to 200 Deg C the caluculated limits are 101 Deg C and 73 Deg C. The next reading (after the 90 Deg C reading) must be between 73 Deg C and 101 Deg C to be valid. **********	 7.4 seconds -60.0 Deg C 200.0 Deg C	No Active DTC's	ECT_Sensor_Ckt_FP	3 failures out of 4 samples 1 sec/ 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.
Throttle Position Sensor Performance (single turbo)	P0121	Detects a performance failure in the Throttle Position sensor (TPS) sensor, such as when a TPS value is stuck in range. This diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from other sensors. The other sensors are the Manifold Pressure (MAP) sensor, Turbocharger Boost Pressure sensor and Mass Air Flow (MAF) sensor. These modeled values are compared against the actual sensor values to see if they are similar. If they are similar, then the model passes. If they are not similar, then that model is considered to be failed. Certain combinations of model passes and model failures can be interpreted to be caused by a performance issue with the TPS sensor. In this case, the TPS	See table **P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix** for combinations of model failures that can set this DTC. MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered MAP1 model fails when ABS(Measured MAP – MAP Model 1) Filtered MAP2 model fails when ABS(Measured MAP – MAP Model 2) Filtered MAP3 model fails when ABS(Measured MAP – MAP Model 3) Filtered TIAP1 model fails when ABS(Measured TIAP – TIAP Model 1) Filtered TPS model fails when Filtered Throttle Model Error TIAP Correlation model fails when High Engine Air Flow is TRUE AND Measured TIAP -	> 20.0 grams/sec > 25.0 kPa > 23.0 kPa > 24.0 kPa > 30.0 kPa > 225 kPa*(g/s)	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria (Coolant Temp OR OBD Max Coolant Achieved Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables.	>= 400 RPM <= 6,100 RPM >= -9 Deg C = TRUE) <= 125 Deg C = FALSE) >= -20 Deg C <= 125 Deg C >= 0.50 Modeled Air Flow Error multiplied by **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM** and **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est** MAP Model 1 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM**	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Performance diagnostic will fail.	measured MAP - offset as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Offset** OR Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Offset** TIAP Correlation is valid when High Engine Air Flow has been TRUE for a period of time OR Low Engine Air Flow has been TRUE for a period of time High Engine Air Flow is TRUE when Mass Air Flow AND	> 30.0 kPa > 30.0 kPa > 0.8 seconds > 0.8 seconds > a threshold in gm sec as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min Air Flow**	No Active DTCs: No Pending DTCs:	MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** MAP Model 3 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP3 Residual Weight Factor based on RPM** TIAP Model 1 Error multiplied by **P0101, P0106, P0121, P0236, P1101: TIAP Residual Weight Factor based on RPM** Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTempSensorFA TC_BoostPresSnsrCktFA AmbientAirDefault 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.
			Manifold Pressure AND Filtered Mass Air Flow - Mass Air Flow Low Engine Air Flow is TRUE when Mass Air Flow AND Manifold Pressure AND Mass Air Flow - Filtered Mass Air Flow	> a threshold in kPa as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min MAP** < 1.3 gm/sec < a threshold in gm sec as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max Air Flow** < a threshold in kPa as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max MAP** < 2.0 gm/sec		MnfdTempSensorCktFP		

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 <	0.3250 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P06A3	79 / 159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 >	4.750 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P06A3	79 / 159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.	Energy is accumulated after the first conbustion event using Range #1 or #2 below: Thermostat type is divided into normal (non-heated) and electrically heated. For this application the "type" cal (KeTHMG_b_TMS_ElecThstEquipped) = 0 If the type cal is equal to one, the application has an electrically heated t-stat, if equal to zero the the application has an non heated t-stat. See appropiate section below. ********** Type cal above = 1 (Electrically heated t-stat) == == == == Range #1 (Primary) ECT reaches Commanded temperature minus 19 °C when Ambient min is ≤ 52 °C and > 10 °C. Note: Warm up target for range #1 will be at least 71 °C == == == == Range #2 (Alternate) ECT reaches Commanded temperature minus 50 °C when Ambient min is ≤ 10 °C and > -9 °C. Note: Warm up target for range #2 will be at least	See the two tables named: **P0128_Maximum Accumulated Energy for Start-up ECT conditions - Primary** and **P0128_Maximum Accumulated Energy for Start-up ECT conditions - Alternate** in the Supporting tables section. This diagnostic models the net energy into and out of the cooling	No Active DTC's Engine not run time (soaking time before current trip) Engine run time Fuel Condition Distance traveled ********** If Engine RPM is continuously greater than for this time period The diagnostic test for this key cycle will abort ********** ********** If T-Stat Heater commanded duty cycle for this time period	ECT_Sensor_Ckt_FA ECT_Sensor_Perf_FA VehicleSpeedSensor_FA OAT_PtEstFiltFA IAT_SensorCircuitFA MAF_SensorFA THMR_AWP_AuxPumpFA THMR_AHV_FA THMR_SWP_Control_FA THMR_SWP_NoFlow_FA THMR_SWP_FlowStuckOn_FA EngineTorqueEstInaccurate ≥ 1,800 seconds 30 ≤ Eng Run Tme ≤ 1,800 seconds Ethanol ≤ 87 % ≥ 0.62 miles ********** 9,999 rpm 5.0 seconds ********** ********** > 20.0 % duty cycle > 5.0 seconds	1 failure to set DTC 1 sec/ sample Once per ignition key cycle	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			55 °C ********** Type cal above = 0 (non - heated t-stat) == == == == Range #1 (Primary) ECT reaches 71 °C when Ambient min is ≤ 52 °C and > 10 °C. == == == == Range #2 (Alternate) ECT reaches 55 °C when Ambient min is ≤ 10 °C and > -9 °C. **********	system during the warm-up process. The five energy terms are: heat from combustion (with AFM correction), heat from after-run, heat loss to enviroment, heat loss to cabin and heat loss to DFCO.	The diagnostic test for this key cycle will abort ********** ECT at start run	********** -60 ≤ ECT ≤ 52 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Low Voltage Bank 1 Sensor 1	P0131	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. 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.	Oxygen Sensor Signal	< 40.0 mVolts	No Active DTC's AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Only when FuelLevelDataFault Commanded Equivalence Ratio Air Per Cylinder Fuel Control State Closed Loop Active	TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA = Not active = Not active = Not active = Not active 10.0 < Volts = Not active = Not active = Not active = Not active = False = False 0.9912 < ratio < 1.0137 60 < mgram < 500 = Closed Loop = TRUE (Please see "**Closed Loop Enable Clarification**" in Supporting Tables).	320 failures out of 400 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.
					All Fuel Injectors for active Cylinders Fuel Condition Ethanol Estimation in Progress Fuel State All of the above met for	Enabled (On) Ethanol ≤ 87 % = Not Active (Please see “**Ethanol Estimation in Progress**” in Supporting Tables). DFCO not active > 5.0 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit High Voltage Bank 1 Sensor 1	P0132	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. 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.	Oxygen Sensor Signal	> 1,050 mvolts	No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Low Fuel Condition Diag Only when FuelLevelDataFault ********** Secondary delay after above conditions are complete (cold start condition) Secondary delay after above conditions are complete (not cold start condition) Commanded Equivalence Ratio ********** All of the above met for	TPS_ThrottleAuthorityDefaulted MAF_SensorFA MAP_SensorFA EvapExcessPurgePsbl_FA FuelInjectorCircuit_FA Ethanol Composition Sensor FA AIR System FA 10.0 < Volts = All Cylinders active = Complete > 5.0 seconds > 30.0 seconds = False = False ********** > 10.0 seconds when engine soak time > 28,800 seconds > 5.0 seconds when engine soak time ≤ 28,800 seconds ≤ 1.014 EQR ********** > 3.0 seconds	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Slow Response Bank 1 Sensor 1) (For use with ESPD and w/o WRAF	P0133	This DTC determines if the Bank 1 primary O2 sensor has a slow response (in the Rich to Lean (R2L) or Lean to Rich (L2R) direction) and thereby can no longer be used for closed loop fuel control based on emission correlation testing. This diagnostic runs passively (see enable conditions) and monitors the time the O2 sensor signal is between an upper and lower voltage thresholds over the sample period. The diagnostic also monitors the O2 sensor signal for the number of Slope Time (ST) switches in each direction between the same upper and lower voltage thresholds over the sample period. When the required data is collected, an average R2L and L2R response time and individual R2L and L2R Slope Time (ST) switch count is calculated. This fault is set when the L2R and R2L response test results are compared to the	Fault condition present when the average response time is caluclated over the test time, and compared to the threshold. OR Slope Time L/R Switches OR Slope Time R/L Switches	Refer to **P0133_O2S Slow Response Bank 1 Sensor 1 Pass/Fail Threshold table** in the Supporting Tables tab < 5 < 5 The test averages the signal response time over 60.0 seconds when the signal is transitioning between 400 mvolts and 600 mvolts. An average rich to lean time and lean to rich time are each calculated separately. Note: the table listed above uses the following calibratable X axis: **P0133_KnEOSD_t_ST_LRC_LimRS1** and calibratable Y axis: **P0133_KnEOSD_t_ST_RLC_LimRS1**	No Active DTC's Bank 1 Sensor 1 DTC's not active System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Only when FuelLevelDataFault Green O2S Condition	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA Ethanol Composition Sensor FA EngineMisfireDetected_FA P0131, P0132, P0134 > 10.0 Volts = Not active = Not active = Not active = Not active = False = False = Not Valid, Green O2S condition is considered valid until the accumulated air flow is greater than	Sample time is 60 seconds Frequency: Once per trip	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		"P0133_O2S Slow Response Bank 1 Sensor 1 "Pass/Fail Threshold Table" and the outcome determines a response faulted condition. Additionally, this fault is set when the L2R or R2L slope time switch count test results are less than the ST individual thresholds.				**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 18.0 grams/sec.		
					O2 Heater on for Learned Htr resistance	≥ 30 seconds = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's")		
					Engine Coolant (Or OBD Coolant Enable Criteria	> 60 ºC = TRUE)		
					IAT	> -40 ºC		
					Engine run Accum	> 30 seconds		
					Time since any AFM status change	> 1.5 seconds		
					Time since Purge On to Off change	> 0.0 seconds		
					Time since Purge Off to On change	> 1.5 seconds		
					Engine airflow	8 ≤ grams/sec ≤ 60		
					Engine speed	1,000 ≤ RPM ≤ 3,500		
					Fuel Condition	< 87 % Ethanol		
					Baro	> 70 kpa		
					Air Per Cylinder	≥ 100 mGrams		
					Fuel Control State Closed Loop Active	= Closed Loop = TRUE (Please see "**Closed Loop Enable**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					LTM (Block Learn) fuel cell Transient Fuel Mass Baro Fuel Control State Fuel State Commanded Proportional Gain ========== All of the above met for	**Clarification**" in Supporting Tables). = Enabled, refer to **Multiple DTC Use - Response Cell Enable Table** for additional info. ≤ 100.0 mgrams = Not Defaulted not = Power Enrichment DFCO not active ≥ 0.0 % ========== > 2.0 seconds		

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	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit. This test compares the measured heater current (monitored thru the low side driver) and compares it to the expected values (over the voltage range provided) for the released sensor. The diagnostic failure counter is incremented if the heater current is outside the expected range. This DTC is set based on the fail and sample counters.	Heater Current outside of the expected range of	0.3 < Amps < 2.5	No Active DTC's System Voltage Heater Warm-up delay O2S Heater device control B1S1 O2S Heater Duty Cycle All of the above met for	ECT_Sensor_FA > 10.0 Volts = Complete = Not active > zero > 120 seconds	8 failures out of 10 samples Frequency: 3 tests per trip 10 seconds delay between tests and 1 second execution rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Low Voltage Bank 1 Sensor 2) (For Single Bank Exhaust Only	P0137	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. 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.	Oxygen Sensor Signal	< 40 mvolts	No Active DTC's AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Only when FuelLevelDataFault Commanded Equivalence Ratio Air Per Cylinder Fuel Control State Closed Loop Active	TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA = Not active = Not active = Not active = Not active 10.0 < Volts = Not active = Not active = Not active = Not active = False = False 0.991 ≤ ratio ≤ 1.014 60 ≤ mgrams ≤ 500 = Closed Loop = TRUE (Please see "**Closed Loop Enable Clarification**" in Supporting Tables).	320 failures out of 400 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.
					All Fuel Injectors for active Cylinders Fuel Condition Ethanol Estimation in Progress Fuel State All of the above met for	Enabled (On) Ethanol ≤ 87 % = Not Active (Please see "**Ethanol Estimation in Progress**" in Supporting Tables). DFCO not active > 5.0 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit High Voltage Bank 1 Sensor 2) (For Single Bank Exhaust Only	P0138	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. 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.	Oxygen Sensor Signal	> 1,050 mvolts	No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Low Fuel Condition Only when FuelLevelDataFault ********** Secondary delay after above conditions are complete (cold start condition) Secondary delay after above conditions are complete (not cold start condition) Commanded Equivalence Ratio ********** All of the above met for	TPS_ThrottleAuthorityDefaulted MAF_SensorFA MAP_SensorFA EvapExcessPurgePsbl_FA FuelInjectorCircuit_FA Ethanol Composition Sensor FA AIR System FA 10.0 < Volts = All Cylinders active = Complete > 5.0 seconds > 30.0 seconds = False = False ********** > 15.0 seconds when engine soak time > 28,800 seconds > 8.0 seconds when engine soak time ≤ 28,800 seconds ≤ 1.014 EQR ********** > 3.0 seconds	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Slow Response Rich to Lean Bank 1 Sensor 2	P013A	The P013A diagnostic is the third in a sequence of six intrusive secondary O2 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, & P013B. This DTC determines if the secondary O2 sensor has an slow response to an A/F change from Rich to Lean and thereby can no longer be used for secondary O2 sensor fuel control or for catalyst monitoring. This diagnostic commands fuel cut off while monitoring the sensor signal and the accumulated mass air flow. Note: The Primary method is used when the secondary O2 sensor signal transitions from above the upper threshold to below the lower threshold, otherwise the Secondary method is used. <u>Primary method</u>: The P013A diagnostic measures the secondary O2 sensor voltage response rate	Primary Method: The EWMA of the Post O2 sensor normalized integral value. The EWMA repass limit is The EWMA calculation uses a 0.15 coefficient. OR Secondary Method: The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 8.0 units ≤ 7.0 units > 75.0 grams (upper voltage threshold is 550 mvolts and lower voltage threshold is 250 mvolts)	No Active DTC's B1S2 DTC's Not Active this key cycle System Voltage Learned heater resistance Green O2S Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA O2S_Bank_ 1_TFTKO O2S_Bank_ 2_TFTKO P013B, P013E, P013F, P2270 or P2271 > 10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid, Green O2S condition is considered valid until the accumulated 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 only enabled when airflow is above 18.0 grams/sec.	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type A, 1 Trips EWMA

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.
O2 Sensor Slow Response Lean to Rich Bank 1 Sensor 2	P013B	The P013B diagnostic is the sixth in a sequence of six intrusive secondary O2 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, & P013B. This DTC determines if the secondary O2 sensor has an slow response to an A/F change from Lean to Rich and thereby can no longer be used for secondary O2 sensor fuel control or for catalyst monitoring. This diagnostic increases the delivered fuel while monitoring the sensor signal and the accumulated mass air flow. Note: The Primary method is used when the secondary O2 sensor signal transitions from below the lower threshold to above the upper threshold, otherwise the Secondary method is used. <u>Primary method</u>: The P013B diagnostic measures the secondary O2 sensor voltage response rate	Primary Method: The EWMA of the Post O2 sensor normalized integral value. The EWMA repass limit is The EWMA calculation uses a 0.15 coefficient. OR Secondary Method: The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 8.0 units ≤ 7.0 units > 615 grams (lower voltage threshold is 350 mvolts and upper voltage threshold is 650 mvolts)	No Active DTC's B1S2 DTC's Not Active this key cycle System Voltage Learned heater resistance Green O2S Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA O2S_Bank_ 1_TFTKO O2S_Bank_ 2_TFTKO P013A, P013E, P013F, P2270 or P2271 > 10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid, Green O2S condition is considered valid until the accumulated 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 only enabled when airflow	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		between an lower and upper voltage threshold. The response rate is then normalized to mass air flow rate and scaled resulting in a normalized intregral value. The normalized integral is fed into a 1st order lag filter to update the final EWMA result. DTC P013B is set when the EWMA value exceeds the EWMA threshold. Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value. Secondary method:			Green Cat System Condition Low Fuel Condition Only when FuelLevelDataFault Post fuel cell DTC's Passed ========== After above conditions are met: Fuel Enrich mode continued. ==========	is above 18.0 grams/sec. = Not Valid, Green Cat System condition is considered valid until accumulated airflow is greater than 360,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is greater than 18.0 grams/ sec. (Note: This feature is only enabled when the vehicle is new and cannot be enabled in service). = False = False = Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info. P2270 P013E P013A P2271 P013F ==========		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		This fault is set if the secondary O2 sensor does not achieve the required upper voltage threshold before the accumulated mass air flow threshold is reached.			During this test the following must stay TRUE or the test will abort: 0.960 ≤ Base Commanded EQR ≤ 1.080			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Delayed Response Rich to Lean Bank 1 Sensor 2	P013E	The P013E diagnostic is the second in a sequence of six intrusive secondary O2 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, & P013B. This DTC determines if the secondary O2 sensor has an initial delayed response to an A/F change from Rich to Lean and thereby can no longer be used for secondary O2 sensor fuel control or for catalyst monitoring. This diagnostic commands fuel cut off while monitoring the sensor signal and the accumulated mass air flow. This fault is set if the secondary O2 sensor does not achieve the required voltage before the accumulated mass air flow threshold is reached.	Post O2 sensor voltage AND The Accumulated mass air flow monitored during the Delayed Response Test under DFCO DFCO begins after: 1) Catalyst has been rich for a minimum of AND 2) Catalyst Rich Accumulation Air Flow is	> 550 mvolts > 85 grams > 1 secs ≥ 3.0 grams	No Active DTC's B1S2 DTC's Not Active this key cycle System Voltage Learned heater resistance Green O2S Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA O2S_Bank_ 1_TFTKO O2S_Bank_ 2_TFTKO P013A, P013B, P013F, P2270 or P2271 > 10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid, Green O2S condition is considered valid until the accumulated 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 only enabled when airflow	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						is above 18.0 grams/sec.		
					Low Fuel Condition Only when FuelLevelDataFault	= False = False		
					Post fuel cell	= Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info.		
					Crankshaft Torque	< 125.0 Nm		
					DTC's Passed	P2270		
					Number of fueled cylinders ========== After above conditions are met: DFCO mode entered (wo driver initiated pedal input).	≤ 3 cylinders ==========		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Delayed Response Lean to Rich Bank 1 Sensor 2	P013F	The P013F diagnostic is the fifth in a sequence of six intrusive secondary O2 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, & P013B. This DTC determines if the secondary O2 sensor has an initial delayed response to an A/F change from Lean to Rich and thereby can no longer be used for secondary O2 sensor fuel control or for catalyst monitoring. This diagnostic increases the delivered fuel while monitoring the sensor signal and the accumulated mass air flow. This fault is set if the secondary O2 sensor does not achieve the required voltage before the accumulated mass air flow threshold is reached.	Post O2 sensor voltage AND The Accumulated mass air flow monitored during the Delayed Response Test	< 350 mvolts > 515 grams	No Active DTC's B1S2 DTC's Not Active this key cycle System Voltage Learned heater resistance Green O2S Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA O2S_Bank_ 1_TFTKO O2S_Bank_ 2_TFTKO P013A, P013B, P013E, P2270 or P2271 > 10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid, Green O2S condition is considered valid until the accumulated 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 only enabled when airflow	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						is above 18.0 grams/sec.		
					Green Cat System Condition	= Not Valid, Green Cat System condition is considered valid until accumulated airflow is greater than 360,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is greater than 18.0 grams/ sec. (Note: This feature is only enabled when the vehicle is new and cannot be enabled in service).		
					Low Fuel Condition	= False		
					Only when FuelLevelDataFault	= False		
					Post fuel cell	= Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info.		
					DTC's Passed	P2270 P013E P013A P2271		
					Number of fueled cylinders	≥ 1 cylinders		
					==========	==========		
					After above conditions are met: Fuel Enrich mode entered.			
					==========			
					During this test the			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					following must stay TRUE or the test will abort: 0.960 ≤ Base Commanded EQR ≤ 1.080			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Performance Bank 1 Sensor 2) (For Single Bank Exhaust Only	P0141	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit. This test compares the measured heater current (monitored thru the low side driver) and compares it to the expected values (over the voltage range provided) for the released sensor. The diagnostic failure counter is incremented if the heater current is outside the expected range. This DTC is set based on the fail and sample counters.	Heater Current outside of the expected range of	0.3 > amps > 2.5	No Active DTC's System Voltage Heater Warm-up delay O2S Heater device control B1S1 O2S Heater Duty Cycle All of the above met for	ECT_Sensor_FA > 10.0 Volts = Complete = Not active > zero > 120 seconds	8 failures out of 10 samples Frequency: 3 tests per trip 10 seconds delay between tests and 1 second execution rate.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Delayed Response Rich to Lean Bank 1 Sensor 1) (For use w/o WRAF	P015A	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 O2 monitor rich to lean tests (P013E / P013A / P2271), which commands fuel cut off. Note: The Primary method is used when the primary O2 sensor signal transitions from above to below the O2 voltage threshold, otherwise the Secondary method is used. Primary method: The P015A diagnostic measures the primary O2 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	Primary Method: The EWMA of the Pre O2 sensor normalized R2L time delay value. The EWMA repass limit is The EWMA calculation uses a 0.15 coefficient. This method calculates the result when the Pre O2 sensor voltage is OR Secondary Method: The Accumulated time monitored during the R2L Delayed Response Test. AND Pre O2 sensor voltage is	> 0.59 EWMA (sec) ≤ 0.50 EWMA (sec) < 550 mvolts ≥ 2.5 Seconds > 100.0 mvolts	No Active DTC's System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Only when FuelLevelDataFault Green O2S Condition	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131, P0132, P013A, P013B, P013E, P013F, P2270, P2271 > 10.0 Volts = Not active = Not active = Not active = Not active = False = False = Not Valid, Green O2S condition is	Frequency: Once per trip Note: if NaESPD_b_FastInitRespIsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponseIsActive = TRUE, multiple tests per trip are allowed	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		value. The normalized delay is fed into a 1st order lag filter to update the final EWMA result. DTC P015A is set when the EWMA value exceeds the EWMA threshold. Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value. Secondary method: This fault is set if the primary O2 sensor does not achieve the required lower voltage threshold before a delay time threshold is reached.			O2 Heater (pre sensor) on for Learned Htr resistance Engine Coolant (Or OBD Coolant Enable Criteria IAT Engine run Accum Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled) Engine Airflow Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled) Closed loop integral	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 18.0 grams/sec. ≥ 30 seconds = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") > 60 ºC = TRUE) > -40 ºC > 30 seconds 1,150 ≤ RPM ≤ 3,500 1,100 ≤ RPM ≤ 3,650 2.0 ≤ gps ≤ 20.0 40.4 ≤ MPH ≤ 77.7 36.0 ≤ MPH ≤ 80.8 0.80 ≤ C/L Int ≤ 1.08		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 2.0 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 met: DFCO Mode is entered (wo driver	= TRUE (Please see “**Closed Loop Enable Clarification**” in Supporting Tables). not in control of purge = Not Active (Please see **“Ethanol Estimation in Progress**” in Supporting Tables). > 70 kpa = enabled = not active = not active ≥ 30.0 sec 550 ≤ ºC ≤ 910 = DFCO possible ========== ========== ≥ 700 mvolts = DFCO active ≤ 3 cylinders ==========		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Delayed Response Lean to Rich Bank 1 Sensor 1) (For use w/o WRAF	P015B	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 O2 monitor lean to rich tests (P013F / P013B), which commands fuel enrichment. Note: The Primary method is used when the primary O2 sensor signal transitions from lean condition to above the O2 voltage threshold, otherwise the Secondary method is used. <u>Primary method</u>: The P015B diagnostic measures the primary O2 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	Primary method: The EWMA of the Pre O2 sensor normalized L2R time delay value. The EWMA repass limit is The EWMA calculation uses a 0.15 coefficient. OR Secondary method: The Accumulated time monitored during the L2R Delayed Response Test. AND Pre O2 sensor voltage is OR At end of Cat Rich stage the Pre O2 sensor output is	> 0.50 EWMA (sec) ≤ 0.50 EWMA (sec) ≥ 1.9 Seconds < 350 mvolts < 700 mvolts	No Active DTC's P015A test is complete and System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Only when FuelLevelDataFault	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131, P0132, P013A, P013B, P013E, P013F, P015A, P2270, P2271 = Passed > 10.0 Volts = Not active = Not active = Not active = Not active = False = False	Frequency: Once per trip Note: if NaESPD_b_FastInitRespIsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponseIsActive = TRUE, multiple tests per trip are allowed	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		order lag filter to update the final EWMA result. DTC P015B is set when the EWMA value exceeds the EWMA threshold. Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value. <u>Secondary method</u>: This fault is set if the primary O2 sensor does not achieve the required higher voltage threshold before a delay time threshold is reached.			Green O2S Condition O2 Heater (pre sensor) on for Learned Htr resistance Engine Coolant (Or OBD Coolant Enable Criteria IAT Engine run Accum Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled) Engine Airflow Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after	= 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: B1S1, B2S1 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 18.0 grams/sec. ≥ 30 seconds = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") > 60 ºC = TRUE) > -40 ºC > 30 seconds 1,150 ≤ RPM ≤ 3,500 1,100 ≤ RPM ≤ 3,650 2.0 ≤ gps ≤ 20.0 40.4 ≤ MPH ≤ 77.7		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					initially enabled)	36.0 ≤ MPH ≤ 80.8		
					Closed loop integral Closed Loop Active	0.80 ≤ C/L Int ≤ 1.08 = TRUE (Please see "**Closed Loop Enable Clarification**" in Supporting Tables).		
					Evap	not in control of purge		
					Ethanol Estimation in Progress	= Not Active (Please see "**Ethanol Estimation in Progress**" in Supporting Tables).		
					Baro Post fuel cell EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on Time	> 70 kpa = enabled = not active = not active ≥ 30.0 sec		
					Predicted Catalyst temp Fuel State Number of fueled cylinders	550 ≤ ºC ≤ 910 = DFCO inhibit ≥ 1 cylinders		
					========== When above conditions are met: Fuel Enrich mode is entered. ========== During this test: Engine Airflow must stay between: and the delta Engine Airflow over 12.5msec	========== ========== 2 ≤ gps ≤ 12		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					must be :	≤ 3.0 gps		

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	Determines if the primary fuel control system for Bank 1 is in a lean condition, based on the filtered long-term and short-term fuel trim. A normally operating system operates centered around long-term fuel trim metric of 1.0. For lean conditions extra fuel trim is required therefor values > 1.0 indicate a Lean condition. A fault is determined, when the long term fuel metric exceeds the threshold value. In addition to the long-term fuel trim limit, the short-term fuel trim metric can be monitored and the fault sets once both threshold values are exceeded. The short-term fuel trim metric is only monitored on programs that have acceptable emissions when the long-term fuel metric reaches its full authority.	The filtered long-term fuel trim metric AND The filtered short-term fuel trim metric (Note: any value below 0.95 effectively nullifies the short-term fuel trim criteria)	>= 1.344 >= 0.102 If a fault has been detected the long-term fuel trim metric must be < 1.340 and the short-term fuel trim metric must be < 2.000 to repass the diagnostic.	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 Closed Loop Long Term FT	400 <rpm< 6,100 > 70 kPa > -20 °C (or OBD Coolant Enable Criteria = TRUE) < 150 °C 5 <kPa< 255 -20 <°C< 150 1 <g/s< 510 > 10 % or if fuel sender is faulty the diagnostic will bypass the fuel level criteria. > 26.5 seconds of data must accumulate on each trip, with at least 14.5 seconds of data in the current fuel trim cell before a pass or fail decision can be made. (Please see **P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage** in Supporting Tables for a list of cells utilized for diagnosis) Enabled Enabled (Please see "**Closed Loop Enable Clarification**" and "**Long Term FT Enable Criteria**" in Supporting Tables.)	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.
					EGR Diag. Catalyst Diag. Post O2 Diag. Device Control EVAP Diag. No active DTC:	Intrusive Test Not Active Intrusive Test Not Active Intrusive Test Not Active Not Active Large Leak Diagnostic (P0455) Not Active IAC_SystemRPM_FA MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR System FA EvapExcessPurgePsbl_FA Ethanol Composition Sensor FA FuelInjectorCircuit_FA EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit_FA MAP_EngineVacuumStatus AmbPresDfltdStatus TC_BoostPresSnsrFA O2S_Bank_1_Sensor_1_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel System Too Rich Bank 1	P0172	Determines if the fuel control system is in a rich condition, based on the filtered long-term fuel trim metric.A normally operating system operates centered around long-term fuel trim metric of 1.0. For rich conditions less fuel trim is required therefor values < 1.0 indicate a rich condition. There are two methods to determine a Rich fault. They are Passive and Intrusive. A Passive Test decision can be made up until the time that purge is first enabled. From that point forward, rich faults can only be detected by turning purge off intrusively. If during this period of time the filtered long-term fuel trim metric exceeds the threshold a fault will be set. In addition to the long-term fuel trim limit, the short-term fuel trim metric can be monitored and the fault sets once both threshold values are exceeded. The short-	**Passive Test:** The filtered Non-Purge Long Term Fuel Trim metric AND The filtered Short Term Fuel Trim metric (Note: any value above 1.05 effectively nullifies the short-term fuel trim criteria) ********** **Intrusive Test:** For 3 out of 5 intrusive segments The filtered Purge Long Term Fuel Trim metric AND The filtered Non-Purge Long Term Fuel Trim metric AND The filtered Short Term Fuel Trim metric (Note: any value above 1.05 effectively nullifies the short-term fuel trim criteria)	<= 0.745 ********** <= 0.750 <= 0.745 <= 1.996 If a fault has been detected (by the passive or intrusive test) the long-term fuel trim metric must be > 0.745 and the short-	********** Purge Vapor Fuel	Secondary Parameters and Enable Conditions are identical to those for P0171, with the exception that fuel level is not considered. ********** <= 25.00 % Intrusive Test is inhibited when Purge Vapor percentage is greater than this threshold. (Note: values greater than 50% indicate the Purge Vapor Fuel requirement is not being used) A minimum number of accumlated Fuel Trim Data samples are required to adequately learn a correct Purge Vapor Fuel value. See the table **Minimum Non-Purge Samples for Purge (Vapor Fuel)** for the Purge Off cells used to validate the Purge Vapor Fuel parameter.	Frequency: 100 ms Continuous Loop ********** **Segment Definition:** Segments can last up to 45 seconds and are separated by the lesser of 24.0 seconds of purge-on time or enough time to purge 11 grams of vapor. A maximum of 5 completed segments or 20 attempts are allowed for each intrusive test. After an intrusive test report is completed, another intrusive test cannot occur for 300 seconds to allow sufficient	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		term fuel trim metric is only monitored on programs that have acceptable emissions when the long-term fuel metric reaches its full authority. Once purge is enabled if the filtered Purge Long Term Fuel Trim metric > 0.750 , 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 <= 0.750 , 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 <= 0.745 the fault will set. Performing intrusive tests too frequently may also affect EVAP and EPAIII emissions, and the execution frequency of other diagnostics. This is why the intrusive test is operated over several		term fuel trim metric must be > 0.000 to repass the diagnostic. The intrusive test will be enabled at long-term fuel metric values < 0.75 until the diagnostic repasses after a failure.		If the accumulated purge volume is > 134.0 grams, the intrusive test will not be inhibited even if Purge Vapor Fuel is > 25.0 %.	time to purge excess vapors from the canister. During this period, fuel trim will pass if the filtered Purge Long Term Fuel Trim metric > 0.750 for at least 200.0 seconds, indicating that the canister has been purged.	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT Fuel Rail Temperature Sensor 1 Circuit Low Fault	P0182	This DTC diagnose SENT fuel rail temperature sensor 1 that is too low out of range. If the sensor digital value (represnting the refernce voltage) is below the lower digital threshold, the low fail counter then increments. If the low fail counter reaches its threshold then a fail is reported. A pass is reported for this DTC if the low sample counter reaches its threshold.	Fuel Temperature Sensor 1 SENT digital read value	< 145	Fuel Temperature Out of Range Diagnoistic Enabled No Fault Active on No Fault Pending on	True Enabled when a code clear is not active or not exiting device control SENT Communication Fault Active (P16E4, P16E5) SENT Intenal Error Fault Active (P126E) Fuel Temperature Sensor SENT Message Error Fault Active (P128C) SENT Intenal Error Fault Pending (P126E) Fuel Temperature Sensor SENT Message Error Fault Pending (P128C)	50.00 failures out of 62.00 samples 100 ms per Sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT Fuel Rail Temperature Sensor 1 Circuit High Fault	P0183	This DTC diagnose SENT fuel rail temperature sensor 1 that is too high out of range. If the sensor digital value (represnting the refernce voltage) is above the upper digital threshold, the high fail counter then increments. If the high fail counter reaches its threshold then a fail is reported. A pass is reported for this DTC if the high sample counter reaches its threshold.	Fuel Temperature Sensor 1 SENT digital read value	> 1,865	Fuel Temperature Out of Range Diagnoistic Enabled No Fault Active on No Fault Pending	True Enabled when a code clear is not active or not exiting device control SENT Communication Fault Active (P16E4, P16E5) SENT Intenal Error Fault Active (P126E) Fuel Temperature Sensor SENT Message Error Fault Active (P128C) SENT Intenal Error Fault Pending (P126E) Fuel Temperature Sensor SENT Message Error Fault Pending (P128C)	50.00 failures out of 62.00 samples 100 ms per Sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT Fuel Rail Temperature Sensor 2 Circuit Low Fault	P0187	This DTC diagnose SENT fuel rail temperature sensor 2 that is too low out of range. If the sensor digital value (represnting the refernce voltage) is below the lower digital read threshold, the low fail counter then increments. If the low fail counter reaches its threshold then a fail is reported. A pass is reported for this DTC if the low sample counter reaches its threshold.	Fuel Temperature Sensor 1 SENT digital read value	< 145.00	Fuel Temperature Out of Range Diagnoistic Enabled No Fault Active on No Fault Pending	True Enabled when a code clear is not active or not exiting device control SENT Communication Fault Active (P16E4, P16E5) SENT Intenal Error Fault Active (P126F) Fuel Temperature Sensor SENT Message Error Fault Active (P128D) SENT Intenal Error Fault Pending (P126F) Fuel Temperature Sensor SENT Message Error Fault Pending (P128D)	50.00 failures out of 62.00 samples 100 ms per Sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT Fuel Rail Temperature Sensor 2 Circuit High Fault	P0188	This DTC diagnose SENT fuel rail temperature sensor 2 that is too high out of range. If the sensor digital value (represnting the refernce voltage) is above the upper digital read threshold, the high fail counter then increments. If the high fail counter reaches its threshold then a fail is reported. A pass is reported for this DTC if the high sample counter reaches its threshold.	Fuel Temperature Sensor 1 SENT digital read value	> 1,865.00	Fuel Temperature Out of Range Diagnoistic Enabled No Fault Active on No Fault Pending	True Enabled when a code clear is not active or not exiting device control SENT Communication Fault Active (P16E4, P16E5) SENT Intenal Error Fault Active (P126F) Fuel Temperature Sensor SENT Message Error Fault Active (P128D) SENT Intenal Error Fault Pending (P126F) Fuel Temperature Sensor SENT Message Error Fault Pending (P128D)	50.00 failures out of 62.00 samples 100 ms per Sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Sensor "B" Circuit Range/ Performance	P018B	This DTC detects a fuel pressure sensor response stuck within the normal operating range using an intrusive test (as follows) a] Intrusive Test Trigger: 1] Fuel Pump Duty Cycle Clamped Time (min or max duty cycle) >= 5 sec Or 2] Fuel Pres Err Variance <= calibration value KeFRPD_cmp_FPSS_MinPres Variance (typically 0.3 to 0.6); Otherwise, Report status as Pass b] Intrusive test freq limit: 60 sec between intrusive tests that pass, c] Intrusive test Fuel Flow limit: Fuel Flow Actual < Max allowed Fuel Flow rate	Absolute value of fuel pressure change (as sensed during intrusive test)	<= 30 kPa	a] Diagnostic Enabled b] Engine Run Time c] Engine Fuel Flow d] Fuel Pump Control Enabled e] Fuel Pump Control State f] Emissions Fuel Level Low g] Validity status VeFRPD_b_FPSS_DataIntegrityOK IF [1] FRP Circuit Low Fault Active (DTC P018C) [2] FRP Circuit High Fault Active (DTC P018D) [3] Fuel Pump Circuit Low Fault Active (DTC P0231) [4] Fuel Pump Circuit High Fault Active (DTC P0232) [5] Fuel Pump Circuit Open Fault Active (DTC P023F) [6] Reference Voltage Fault Status (DTC P0641) [7] Fuel Pump Control Module Driver Over-temperature Fault Active (DTC P1255) [8] Fuel Pump Driver Mod	a] == TRUE b] >= 5.00 sec c] > 0.05 g / sec d] == TRUE e] Normal OR Fuel Pres Sensor Stuck Ctrl (rationality) f] <> True g] == TRUE IF [1] <> True [2] <> True [3] <> True [4] <> True [5] <> True [6] <> Active This Key [7] <> True [8] <> True	1 sample / 12.5 millisec Intrusive Test Duration: Fuel Flow - related (5 to 12 sec)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Ign Sw RunStart Pstn Ckt Low Fault Active (DTC P129D) [9] Fuel Pump Driver Control Mod Enable Ckt Perf Fault Active(DTC P12A6)	[9] <> True		

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	Fuel Pressure Sensor Voltage Percent, 5.0V Nominal ((Abs(5.0V - SensorV_actual) /5.0V) *100)	< 4.00 % or [0 kPa ga]	Ignition circuit input state	High (Run or Crank)	64 failures / 80 samples 1 sample/12.5 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Sensor "B" Circuit High	P018D	This DTC detects if the fuel pressure sensor circuit is shorted high	Fuel Pressure Sensor Voltage Percent, 5.0V Nominal ((Abs(5.0V - SensorV_actual) /5.0V) *100)	> 96.00 % or [743 kPa ga]	Ignition circuit input state	High (Run or Crank)	64 failures / 80 samples 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.
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.	Primary sensor (P1) vs. Secondary sensor (P2) performance rationality **(**(Low Limit fail Filtered Fuel Control Error) OR (High Limit Fail: Filtered Fuel Control Error)**)** AND (FIltered Absolute delta between sensor1 and sensor2	<= **P0191 - Low fail limit of fuel control due to pressure sensor skewed low** (See supporting table) >= **P0191 - High fail limit of fuel control due to high pressure sensor skewed High** (see Supporting table) >= 1.00 mpa Note: fuel control error is calcuated based on the squreroot of senor1 divided by sensor2, this value is filter to ensure proper failure detection. Absolute delta between sensor1 and sensor2 value is filter to ensure proper failure detection.	Commanded Pressure rate of change (increasing or dercresing) for a period of time	< 0.70 mpa >= 1.25 seconds Enabled when a code clear is not active or not exiting device control	Filter Fuel Control Error term and Absolute delta between sensor1 and sensor2 exceed Low or High Fail limit for a duration >= 1.50 seconds This is diagnostic runs Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT Fuel Rail Pressure Sensor 1 Out of Range	P0192	This DTC diagnose SENT high pressure sensor 1 that is too low out of range. If the sensor digital value (represnting the refernce voltage) is below the lower digital threshold, the low fail counter then increments. If the low fail counter reaches its threshold then a fail is reported. A pass is reported for this DTC if the low sample counter reaches its threshold.	High Pressure Rail Sensor 1 SENT digital read value	=< 94			Time Based: 400 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.
Injector 1 Open Circuit - (SIDI)	P0201	Controller specific output driver circuit diagnoses Injector 1 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. Or Controller specific output driver circuit diagnoses Injector 1 high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. Or Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground >= 200 KOhms impedance between signal and controller ground	Battery Voltage Engine Running	>= 11 Volts >= 1 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
TPS2 Circuit Low	P0222	Detects a continuous or intermittent short low or open in TPS2 circuit by monitoring the TPS 2 sensor percent Vref and failing the diagnostic when the TPS percent Vref is too low. This diagnostic only runs when battery voltage is high enough.	TPS2 % Vref <	0.250 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P06A3	79 / 159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 >	4.590 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P06A3	79 / 159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Secondary Circuit Low [FPPM applications only]	P0231	This DTC detects if the fuel pump control circuit is shorted to low. Per "smart device" design guidelines, Fuel Pump Power Driver device reports a Faulted state enumeration if current >= 18A [25A for high performance variants. FPDCM reports Not Faulted enumeration if current < 18A FPDCM reports Indeterminate state enumeration if the circuit is not being evaluated during current decision loop due to other conditions.	Power driver output current (Fuel Pump Power Module Driver Circuit Ground Short enumeration)	Current >= 18.0 A	a) Chassis Fuel Pres Sys Type configuration selection b) Diagnostic Enabled c) Fuel Pump Control Enable command d) Fuel Pump Control Enable time [FAFR FPPM GshtDlyThr] e) System Voltage f] FPDCM Driver Status Alive Rolling Count Sample Faulted g] Diagnostic feedback received	a) == FCBR Gas ECM FPPM Sys b) == TRUE c) == TRUE d) >= 40.00 seconds e) > 7.00 Volts f] <> TRUE g] == TRUE	64.00 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 Secondary Circuit High [FPPM applications only]	P0232	This DTC detects if the fuel pump control circuit is shorted to high voltage by measuring voltage offset relative to low state level of duty cycle pulse. Per "smart device" design guidelines, Fuel Pump Power device reports a Faulted state enumeration if circuit voltage >= 4V. FPPM reports Not Faulted enumeration if circuit voltage < 4V. FPPM reports Indeterminate state enumeration if the circuit is not being evaluated during current decision loop due to other conditions.	Voltage offset relative to low state level of duty cycle pulse measured at fuel pump circuit	> 4.0 V	a) Chassis Fuel Pres Sys Type configuration selection b) Diagnostic Enabled c) Diagnostic System Disabled d) Fuel Pump Control Enabled e] Arbitrated Fuel Pump Duty Cycle Rate of Change [FCBR] f] System voltage g] FPPM Driver Status Alive Rolling Count Sample Faulted h] Diagnostic serial data received	a) == FCBR Gas ECM FPPM Sys b) == TRUE c) <> True d) == TRUE e] >= -100.0 % / sec f] > 7.0 volts g] <> True h] == TRUE	64 failures / 80 samples 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.
Turbo/Super Charger Engine Overboost Turbocharger with wastegate. Not supercharger with mechanical compressor	P0234	This DTC indicates an over boost failure. Two failure paths are considered. When pressure control closed loop control being active, a negative boost pressure deviation indicates overboost conditions at constant driving conditions. In case boost pressure close loop control not being active and with desired boost pressure below basic boost pressure, overboost conditions can be detected when actual boost pressure is higher than basic boost pressure plus a diagnostic offset.	Desired boost pressure - Actual boost pressure	< refer to **P0234: Overboost pressure deviation limit as a function of engine speed and desired boost pressure** - **P0234 P0299: Ambient pressure correction as a function of engine speed and ambient pressure** in Supporting tables.	Dev. diagnostic enable ********** Coolant temperature or OBD Coolant enable criteria and Coolant temperature Intake air temperature is in range Ambient air pressure is in range Engine speed in range Desired boost pressure in range Desired boost pressure derivative in range ********** All conditions have to be fullfilled for: ********** No active DTCs: ********** Pressure control has to be in closed loop.	True ********** > -40.0 °C = TRUE < 126.0 °C > -40.0 °C < 80.0 °C > 60.0 kPa < 120.0 kPa > 2,000 rpm < 6,500 rpm > 100.0 kPa < 280.0 kPa > -70.0 kPa/s < 55.0 kPa/s ********** > refer to **P0234 P0299: Boost deviation diagnostic enable delay as a function of engine speed** in Supporting tables. ********** BSTR_b_PCA_CktFA BSTR_b_TurboBypassCktFA ECT_Sensor_FA IAT_SensorFA BSTR_b_BoostSnsrFA AmbientAirDefault **********	24 failures out of 30 samples 100ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No device control active for WG and compresseor recirculation valve.			
			Actual boost pressure	> refer to **P0234: Overboost pressure limit below basic pressure as a function of engine speed and ambient pressure** in Supporting tables. +Basic Pressure	Basic pressure diag enable and Dev. diagnostic enable ********** Coolant temperature or OBD Coolant enable criteria and Coolant temperature Intake air temperature is in range Ambient air pressure is in range Engine speed in range All conditions haveto be fullfilled for: ********** No active DTCs: ********** Pressure control has to be in open loop.	False True ********** > -40.0 °C = TRUE < 126.0 °C > -40.0 °C < 80.0 °C > 60.0 kPa < 120.0 kPa > 2,000 rpm < 3,500 rpm > 2.00 Seconds ********** BSTR_b_PCA_CktFA BSTR_b_TurboBypassCktFA ECT_Sensor_FA IAT_SensorFA BSTR_b_BoostSnsrFA AmbientAirDefault BSTR_b_PCA_TFTKO **********	20 failures out of 25 samples 100ms / sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No device control active for WG and compresseor recirculation valve.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger Boost Pressure (TIAP) Sensor Performance (single turbo)	P0236	Detects a performance failure in the Turbocharger Boost Pressure sensor, such as when a Turbocharger Boost Pressure value is stuck in range. If the engine has been off for a sufficient amount of time, the pressure values in the induction system will have equalized. The Turbocharger Boost Pressure sensor value is checked to see if it is within the normal expected atmospheric pressure range. If it is not, then the Turbocharger Boost Pressure performance diagnostic will fail. If the Turbocharger Boost Pressure sensor value is within the normal expected atmospheric range, then Manifold Pressure (MAP), Turbocharger Boost Pressure and Barometric Pressure (BARO) are compared to see if their values are similar. If the MAP and BARO sensor values are similar, but the Turbocharger Boost Pressure value is not	**Engine Running:** See table **P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix** for combinations of model failures that can set this DTC. MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered MAP1 model fails when ABS(Measured MAP – MAP Model 1) Filtered MAP2 model fails when ABS(Measured MAP – MAP Model 2) Filtered MAP3 model fails when ABS(Measured MAP – MAP Model 3) Filtered TIAP1 model fails when ABS(Measured TIAP - TIAP Model 1) Filtered TPS model fails when Filtered Throttle Model Error TIAP Correlation model fails when High Engine Air Flow is TRUE AND Measured TIAP -	 > 20.0 grams/sec > 25.0 kPa > 23.0 kPa > 24.0 kPa > 30.0 kPa > 225 kPa*(g/s)	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria (Coolant Temp OR OBD Max Coolant Achieved Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables.	>= 400 RPM <= 6,100 RPM >= -9 Deg C = TRUE) <= 125 Deg C = FALSE) >= -20 Deg C <= 125 Deg C >= 0.50 Modeled Air Flow Error multiplied by **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM** and **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est** MAP Model 1 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM** MAP Model 2 Error	Continuous Calculation are performed every 12.5 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		similar, then a Turbocharger Boost Pressure performance diagnostic will fail. The engine running portion of this diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from other sensors. The other sensors are the Mass Air Flow (MAF) sensor, Manifold Pressure (MAP) sensor and Throttle Position sensor (TPS). These modeled values are compared against the actual sensor values to see if they are similar. If they are similar, then the model passes. If they are not similar, then that model is considered to be failed. Certain combinations of model passes and model failures can be interpreted to be caused by a performance issue with the Turbocharger Boost Pressure sensor. In this case, the Turbocharger Boost Pressure Performance	measured MAP - offset as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Offset** OR Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Offset** TIAP Correlation is valid when High Engine Air Flow has been TRUE for a period of time OR Low Engine Air Flow has been TRUE for a period of time High Engine Air Flow is TRUE when Mass Air Flow	> 30.0 kPa > 30.0 kPa > 0.8 seconds > 0.8 seconds > a threshold in gm/sec as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min Air Flow**	No Active DTCs: No Pending DTCs:	multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** MAP Model 3 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP3 Residual Weight Factor based on RPM** TIAP Model 1 Error multiplied by **P0101, P0106, P0121, P0236, P1101: TIAP Residual Weight Factor based on RPM** Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTempSensorFA TC_BoostPresSnsrCktFA AmbientAirDefault EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP MnfdTempSensorCktFP		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		diagnostic will fail.	AND Manifold Pressure AND Filtered Mass Air Flow - Mass Air Flow Low Engine Air Flow is TRUE when Mass Air Flow AND Manifold Pressure AND Mass Air Flow - Filtered Mass Air Flow	> a threshold in kPa as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min MAP** < 1.3 gm/sec < a threshold in gm/ sec as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max Air Flow** < a threshold in kPa as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max MAP** < 2.0 gm/sec				
			Engine Not Rotating: Turbocharger Boost Pressure OR Turbocharger Boost	< 50.0 kPa	Time between current ignition cycle and the last time the engine was running Engine is not rotating	> 10.0 seconds	4 failures out of 5 samples 1 sample every 12.5 msec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Pressure OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure) AND ABS(Turbocharger Boost Pressure - Baro Pressure)	> 115.0 kPa <= 10.0 kPa > 10.0 kPa > 10.0 kPa	No Active DTCs: No Pending DTCs:	EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA AAP2_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger Boost Pressure Sensor Circuit Low (Gen III)	P0237	Detects a continuous short to ground in the Turbocharger Boost Pressure signal circuit by monitoring the Turbocharger Boost Pressure sensor output voltage and failing the diagnostic when the Turbocharger Boost Pressure voltage is too low. The Turbocharger Boost Pressure sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	Turbocharger Boost Pressure Voltage	< 14.4 % of 5 Volt Range (This is equal to 50.0 kPa)			320 failures out of 400 samples 1 sample every 12.5 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger Boost Pressure Sensor Circuit High (Gen III)	P0238	Detects a continuous short to power or open circuit in the Turbocharger Boost Pressure signal circuit by monitoring the Turbocharger Boost Pressure sensor output voltage and failing the diagnostic when the Turbocharger Boost Pressure voltage is too high. The Turbocharger Boost Pressure sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	Turbocharger Boost Pressure Voltage	> 86.0 % of 5 Volt Range (This is equal to 372.0 kPa)			320 failures out of 400 samples 1 sample every 12.5 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Secondary Circuit Open [FPPM applications only]	P023F	This DTC detects if the fuel pump control circuit is open Per "smart device" design guidelines, Fuel Pump Power device reports a Faulted state enumeration if current <= 1A . FPPM reports Not Faulted enumeration if current > 1A. FPPM reports Indeterminate state enumeration if the circuit is not being evaluated during current decision loop due to other conditions.	Output driver current (Fuel Pump Power Module Driver Circuit Open enumeration)	Current <= 1.0 A	a) Chassis Fuel Pres Sys Type configuration selection b) Diagnostic Enabled c) Arbitrated Fuel Pump Duty Cycle (%) d] Fuel Pump Control Enable Faulted e] FPPM Fuel Pmp Driver Over-temperature Faulted f] FPPM Driver Status Alive Rolling Count Sample Faulted g] Diagnostic feedback received h] System Voltage	a) == FCBR Gas ECM FPPM Sys b) == TRUE c) > 48.48 % d] <> TRUE e] <> TRUE f] <> TRUE g] == TRUE h] > 11.00 Volts	40 failures / 80 samples 1 sample/12.5ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger Wastegate / Supercharger Boost Solenoid A Control Circuit	P0243	Controller specific output driver circuit diagnostic, diagnosing the 'turbocharger boost solenoid'A' actuator' low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In a parallel application, turbocharger 'A' is associated with engine bank 1.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	≥ 200 K Ω impedance between output and controller ground	Diagnostic enabled ********** Powertrain relay voltage Ignition run crank voltage ********** Engine does not crank Diagnostic system not disabled	True ********** >= 11.0 Volts > 5.00 Volts **********	10 failures out of 20 samples 100ms / sample	Type A, 1 Trips Note: In certain controllers P0245 may also set turbocharger wastegate / supercharger boost solenoid A control circuit low

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger Wastegate / Supercharger Boost Solenoid A Control Circuit Low	P0245	Controller specific output driver circuit diagnostic, diagnosing the 'turbocharger boost solenoid 'A' actuator' low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In a parallel application, turbocharger 'A'is associated with engine bank 1.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. In certain controllers this diagnosis runs only when the HWIO-output is driven by the application S/W.	≤ 0.5 Ω impedance between output and controller ground	Diagnostic enabled ********** Powertrain relay voltage Ignition run crank voltage ********** Engine does not crank Diagnostic system not disabled	True ********** >= 11.0 Volts > 5.00 Volts **********	10 failures out of 20 samples 100ms / sample	Type A, 1 Trips Note: In certain controllers P0243 may also set turbocharger wastegate / supercharger boost solenoid A control circuit

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger Wastegate / Supercharger Boost Solenoid A Control Circuit High	P0246	Controller specific output driver circuit diagnostic, diagnosing the 'turbocharger boost solenoid 'A' actuator' low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds. In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In a parallel application, turbocharger 'A'is associated with engine bank 1.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. In certain controllers this diagnosis runs only when the HWIO-output is driven by the application S/W.	≤ 0.5 Ω impedance between output and controller power	Diagnostic enabled ********** Powertrain relay voltage Ignition run crank voltage ********** Engine does not crank Diagnostic system not disabled	True ********** >= 11.0 Volts > 5.00 Volts **********	10 failures out of 20 samples 100ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 Low side circuit shorted to ground (SIDI)	P0261	Controller specific output driver circuit diagnoses Injector 1 low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	 <= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 1 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 Low side circuit shorted to power (SIDI)	P0262	Controller specific output driver circuit diagnoses Injector 1 low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 1 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 Low side circuit shorted to ground (SIDI)	P0264	Controller specific output driver circuit diagnoses Injector 2 low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	 <= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 1 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 Low side circuit shorted to power (SIDI)	P0265	Controller specific output driver circuit diagnoses Injector 2 low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 1 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 Low side circuit shorted to ground (SIDI)	P0267	Controller specific output driver circuit diagnoses Injector 3 low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	 <= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 1 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 Low side circuit shorted to power (SIDI)	P0268	Controller specific output driver circuit diagnoses Injector 3 low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 1 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 4 Low side circuit shorted to ground (SIDI)	P0270	Controller specific output driver circuit diagnoses Injector 4 low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	 <= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 1 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 4 Low side circuit shorted to power (SIDI)	P0271	Controller specific output driver circuit diagnoses Injector 4 low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 1 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbo/Super Charger Engine Underboost Turbocharger with wastegate. Not supercharger with mechanical compressor	P0299	This DTC indicates an under boost failure. Two failure paths are considered. At steady state engine operating conditions with boost pressure closed loop control being active, a positive boost pressure deviation indicates underboost conditions. During transient conditions, in case the boost pressure increase gradient is below a diagnostic threshold, underboost conditions will be detected.	Desired boost pressure - Actual boost pressure	<refr to **P0299: Underboost pressure deviation limit as a function of engine speed and desired boost pressure** + **P0234 P0299: Ambient pressure correction as a function of engine speed and ambient pressure** in Supporting tables.	Dev. Diagnostic enable ********** Coolant temperature or OBD Coolant Enable Criteria and Coolant temperature Intake air temperature is in range Ambient air pressure is in range Engine speed in range Desired boost pressure in range Desired boost pressure derivative in range ********** All conditions haveto be fullfilled for: ********** No active DTCs: ********** Pressure control has to be in closed loop.	True ********** > -40.0 °C = TRUE) < 126.0 °C > -40.0 °C < 80.0 °C > 60.0 kPa < 120.0 kPa > 2,000 rpm < 6,500 rpm > 100.0 kPa < 280.0 kPa > -70.0 kPa/s < 55.0 kPa/s ********** >refer to **P0234 P0299: Boost deviation diagnostic enable delay as a function of engine speed** in Supporting tables. ********** BSTR_b_PCA_CktFA BSTR_b_TurboBypassCktFA ECT_Sensor_FA IAT_SensorFA BSTR_b_BoostSnsrFA AmbientAirDefault **********	24 failures out of 30 samples 100ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No device control active for WG and compresseor recirculation valve.			
			Actual boost pressure delta the delta is limited by these tables: refer to Max: **P0299: Underboost high rate limit as a function of engine speed** Min: **P0299: Underboost low rate limit as a function of engine speed** in supporting tables.	< 15.00	Rate base diagostic enable and Dev. Diagnostic enable ********** Coolant temperature or OBD Coolant enable criteria and Coolant temperature Intake air temperature is in range Ambient air pressure is in range Desired boost pressure in range Desired boost pressure derivative in hysteresis range Engine speed is in range ********** All conditions have to be fullfilled for: ********** No active DTCs:	False True ********** > -40.0 °C = TRUE) < 126.0 °C > -40.0 °C < 80.0 °C > 60.0 kPa < 120.0 kPa > 100.0 kPa < 280.0 kPa Enable Limit: 20.0 Disable Limit: -20.0 > 2,000 rpm < 3,500 rpm ********** > 0.20 Seconds ********** BSTR_b_PCA_CktFA BSTR_b_TurboBypassCktFA ECT_Sensor_FA IAT_SensorFA BSTR_b_BoostSnsrFA	20 failures out of 25 samples 100ms / sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					********** Pressure control has to be in closed loop. No device control active for WG and compresseor recirculation valve.	AmbientAirDefault **********		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Random Misfire Detected Cylinder 1 Misfire Detected Cylinder 2 Misfire Detected Cylinder 3 Misfire Detected Cylinder 4 Misfire Detected	P0300 P0301 P0302 P0303 P0304	These DTC's will determine if a random or a cylinder specific misfire is occurring by monitoring various terms derived from crankshaft velocity. The rate of misfire over an interval is compared to both emissions and catalyst damaging thresholds. The pattern of crankshaft acceleration after the misfire is checked to differentiate between real misfire and other sources of crank shaft noise. Emissions Neutral Default Action: If consumed Emissions Neutral Default DTCs from other subsystems are set: Ignore Rough Road, Traction, Stability, and Antilock brake signals. If default action not activated, Misfire Monitor could complete less frequently or inaccurately. Default Action Latched for duration of Trip Default Action: If Misfire P030x sets on some hybrid applications, the isolation damper	Crankshaft Deceleration Value(s) vs. Engine Speed and Engine load The equation used to calculate deceleration value is tailored to specific vehicle operating conditions. The selection of the equation used is based on the 1st single cylinder continuous misfire threshold tables encountered that are not max of range. If all tables are max of range at a given speed/load, that speed load region is an ***Undetectable region*** see Algorithm Description Document for additional details. SINGLE CYLINDER CONTINUOUS MISFIRE((Medres_Decel Medres_Jerk OR (Medres_Decel Medres_Jerk OR (Lores_Decel Lores_Jerk OR (Lores_Decel Lores_Jerk OR RevBalanceTime)	- see details of thresholds on Supporting Tables Tab > **RufSCD_Decel** AND > **RufSCD_Jerk)** > **SCD_Decel** AND > **SCD_Jerk)** > **RufCyl_Decel** AND > **RufCyl_Jerk)** > **CylModeDecel** AND > **CylModeJerk)** >**RevMode_Decel**	Engine Run Time Engine Coolant Temp Or If ECT at startup Then System Voltage + Throttle delta - Throttle delta Early Termination option: (used on plug ins that may not have enough engine run time at end of trip for normal interval to complete.)	> 2 crankshaft revolution "ECT" If OBD Max Coolant Achieved = FALSE -10 ºC < ECT Or if OBD Max Coolant Achieved = TRUE -10 ºC < ECT < 127 ºC < -10 ºC If OBD Max Coolant Achieved = FALSE 21 ºC < ECT If OBD Max Coolant Achieved = TRUE 21 ºC < ECT < 127 ºC 9.00 < volts < 32.00 < 60.00 % per 25 ms < 60.00 % per 25 ms Not Enabled	Emission Exceedence = any (5) failed 200 rev blocks out of (16) 200 rev block tests Failure reported for (1) Exceedence in 1st (16) 200 rev block tests, or (4) Exceedences thereafter. OR when Early Termination Reporting = Enabled and engine rev > 1,000 revs and < 3,200 revs at end of trip	Type B, 2 Trips (Mil Flashes with Catalyst damage level of Misfire)

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			OR (Revmode Active AND (within one engine cycle: 2nd largest Lores_Decel) AND Above TRUE for))	> **CylModeDecel * PairCylModeDecel** > 35 engine cycles out of 100 engine cycles				
			BANK MISFIRE Cylinders above Bank Thresholds (Medres_Decel AND Medres_Jerk)	>= 3 cylinders > **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	> **RufSCD_Decel** * **ConsecSCD_Decel**				
			AND Medres_Jerk)	> **RufSCD_Jerk** * **ConsecSCD_Jerk**				
			OR (Medres_Decel	> **SCD_Decel** * **ConsecSCD_Decel**				
			AND Medres_Jerk)	> **SCD_Jerk** * **ConsecSCD_Jerk**				
			OR (Lores_Decel	> **RufCyl_Decel** * **ConsecCylModDecel**				
			AND Lores_Jerk)	> **RufCyl_Jerk** * **ConsecCylModeJerk**				
			OR (Lores_Decel	> **CylModeDecel** * **ConsecCylModDecel**				
			AND Lores_Jerk)	> **CylModeJerk** * **ConsecCylModeJerk**				
			CYLINDER DEACTIVATION MODE (Active Fuel Managment)					

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Misfire Percent Emission Failure Threshold	≥ 3.00 % P0300				
			Misfire Percent Catalyst Damage	> **Catalyst_Damage_Misfire_Percentage** in Supporting Tables whenever secondary conditions are met.				
			When engine speed and load are less than the FTP cals (3) catalyst damage exceedences are allowed.	≤ 1,350 FTP rpm AND ≤ 20 FTP % load	(at low speed/loads, one cylinder may not cause cat damage) Engine Speed Engine Load Misfire counts	 > 1,400 rpm AND > 15 % load AND < 180 counts on one cylinder		
					Engine Speed	665 < rpm < ((Engine Over Speed Limit) - 400) OR 8,191) Engine speed limit is a function of inputs like Gear and temperature	4 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						see **EngineOverSpeedLimit** in supporting tables		
					No active DTCs:	TPS_FA EnginePowerLimited MAF_SensorTFTKO MAP_SensorTFTKO IAT_SensorTFTKO ECT_Sensor_Ckt_TFTKO 5VoltReferenceB_FA CrankSensor_TFTKO CrankSensor_FA CamLctnIntFA CamLctnExhFA CamSensorAnyLctnTFTKO AnyCamPhaser_FA AnyCamPhaser_TFTKO AmbPresDfltdStatus	4 cycle delay	
					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	***Undetectable region***	4 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					speed and engine load region	from Malfunction Criteria		
					Abusive Engine Over Speed	> 7,000 rpm	0 cycle delay	
					Below zero torque (except CARB approved 3000 rpm to redline triangle.)	< **ZeroTorqueEngLoad** or <**ZeroTorqueAFM** if AFM is active in Supporting Tables	4 cycle delay	
					Below zero torque: TPS Vehicle Speed	≤ 1.4 % (≤ 1.4 % in AFM) > 19 mph (> 19 mph AFM)	4 cycle delay	
					NEGATIVE TORQ AFM If deactivated cylinders appear to make power, torque is negative: DeactivatedCyl_Decel AND DeactivatedCyl_Jerk AND # of Deact Cyls Inverted	 <**DeacCylInversionDecel** <**DeacCylInversionJerk** > 4 cylinders	 0 cycle delay	
					EGR Intrusive test	if Active	0 cycle delay	
					Manual Trans	Clutch shift	4 cycle delay	
					Accel Pedal Position AND Automatic transmission shift	> 98.00 %	7 cycle delay	
					After Fuel resumes on Automatic shift containing Fuel Cut		2 Cylinder delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Delay if PTO engaged	Enabled	4 cycle delay	
					********** **This Feature not used on Gasoline engines**	**********	**********	
					Combustion Mode	= **InfrequentRegen** value in Supporting Tables	0 cycle delay	
					Driver cranks before Wait to Start lamp extinguishes	IF TRUE	**WaitToStart** cycle delay	
					Brake Torque	> 199.99 % Max Torque	0 cycle delay	
					**********	**********	**********	
					DRIVELINE RING FILTER After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.			
					Filter Driveline ring:	> "**Ring Filter**" # of engine cycles after misfire in Supporting Tables		
					Stop filter early:	> "**Number of Normals**" # of engine cycles after misfire in Supporting Tables tab		
					ABNORMAL ENGINE SPEED OSCILLATION: (checks each "misfire" candidate in 100 engine			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Cycle test to see if it looks like some disturbance like rough road (abnormal).)			
					Used Off Idle, and while not shifting,			
					TPS	> 3 %		
					Engine Speed	> 1,000 rpm		
					Veh Speed	> 3 mph		
					Auto Transmission	not shifting		
					indivdual candidate deemed abnormal if number of consecutive decelerating cylinders after "misfire": (Number of decels can vary with misfire detection equation)			
					Consecutive decels while in SCD Mode	> **Abnormal SCD Mode**		
					Cyl Mode	> **Abnormal Cyl Mode**		
					Rev Mode	> **Abnormal Rev Mode** in Supporting Tables		
					At the end of 100 engine cycle test, the ratio of abnormal/candidate is checked to confirm if real misfire is present within the 100 engine cycles.			
					abnormal candidates/ total candidates	> 0.50 ratio	discard 100 engine cycle test	
					MISFIRE CRANKSHAFT			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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. Typically used for checking a single misfire per engine cycle but can support some other patterns on some packages			
					Pattern Recog Enabled:	Enabled		
					Pattern Recog Enabled during Cylinder Deac	Not Enabled		
					Pattern Recog Enabled consecutive cyl pattrn	Enabled		
					Engine Speed	900 < rpm < 6,100		
					Veh Speed	> 1.6 mph		
					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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					thresholds in effect at that speed and load.			
					(CylAfter_Accel AND	> Misfire_ decel ***** **1st_FireAftrMisfr_Acel**		
					CylAfter_Jerk)	> Misfire_Jerk ***** **1st_FireAftrMisfr_Jerk** Or if AFM mode is active: > Misfire_ decel * **1stFireAftrMisAcelAFM** > Misfire_Jerk * **1stFireAfterMisJerkAFM**		
					Addtionally, the crankhaft is checked again a small calibratible number of cylinders later to see if the distrubance is still large like rough road, or has calmed down like real misfire. The size of disturbance is compared to a multiplier times the ddt_jerk value used to detect misfire at that speed and load. If there is repetitive misfire on consecutive engine cycles, the expected snap is adjusted due to the higher expected disturbance.			
					Num of Cylinders after misfire to start check of crankshaft snap	2 Cylinders		
					"misfire" recognized if: Crankshaft snap after: isolated "misfire"	< Misfire_Jerk ***** **SnapDecayAfterMisfire**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					repetative "misfire"	< Misfire_Jerk * **SnapDecayAfterMisfire * RepetSnapDecayAdjst** in Supporting Tables		
					At the end of 100 engine cycle test, the ratio of unrecog/recognized is checked to confirm if real misfire is present.			
					Ratio of Unrecog/Recog	> 0.60	discard 100 engine cycle test	
					**********	**********	**********	
					NON-CRANKSHAFT BASED ROUGH ROAD:	Disabled		
					Rough Road Source	CeRRDR_e_None		
					**********	**********	**********	
					IF Rough Road Source = WheelSpeedInECM ABS/TCS Wheel speed noise VSES	active > **WSSRoughRoadThres** active	discard 100 engine cycle test	
					AND No Emission Neutral Default Action DTCs	ABS Failed Vehicle Dynamics Control System Status Driven Wheel Rotation Status Non Driven Wheel Rotation Status		
					**********	**********	**********	
					IF Rough Road Source = "FromABS" ABS/TCS	active	discard 100	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					RoughRoad VSES AND No Emission Neutral Default Action DTCs ********** IF Rough Road Source = "TOSS" TOSS dispersion AND No Active DTCs ********** Default Action Isolator Resonance Default Action Option ********** If Isolator Resonance Option Enabled AND Misfire P030x TFTKO	detected active ABS Failed Vehicle Dynamics Control System Status ********** >**TOSSRoughRoadThres** in supporting tables Transmission Output Shaft Angular Velocity Validity TransmissionEngagedStat e_FA (Auto Trans only) ClutchPstnSnsr FA (Manual Trans only) ********** Not Enabled ********** Set engine speed limits: 0 < Eng RPM < 9,000	engine cycle test ********** discard 100 engine cycle test 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°.	The Crankshaft target wheel should be 360 degrees around in circumferance. Loss or controller non-volitile memory or an error in memory will cause the values of individual teeth learn to be defaulted or incorrect. Set the DTC if the Differance between the sum of the reluctor wheel's teeth and 360 degrees is greater than:	> 0.001 degrees	OBD Manufacturer Enable Counter	MEC = 0	0.50 seconds Frequency Continuous100 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle)	Yes ≥ 2.0 seconds ≥ 580 RPM AND ≤ 8,500 RPM ≥ 40 mg/cylinder AND ≤ 2,000 mg/cylinder ≥ -40 deg's C = TRUE ≥ -40 deg's C ≥ 158 revs	First Order Lag Filters with Weight Coefficient = 0.0257 Updated each engine event	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Knock Sensor (KS) Circuit Bank 1	P0325	This diagnostic checks for an open in the knock sensor circuit Sensor 1/Bank 1. There are two possible methods used: 1. **20 kHz Method**: This method injects a 20 kHz signal (internal to the ECU) onto one of the Knock Sensor inputs. For a normal/ good circuit the 20 kHz signal will propogate through the Knock sensor and back to the ECU through the sensor return circuit. The 20 kHz signal is processed through the Fast Fourier Transform (FFT) and then filtered with a first-order lag filter. Since the Knock Detection algorithm uses a Differential Op-Amp to compare the input from the two knock sensor wires, the FFT 20 kHz diagnostic signal will have either: A. Low output with a good circuit (because the 20 kHz injected signal is detected on both of the sensor inputs) or B, High output for an Open Circuit (because	Open Circuit Method chosen (2 possible methods: 20 kHz or Normal Noise): Filtered FFT Output Filtered FFT Output	= **P0325_P0330_OpenMethod_2** **<u>Case 1 (20 kHz Method):</u>** **>** **P0325_P0330_OpenCktThrshMin (20 kHz)** **AND** **<** **P0325_P0330_OpenCktThrshMax (20 kHz)** **<u>Case 2 (Normal Noise Method):</u>** **>** **P0325_P0330_OpenCktThrshMin (Normal Noise)** **AND** **<** **P0325_P0330_OpenCktThrshMax (Normal Noise)**	Diagnostic Enabled? Engine Run Time Engine Speed Cumulative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above) Engine Air Flow Engine Coolant Temperature or OBD Coolant Enable Criteria Inlet Air Temperature	Yes ≥ 2.0 seconds ≥ 400 RPM and ≤ 8,500 RPM ≥ 200 revs ≥ 20 mg/cylinder and ≤ 2,000 mg/cylinder ≥ -40 deg's C = TRUE ≥ -40 deg's C	First Order Lag Filter with Weight Coefficient Weight Coefficient = 0.0100 Updated each engine event	Type A, 1 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.	Filtered FFT Intensity (where 'FFT Intensity' = Non-knocking, background engine noise for a selected frequency) OR Filtered FFT Intensity	**Case 1: Engine not in AFM mode** **P0326_P0331_AbnormalNoise_Threshold** (Supporting Table) **Case 2: Engine is in AFM mode** **P0326_P0331_AbnormalNoise_Thresh_AFM** (Supporting Table; Engine is in AFM mode)	Diagnostic Enabled? Engine Run Time Engine Speed Engine Air Flow Engine Coolant Temperature or OBD Coolant Enable Criteria Inlet Air Temperature Individual Cylinders enabled for Abnormal Noise Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle)	Yes ≥ 2.0 seconds ≥ 2,000 RPM (not in AFM mode) OR ≥ 2,000 (in AFM mode) AND ≤ 8,500 RPM ≥ 30 mg/cylinder AND ≤ 2,000 mg/cylinder ≥ -40 deg's C = TRUE ≥ -40 deg's C **P0326_P0331_AbnormalNoise_CylsEnabled** (Supporting Table) ≥ 333 Revs	First Order Lag Filters with Weight Coefficient = 0.0042 Updated each engine event	Type A, 1 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Knock Sensor (KS) Circuit Bank 2	P0330	This diagnostic checks for an open in the knock sensor circuit Sensor 2/Bank 2 There are two possible methods used: 1. **20 kHz Method**: This method injects a 20 kHz signal (internal to the ECU) onto one of the Knock Sensor inputs. For a normal/ good circuit the 20 kHz signal will propogate through the Knock sensor and back to the ECU through the sensor return circuit. The 20 kHz signal is processed through the Fast Fourier Transform (FFT) and then filtered with a first-order lag filter. Since the Knock Detection algorithm uses a Differential Op-Amp to compare the input from the two knock sensor wires, the FFT 20 kHz diagnostic signal will have either: A. Low output with a good circuit (because the 20 kHz injected signal is detected on both of the sensor inputs) or B, High output for an	**Open Circuit Method chosen** (2 possible methods: 20 kHz or Normal Noise): Filtered FFT Output Filtered FFT Output	= **P0325_P0330_OpenMethod_2** (supporting table) **Case 1 (20 kHz Method):** **> P0325_P0330_OpenCktThrshMin (20 kHz)** **AND** **< P0325_P0330_OpenCktThrshMax (20 kHz)** **Case 2 (Normal Noise Method):** **> P0325_P0330_OpenCktThrshMin (Normal Noise)** **AND** **< P0325_P0330_OpenCktThrshMax (Normal Noise)**	Diagnostic Enabled? Engine Run Time Engine Speed Cumlative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above) Engine Air Flow Engine Coolant Temperature or OBD Coolant Enable Criteria Inlet Air Temperature	Yes ≥ 2.0 seconds ≥ 400 RPM and ≤ 8,500 RPM ≥200 revs ≥ 20 mg/cylinder and ≤ 2,000 mg/cylinder ≥ -40 deg's C = TRUE ≥ -40 deg's C	First Order Lag Filter with Weight Coefficient Weight Coefficient = 0.0100 Updated each engine event	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		for method definition: **P0325_P0330_OpenMethod** defines which of the two diagnostic methods is used as a fucntion of engine speed (RPM). Typical implementations: A. Use 20 kHz method at allengine RPM (used when acceptable separation achieved at all RPM) or B. Use 20 kHz method at low/medium RPM and Normal Noise at high RPM						

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.	Filtered FFT Intensity (where 'FFT Intensity' = Non-knocking, background engine noise) Filtered FFT Intensity	**Case 1: Engine <u>not</u> in AFM mode** < **P0326_P0331_AbnormalNoise_Threshold** (Supporting Table) OR **Case 2: Engine <u>is</u> in AFM mode** < **P0326_P0331_AbnormalNoise_Thresh_AFM** (Supporting Table)	Diagnostic Enabled? Engine Run Time Engine Speed Engine Air Flow Engine Coolant Temperature or OBD Coolant Enable Criteria Inlet Air Temperature Individual Cylinders enabled for Abnormal Noise Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle)	Yes ≥ 2.0 seconds ≥ 2,000 RPM (not in AFM mode) OR > 2,000 (in AFM mode) AND ≤ 8,500 RPM ≥ 30 mg/cylinder AND ≤ 2,000 mg/cylinder ≥ -40 deg's C = TRUE ≥ -40 deg's C **P0326_P0331_AbnormalNoise_CylsEnabled** (Supporting Table) ≥ 333 Revs	First Order Lag Filters with Weight Coefficient = 0.0042 Updated each engine event	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Knock Sensor (KS) Circuit Low Bank 2	P0332	This diagnostic checks for an out of range low knock sensor signal. A 3-resistor bias network at each sensor input to the ECM provides a DC diagnostic voltage that will remain within a normal range when the external knock sensor circuit is free of short circuit faults. The diagnostic output is reported as a percentage (0 to 100%) when compared to the 5.0 volt reference voltage.	Sensor Input or Return Signal Line	< 8.0 Percent (of 5 Volt Reference)	Diagnostic Enabled? Engine Speed	Yes > 0 RPM and < 8,500 RPM	50 Failures out of 63 Samples 100 msec rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Knock Sensor (KS) Circuit High Bank 2	P0333	This diagnostic checks for an out of range high knock sensor signal. A 3-resistor bias network at each sensor input to the ECM provides a DC diagnostic voltage that will remain within a normal range when the external knock sensor circuit is free of short circuit faults. The diagnostic output is reported as a percentage (0 to 100%) when compared to the 5.0 volt reference voltage.	Sensor Input or Return Signal Line	> 39.00 Percent (of 5 Volt Reference)	Diagnostic Enabled? Engine Speed	Yes > 0 RPM and < 8,500 RPM	50 Failures out of 63 Samples 100 msec rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP) Sensor A Circuit	P0335	Diagnostic will fail if a crank sensor pulse was not received during a period of time; if crank sensor pulses are received the diagnostic will pass.	Time since last crankshaft position sensor pulse received	>= 4.0 seconds	Starter engaged AND (cam pulses being received OR (MAF_SensorFA AND Engine Air Flow	 = FALSE > 1.5 grams/second))	Continuous every 100 msec	Type B, 2 Trips
			No crankshaft pulses received	>= 0.3 seconds	Engine is Running Starter is not engaged		Continuous every 12.5 msec	
			No crankshaft pulses received		Engine is Running OR Starter is engaged No DTC Active:	 P0365 P0366	2 failures out of 10 samples One sample per engine revolution	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP) Sensor A Performance	P0336	1. Fail counts will occur if the engine goes out of synchronization repeatedly over a period of time and will pass if the engine stays in synchronization. 2. Diagnostic will fail if synchronization gap is not found in a specified period of time and will pass if the synchronization gap is found. 3. Diagnostic will fail if the incorrect number of crank sensor teeth are detected in-between detecting the synchronization gap and will pass if the correct number of teeth are seen.	Time in which 4 or more crank re-synchronizations occur	< 5.0 seconds	Engine Air Flow Cam-based engine speed No DTC Active:	>= 1.5 grams/second > 100 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		Continuous every 12.5 msec	
			Time since starter engaged without detecting crankshaft synchronization gap	>= 1.5 seconds	Starter engaged AND (cam pulses being received OR (MAF_SensorFA AND Engine Air Flow	 = FALSE > 1.5 grams/second))	Continuous every 100 msec	
			Crank pulses received in one engine revolution OR Crank pulses received in one engine revolution	< 0 > 65,535	Engine is Running OR Starter is engaged No DTC Active:	 P0365 P0366	8 failures out of 10 samples One sample per engine revolution	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor A	P0340	Diagnostic will fail if a cam sensor pulse was not received during a period of time; if cam sensor pulses are received the diagnostic will pass.	Time since last camshaft position sensor pulse received OR Time that starter has been engaged without a camshaft sensor pulse	>= 5.5 seconds >= 4.0 seconds	Starter engaged AND (crank pulses being received OR (MAF_SensorFA AND Engine Air Flow	 = FALSE > 1.5 grams/second))	Continuous every 100 msec	Type B, 2 Trips
			Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Engine is running Starter is not engaged		Continuous every 100 msec	
			No camshaft pulses received during first 12 MEDRES events (There are 12 MEDRES events per engine cycle		Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	 CrankSensor_FA	Continuous every MEDRES event	
			The number of camshaft pulses received during 100 engine cycles	= 0	Crankshaft is synchronized No DTC Active:	 CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor A	P0341	Diagnostic will fail if an incorrect number of cam sensor pulses are detected over a number of engine cycles and will pass if the number of cam pulses is correct.	The number of camshaft pulses received during first 12 MEDRES events is OR (There are 12 MEDRES events per engine cycle)	< 4 > 6	Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	CrankSensor_FA	Continuous every MEDRES event	Type B, 2 Trips
			The number of camshaft pulses received during 100 engine cycles OR	< 398 > 402	Crankshaft is synchronized No DTC Active:	CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position Sensor - Crankshaft Start Position Incorrect	P034A	Monitors the position of the crankshaft during auto-start's to verify that the crankshaft is in the expected position- diagnostic will fail if the crankshaft is not in the expected range otherwise the diagnostic will pass	Crankshaft position is in error by a number of crankshaft wheel teeth	> 2 crankshaft teeth	Engine has started rotating during a hybrid auto-start Crankshaft position is being verified No Active DTCs:	CrankSensor_FA	2 failures out of 3 samples a sample occurs each time the engine is started	Type B, 2 Trips
			Crankshaft position is in error by at least one crankshaft wheel tooth		Engine has started rotating during a hybrid auto-start Crankshaft position is being verified No Active DTCs:	CrankSensor_FA	4 failures out of 5 samples a sample occurs each time the engine is started	

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #2 CIRCUIT	P0352	Diagnoses Cylinder #2 Ignition Control (EST) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	$\geq$ 30 kΩ impedance between signal and controller ground	Engine running Ignition Voltage	 > 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #3 CIRCUIT	P0353	Diagnoses Cylinder #3 Ignition Control (EST) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	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.	$\geq$ 30 kΩ impedance between signal and controller ground	Engine running Ignition Voltage	 > 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #4 CIRCUIT	P0354	Diagnoses Cylinder #4 Ignition Control (EST) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	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.	$\geq$ 30 kΩ impedance between signal and controller ground	Engine running Ignition Voltage	 > 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor B	P0365	Diagnostic will fail if a cam sensor pulse was not received during a period of time; if cam sensor pulses are received the diagnostic will pass.	Time since last camshaft position sensor pulse received OR Time that starter has been engaged without a camshaft sensor pulse	>= 5.5 seconds >= 4.0 seconds	Starter engaged AND (crank pulses being received OR (MAF_SensorFA AND Engine Air Flow	 = FALSE > 1.5 grams/second))	Continuous every 100 msec	Type B, 2 Trips
			Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Engine is running Starter is not engaged		Continuous every 100 msec	
			No camshaft pulses received during first 12 MEDRES events (There are 12 MEDRES events per engine cycle		Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	 CrankSensor_FA	Continuous every MEDRES event	
			The number of camshaft pulses received during 100 engine cycles	= 0	Crankshaft is synchronized No DTC Active:	 CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor B	P0366	Diagnostic will fail if an incorrect number of cam sensor pulses are detected over a number of engine cycles and will pass if the number of cam pulses is correct.	The number of camshaft pulses received during first 12 MEDRES events is OR (There are 12 MEDRES events per engine cycle)	< 4 > 6	Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	CrankSensor_FA	Continuous every MEDRES event	Type B, 2 Trips
			The number of camshaft pulses received during 100 engine cycles OR	< 398 > 402	Crankshaft is synchronized No DTC Active:	CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Catalyst System Low Efficiency Bank 1	P0420	NOTE: The information below applies to applications that use the Decel Catalyst Monitor Algorithm Oxygen Storage. The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and O2 during lean A/F excursions to store the excess oxygen (I.e. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H2 to release this stored oxygen (I.e. Cerium Reduction). This is referred to as the Oxygen Storage Capacity, or OSC. CatMon's strategy is to "measure" the OSC of the catalyst through forced Rich (intrusive rich) and Lean (decel fuel cutoff) A/F excursions Normalized Ratio OSC Value Calculation Information and Definitions = 1. Raw OSC Calculation = (post cat O2 Resp time - pre cat O2 Resp time) 2. BestFailing OSC value from a calibration	Normalized Ratio OSC Value (EWMA filtered)	< 0.35	All enable criteria associated with P0420 can be found under P2270 - (O2 Sensor Signal Stuck Lean Bank 1 Sensor 2) Rapid Step Response (RSR) feature will initiate multiple tests: If the difference between current EWMA value and the current OSC Normalized Ratio value is and the current OSC Normalized Ratio value is Maximum number of RSR tests to detect failure when RSR is enabled. MAF Predicted catalyst temperature Front O2 Sensor or Front WRAF Rear O2 Sensor General Enable Criteria In addition to the p-codes listed under P2270, the following DTC's shall also	 > 0.66 < 0.10 8 > 1.70 g/s < 20.00 g/s < 910 ° C > 680.00 mV or > 1.01 EQR > 750.00 mV	1 test attempted per valid decel period Minimum of 1 test per trip Maximum of 3 tests per trip Frequency: Fueling Related : 12.5 ms OSC Measurements: 100 ms Temp Prediction: 12.5ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		table (based on temp and exhaust gas flow) 3. WorstPassing OSC value (based on temp and exhaust gas flow) Normalized Ratio Calculation = (1-2) / (3-2) A Normalized Ratio of 1 essentially represents a good part and a ratio of 0 essentially represents a very bad part. Refer to the **P0420_WorstPassingOSCTableB1** and **P0420_BestFailingOSCTableB1** in Supporting Tables tab for details The Catalyst Monitoring Test is completed during a decel fuel cutoff event. This fuel cutoff event occurs following a rich instrusive fueling event initiated by the O2 Sensor Signal Stuck Lean Bank 1 Sensor 2 test (P2270). Several conditions must be met in order to execute this test. Additional conditions and their related values			not be set: For switching O2 sensors: For WRAF O2 sensors:	 O2S_Bank_1_Sensor_1_FA O2S_Bank_1_Sensor_2_FA O2S_Bank_2_Sensor_1_FA O2S_Bank_2_Sensor_2_FA WRAF_Bank_1_FA WRAF_Bank_2_FA **P0420_WorstPassingOSCTableB1** **P0420_BestFailingOSCTableB1**		

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 (O2 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.
Evaporative Emission (EVAP) System Small Leak Detected (No ELCP - Conventional EVAP Diagnostic - with EAT using OAT Sensor - without Fuel Tank Zone 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 DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 3 additional consecutive trips.	> 0.61 (EWMA Fail Threshold), ≤ 0.35 (EWMA Re-Pass Threshold)	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 Ambient Temperature Using OAT Sensor to be	10 % ≤ Percent ≤ 90 % ≥ 600 seconds ≥ 5.0 miles ≥ 63 °C = TRUE) ≥ 70 kPa ≥ 10.0 miles ≤ refer to **P0442 Engine Off Time Before Vehicle Off Maximum as a Function of Estimated Ambient Temperature** in Supporting Tables. ≥ 8 hours ≥ 8 hours 0 °C≤Temperature≤ 35 °C	Once per trip, during hot soak (up to 2,400 sec.). No more than 2 unsuccessful attempts between completed tests.	Type A, 1 Trips EWMA Average run length is 8 to 12 trips under normal condition s Run length is 3 to 6 trips after code clear or non-volatile reset

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.			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 < 10 mph 10 mph<speed< 35 mph 35 mph<speed< 124 124 mph<speed< 124 Speed timer can never be less than 0 seconds ********** 1. High Fuel Volatility During the volatility	********** ≤ 0 °C ≥ 7,200 seconds ≤ 3,600 seconds 0 °C ≤ difference ≤ 2 °C ≥ 240 seconds ≤ 2 °C - 0.2 seconds 0.10 seconds 0.20 seconds 0.20 seconds ********** 		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR 5. Vacuum Out of Range and Refueling Detected See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for information on fuel level refueling. OR 6. Vent Valve Override Failed Device control using an off-board tool to control the vent solenoid, cannot exceed during the EONV test OR 7. Key up during EONV test No active DTCs: No Active DTC's TFTKO	0.50 seconds MAF_SensorFA ECT_Sensor_FA IAT_SensorFA VehicleSpeedSensor_FA IgnitionOffTimeValid AmbientAirDefault FuelLevelDataFault P0443 P0446 P0449 P0452 P0453 P0455 P0458 P0459		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P0498 P0499 P0496		

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 Ω impedance between output and controller ground.	Powertrain relay voltage	Voltage ≥ 11.0 volts	20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0458 may also set (Canister Purge Solenoid Short to Ground)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission (EVAP) Vent System Performance (No ELCP - Conventional EVAP Diagnostic - without Fuel Tank Zone Module (FTZM))	P0446	This DTC will determine if a restriction is present in the vent solenoid, vent filler, vent hose or EVAP canister. This diagnostic runs with normal purge control and canister vent solenoid commanded open. The diagnostic fails when the FTP sensor vacuum measurement is above a vacuum threshold before it accumulates purge volume above a threshold. The diagnostic passes when it accumulates purge volume above a threshold before the FTP sensor vacuum measurement is above a vacuum threshold.	Vent Restriction Prep Test: Vented Vacuum for OR Vented Vacuum for Vent Restriction Test: Tank Vacuum for before Purge Volume After setting the DTC for the first time, 0 liters of fuel must be consumed before setting the DTC for the second time.	 < -623 Pa 60 seconds > 1,245 Pa 60 seconds > 2,989 Pa 5 seconds ≥ 3 liters	Fuel Level System Voltage Startup IAT Startup ECT BARO No active DTCs: No Active DTC's TFTKO	10 % ≤ Percent ≤ 90 % ≥ 10.0 volts 4 °C≤Temperature≤ 35 °C ≤ 35 °C ≥ 70 kPa MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454 P0458 P0459 P0498 P0499	Once per Cold Start Time is dependent on driving conditions Maximum time before test abort is 1,400 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission (EVAP) Vent Solenoid Control Circuit (ODM) (No ELCP - Conventional EVAP Diagnostic - without 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 Ω impedence between output and controller ground			20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0498 may also set (Vent Solenoid Short to Ground)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Tank Pressure (FTP) Sensor Circuit Performance (No ELCP - Conventional EVAP Diagnostic)	P0451	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. During the EONV test, the fuel tank vacuum sensor is re-zeroed. A re-zero occurs: 1) At the transition from the volatility phase to the pressure phase. 2) At the transition from the pressure phase to the vacuum phase. 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. 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	The tank vacuum sensor voltage is compared to a window about the nominal sensor voltage offset (~1.5 volts) Upper voltage threshold (voltage addition above the nominal voltage) Lower voltage threshold (voltage subtraction below the nominal voltage) 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). When EWMA is the DTC light is illuminated. The DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 3 additional consecutive trips.	0.2 volts 0.2 volts > 0.73 (EWMA Fail Threshold), ≤ 0.40 (EWMA Re-Pass Threshold)	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.	Type A, 1 Trips EWMA Average run length: 6 Run length is 2 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.
		detected, then the results of the re-zero test are used to determine if there is a re-zero problem. 1) An individual re-zero test generates a re-zero ratio. The ratio goes from 0.0 to 1.0. 2) A 0.0 means that the re-zero pressure signal achieved exactly atmospheric pressure. 3) A ratio of 1.0 means that the re-zero pressure did not get within the window. 4) Re-zero pressure within the window generates values between 0.0 and 1.0. 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.						

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 - without Fuel Tank Zone Module (FTZM))	P0452	This DTC will detect a Fuel Tank Pressure (FTP) sensor signal that is too low out of range. The FTP sensor circuit out of range diagnostic compares the raw sensor voltage to a lower voltage threshold. It is an X out of Y diagnostic that runs continuously anytime the controller is awake. If the sensor voltage is below the lower voltage threshold, the low fail counter then increments. If the low fail counter reaches its threshold then a fail is reported for P0452 DTC. A pass is reported for P0452 DTC if the low sample counter reaches its threshold.	FTP sensor signal The normal operating range of the FTP sensor is 0.5 volts (~1245 Pa) to 4.5 volts (~ -3736 Pa).	< 0.15 volts (3.0 % of Vref or ~ 1,495 Pa)			640 failures out of 800 samples 12.5 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Tank Pressure (FTP) Sensor Circuit High Voltage (No ELCP - Conventional EVAP Diagnostic - without Fuel Tank Zone Module (FTZM))	P0453	This DTC will detect a Fuel Tank Pressure (FTP) sensor signal that is too high out of range. The FTP sensor circuit out of range diagnostic compares the raw sensor voltage to an upper voltage threshold. It is an X out of Y diagnostic that runs continuously anytime the controller is awake. If the sensor voltage is above the upper voltage threshold, the high fail counter then increments. If the high fail counter reaches its threshold then a fail is reported for P0453 DTC. A pass is reported for P0453 DTC if the high sample counter reaches its threshold.	FTP sensor signal The normal operating range of the FTP sensor is 0.5 volts (~1245 Pa) to 4.5 volts (~ -3736 Pa).	> 4.85 volts (97.0 % of Vref or ~ -3,985 Pa)			640 failures out of 800 samples 12.5 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Tank Pressure (FTP) Sensor Circuit Intermittent (No ELCP - Conventional EVAP Diagnostic)	P0454	This DTC will detect intermittent tank vacuum sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event. During the EONV test, an abrupt change in fuel tank vacuum is identified as a possible refueling event. If the abrupt change occurs while the vent valve is closed, the EONV small-leak test aborts and the refueling rationality test starts. If the refueling rationality test detects a refueling event, then the vacuum change is considered “rational.” If the refueling rationality test does not detect a refueling event, then the vacuum change is considered “irrational.” The vacuum change rationality diagnostic is an “X out of Y” test. 1) Each time the EONV test completes, the (Y) sample counter is incremented. 2) Each time the	If an abrupt change in tank vacuum is detected the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that a refueling event occurred. If a refueling is confirmed, then the test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem. An abrupt change is defined as a change in vacuum in the span of 1.0 seconds. But in 12.5 msec. A refueling event is confirmed if the fuel level has a persistent change of for 30 seconds during a 600 second refueling rationality test.	> 112 Pa < 249 Pa >15 %	This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes and the canister vent solenoid is closed		This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period.The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete.The test will report a failure if 2 out of 3 samples are failures. 12.5 ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 - without Fuel Tank Zone Module (FTZM))	P0455	This DTC will detect a weak vacuum condition (large leak or purge blockage) in the EVAP system. This mode checks for large leaks and blockages when proper driving conditions are met. If these conditions are met, the diagnostic commands the vent valve closed and controls the purge duty cycle to allow purge flow to purge the fuel tank and canister system while monitoring the fuel tank vacuum level. The algorithm accumulates purge flow during the test to determine a displaced purge volume as the test proceeds. If the displaced purge volume reaches a threshold before the fuel tank vacuum level reaches its passing threshold, then a large leak failure is detected. On fuel systems with fuel caps If the first failure of	Purge volume while Tank vacuum After setting the DTC for the first time, 0 liters of fuel must be consumed before setting the DTC for the second time. Weak Vacuum Follow-up Test (fuel cap replacement test) Weak Vacuum Test failed. Passes if tank vacuum Note: Weak Vacuum Follow-up Test can only report a pass.	> 15 liters ≤ 2,740 Pa ≥ 2,740 Pa	Fuel Level System Voltage BARO Purge Flow No active DTCs: No Active DTC's TFTKO If ECT > IAT, Startup temperature delta (ECT-IAT): Startup IAT Startup ECT Weak Vacuum Follow-up Test This test can run following a weak vacuum failure or on a hot restart.	10 % ≤ Percent ≤ 90 % ≥ 10.0 volts ≥ 70 kPa ≥ 4.20 % MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454 P0458 P0459 P0498 P0499 ≤ 8 °C 4 °C≤Temperature≤ 35 °C ≤ 35 °C	Once per cold start Time is dependent on driving conditions Maximum time before test abort is 1,400 seconds Weak Vacuum Follow-up Test With large leak detected, the follow-up test is limited to 0 seconds. Once the MIL is on, the follow-up test runs indefinitely.	Type B, 2 Trips

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

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 Ω impedence between output and controller ground	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 Ω impedence between output and controller power	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) < 3 liters b) >= 29.20 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	P0462	This DTC will detect a primary fuel tank sensor stuck out-of-range low.	Fuel level Sender % of 5V range	< 10 % or 27.36 liters	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	100 failures out of 125 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.
Fuel Level Sensor 1 Circuit High Voltage	P0463	This DTC will detect a primary fuel tank level sensor stuck out-of-range high.	Fuel level Sender % of 5V range	> 60 % or 2.97 liters	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	100 failures out of 125 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.
Fuel Level Sensor 1 Circuit Intermittent (No ELCP - Conventional EVAP Diagnostic)	P0464	This DTC will detect intermittent fuel level sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event. During the EONV test, a change in fuel level is identified as a possible refueling event. If the change occurs while the vent valve is closed, the EONV small-leak test aborts and the refueling rationality test starts. If the refueling rationality test detects a refueling event, the fuel level change is considered “rational.” If the refueling rationality test does not detect refueling, the fuel level change is considered “irrational.” The fuel level change rationality diagnostic is an “X out of Y” test. 1) Each time the EONV test completes, the (Y) sample counter is incremented. 2) Each time the rationality test has an	If a change in fuel level is detected, the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that an actual refueling event occurred. If a refueling event is confirmed, then the test sample is considered passing. Otherwise, if a refueilng event is not confirmed, then the test sample is considered failing which indicates an intermittent signal problem. An intermittent fuel level signal problem is defined as: The fuel level changes by and does not remain for 30 seconds during a 600 second refueling rationality test.	 > 15 % > 15 %	This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period.The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete.The test will report a failure if 2 out of 3 samples are failures. 100 ms / sample	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan 1 Relay Control Circuit Open (Output Driver Monitor) (Not used on EREV)	P0480	Diagnoses the cooling fan 1 relay control low side driver circuit for circuit faults	Voltage low during driver off state (indicates open circuit)	Open Circuit: ≥ 200 K Ω impedance between signal and controller ground	Powertrain Relay Voltage	Voltage ≥ 11.00 volts	50.00 failures out of 63.00 samples 100 ms / sample	Type B, 2 Trips Note: In certain controllers P0691 may also set (Fan 1 Short to Ground).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission (EVAP) System Flow During Non-Purge (No ELCP - Conventional EVAP Diagnostic - without Fuel Tank Zone Module (FTZM))	P0496	This DTC will determine if the purge solenoid is leaking to engine manifold vacuum. This test checks for purge valve leaks to intake manifold vacuum such that there would always be a small amount of purge flow present. It does this by sealing the EVAP system (purge and vent valve closed) and then monitors fuel tank vacuum level. The fuel tank vacuum level should not increase. If tank vacuum increases above a threshold, a malfunction is indicated. Additional Information This diagnostic test detects purge valve leaks to intake manifold vacuum. It is not intended to detect purge valve leaks to the atmosphere which are monitored by the EONV small leak diagnostic (P0442). The purge valve leak diagnostic exists to helps service replace	Tank Vacuum for Test time	> 2,491 Pa 5 seconds ≤ refer to **P0496 Purge Valve Leak Test Engine Vacuum Test Time (Cold Start) as a Function of Fuel Level** in Supporting Tables. Test time only increments when engine vacuum ≥ 10.0 kPa.	Fuel Level System Voltage BARO Startup IAT Startup ECT Engine Off Time No active DTCs: No Active DTC's TFTKO	10 % ≤ Percent ≤ 90 % ≥ 10.0 volts ≥ 70 kPa 4 °C≤Temperature≤ 35 °C ≤ 35 °C ≥ 28,800.0 seconds MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454 P0458 P0459 P0498 P0499	Once per cold start Cold start: max time is 1,400 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 - without 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 Ω impedence between output and controller ground			20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0449 may also set (Vent Solenoid Open Circuit)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Vent Solenoid Control Circuit High (No ELCP - Conventional EVAP Diagnostic - without 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 Ω impedence between output and controller power			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.
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	> 91.00 rpm	Baro	> 70 kPa	Diagnostic runs in every 12.5 ms loop	Type B, 2 Trips
			Filter coefficient	0.00300	Coolant Temp	> 60 °C and < 125 °C	Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	
					Engine run time	≥ 60 sec		
					Ignition voltage	32 ≥ volts ≥ 11		
					Time since gear change	≥ 3 sec		
					Time since a TCC mode change	> 3 sec		
					IAT	> -20 °C		
					Vehicle speed	≤ 1.24 mph, 2kph		
					Commanded RPM delta	≤ 25 rpm		
					Idle time	> 5 sec		
					For manual transmissions: Clutch Pedal Position or Clutch Pedal Position	 > 75.00 pct < 12.00 pct		
						PTO not active		
						Transfer Case not in 4WD LowState		

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_EngSpdReqIntvType = CeTESR_e_EngSpdMinLimit AND VeTESR_e_EngSpdReqRespType = CeTESR_e_NoSuggestion) Clutch is not depressed TC_BoostPresSnsrFA ECT_Sensor_FA EnginePowerLimited EGRValveCircuit_FA EGRValvePerformance_FA IAT_SensorCircuitFA EvapFlowDuringNonPurge_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA FuelInjectorCircuit_FA MAF_SensorFA EngineMisfireDetected_FA IgnitionOutputDriver_FA TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA FuelLevelDataFault LowFuelConditionDiagnostic Clutch Sensor FA AmbPresDfltdStatus		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
High Engine Speed Idle System	P0507	This DTC indicates that actual engine speed is higher than desired engine speed at idle so that it is out of speed control capability. Testing is performed when basic conditions are met. If filtered engine speed error exceeds a calibrated threshold for a calibrated duration, code is set. This testing is performed continuously per trip if basic conditions are met	Filtered Engine Speed Error. It is calculated with a calibrated filter coefficient	< -182.00 rpm	Baro	> 70 kPa	Diagnostic runs in every 12.5 ms loop	Type B, 2 Trips
					Coolant Temp	> 60 °C and < 125 °C Must verify	Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	
			Filter coefficient	0.00300				
					Engine run time	≥ 60 sec		
					Ignition voltage	32 ≥ volts ≥ 11		
					Time since gear change	≥ 3 sec		
					Time since a TCC mode change	> 3 sec		
					IAT	> -20 °C		
					Vehicle speed	≤ 1.24 mph, 2kph		
					Commanded RPM delta	≤ 25 rpm		
					For manual transmissions: Clutch Pedal Position or Clutch Pedal Position	> 75.00 pct < 12.00 pct		
						PTO not active		
						Transfer Case not in 4WD LowState		
						Off-vehicle device control (service bay control) must not be active.		

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cold Start Rough Idle	P050D	Monitors the combustion performance when the cold start emission reduction strategy is active by accumulating and determining the percentage of engine cycles that have less than complete combustion relative to the total number of engine cycles in which Dual Pulse is active.	Deceleration index vs. Engine Speed Vs Engine load Deceleration index calculation is tailored to specific vehicle. Tables used are 1st tables encountered that are not max of range. Undetectable region at a given speed/load point is where all tables are max of range point. Incomplete combustion identified by P0300 threshold tables:	(>Idle SCD AND >Idle SCD ddt Tables) OR (>Idle Cyl Mode AND > Idle Cyl Mode ddt Tables)	Misfire Algorithm Enabled (Refer to P0300 for Enablement Requirements) OBD Manufacturer Enable Counter To enable the diagnostic, the Cold Start Emission Reduction Strategy Must Be Active per the following: Catalyst Temperature AND Engine Coolant AND Engine Coolant AND Barometric Pressure In addition, Dual Pulse Strategy Is Enabled and Active Per the following: Engine Speed Accel Position Engine Run Time For the engine speeds and loads in which Dual Pulse is active:	= 0 < 350.00 degC > -10.00 degC <= 66.00 degC >= 72.00 KPa >= 450.00 RPM <= 2,500.00 RPM <= 2.00 Pct < 45 seconds	Runs once per trip when the cold start emission reduction strategy is active and Dual Pulse is enabled and active. Frequency: 100ms Test completes after Dual Pulse is no longer active OR The first 500 engine cycles have been reached	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Dual Pulse Error induced misfires percentage	>= catalyst damaging misfire		
					Dual Pulse Error induced misfires percentage	< 90% of the maximum achieveable catalyst damaging misfire.		
					Engine Cycles	>= 50 < 501		
					The Cold Start Emission Reduction strategy must not be exiting. The strategy will exit per the following:			
					Catalyst Temperature AND Engine Run Time	>= 900.00 degC >= 45.00 seconds		
					OR Engine Run Time	> **P050D_P1400_CatalystLightOffExtendedEngineRunTimeExit** This Extended Engine run time exit table is a function of percent ethanol and Catmons NormRatioEWMA. Refer to "Supporting Tables" for details.		
					OR Barometric Pressure	< 72.00 KPa		

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	> 2,400.00 RPM > 5.00 Pct		
					Engine Run Time	>= 45 seconds		
					Dual Pulse Strategy will also exit if the any of the "Additional Dual Pulse Enabling Criteria" is not satisfied:			
					"Additional Dual Pulse Enabling Criteria":			
					Green Engine Enrichment	Not Enabled		
					Misfire Converter Protection strategy	Not being requested		
					Engine Metal Overtemp strategy	Not being requested		
					Fuel control state	Open Loop		
					Output State Control	Not being requested for fuel		
					DOD Or DFCO	Not Active		
					Power Enrichment	Not Active		
					Dynamic Power Enrichment	Not Active		
					Piston Protection	Not Active		
					Hot Coolant Enrichment	Not Active		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Assist Vacuum Too Low	P050F	Monitors for a brake booster vacuum leak	Brake booster vacuum drift ratio (EWMA) reaches the fail threshold (based on engine running condition) before the sample count threshold is reached, a failure is reported. Engine Running Fail Threshold based on prior diagnostic state (description below) Diagnostic failed prior loop Diagnostic passed prior loop Before the sample counts Engine Stopped Fail Threshold based on prior diagnostic state (description below) Diagnostic failed prior loop Diagnostic passed prior loop Before the sample counts	 >= 0.60 >= 0.65 > 0.00 counts >= 0.55 >= 0.65 > 0.00 counts	Diagnostic is enabled and the following conditions are met for engine run conditions: No brake booster vacuum sensor faults active No brake pedal position sensor faults active Brake pedal travel is No mass air flow faults No manifold air pressure faults Mass air flow estimate Manifold air pressure Engine vacuum stability time has reached Difference between brake booster vacuum and manifold air pressure is OR Diagnostic is enabled for the following engine auto off conditions:	Enabled < 8.00 percent - 5.00 percent offset >= 6.00 grams / second <= 20.00 kPa >= 0.70 seconds > 10.00 kPa Enabled	Performed every 100 msecond Minimum time to pass: Engine Running 0.00 second Engine Stopped 0.00 second	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No brake booster vacuum sensor faults active No brake pedal position sensor faults active Brake pedal travel is No engine movement detected Engine is in AutoStop mode OR Diagnostic is enabled for the following key off conditions: No brake booster vacuum sensor faults active No brake pedal position sensor faults active Brake pedal travel is No engine movement detected Engine is in KeyStop mode	< 8.00 percent - 5.00 percent offset Disabled < 8.00 percent - 5.00 percent offset		

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	Determines if the Engine Oil Pressure (EOP) Sensor is stuck or biased in range. The engine oil pressure is compared against thresholds when engine is running and when engine is off.The engine oil pressure rationality diagnostic has two parts: engine runing test and engine off test. The engine running test compares the measured oil pressure to threshold. If the measured oil pressure is out of the thresholds, then the error counter increments. The engine off test compares the measured oil pressure against thresholds after the engine has stopped rotating. If the measured oil pressure is out of the thresholds, then the error counter increments.	**Two Stage Oil Pump EOP Sensor Test with Engine Running, High Pressure State** <u>To Fail when previously passing with the engine running:</u> Filtered Engine Oil Pressure below expected threshold OR Filtered Engine Oil Pressure above expected threshold <u>To pass when previously failing:</u> Filtered Engine Oil Pressure above low threshold plus an offset OR	 Filtered Oil Pressure < (**P0521_P06DD_P06DE_OP_HiStatePressure** * 0.90 - 75.0 kPa) OR Filtered Oil Pressure > (**P0521_P06DD_P06DE_OP_HiStatePressure** ***** 1.10 + 75.0 kPa) Filtered Oil Pressure > **P0521_P06DD_P06DE_OP_HiStatePressu** (**re** * 0.90 - 75.0 kPa + 10.0 kPa) OR Filtered Oil Pressure < (	Two Stage Oil Pump is Present = TRUE Pump is in high pressure state Engine Running Diagnostic Status Engine Off Rationality Test Diagnostic Reporting Status Oil Pressure Sensor In Use Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 10,000 RPM for longer than 30.0 seconds) Filtered Engine Speed within range Modelled Oil Temperature within range No active DTC's	TRUE Enabled Test not report a fail state Yes ≥ 10.0 seconds ≥ 70.0 kPa FALSE 1,000 RPM ≤ Filtered Engine Speed ≤ 4,500 RPM 40.0 deg C ≤ Oil Temp ≤ 120.0 deg C Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA CrankSensor_FA	 ≥ 40 errors out of 50 samples. Performed every 100 msec ≥ 10 passes 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.
			Filtered Engine Oil Pressure below high threshold minus an offset	**P0521_P06DD_P06DE_OP_HiStatePressure** * 1.10 + 75.0 kPa - 10.0 kPa) (Details on Supporting Tables Tab: **P0521_P06DD_P06DE_OP_HiStatePressure**)				
			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** * 0.90 - 75.0 kPa) OR Filtered Oil Pressure > (**P0521_P06DD_P06DE_OP_LoStatePressure** * 1.10 + 75.0 kPa)	Two Stage Oil Pump is Present = TRUE Pump is in low pressure state Engine Running Diagnostic Status Engine Off Rationality Test Diagnostic Reporting Status Oil Pressure Sensor In Use Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 10,000 RPM for longer than 30.0 seconds) Filtered Engine Speed within range Modelled Oil Temperature	TRUE Enabled Test not report a fail state Yes ≥ 10.0 seconds ≥ 70.0 kPa FALSE 1,000 RPM ≤ Filtered Engine Speed ≤ 4,500 RPM 40.0 deg C ≤ Oil Temp ≤ 120.0 deg C	 ≥ 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** * 0.90 - 75.0 kPa + 10.0 kPa) OR Filtered Oil Pressure < (**P0521_P06DD_P06DE_OP_LoStatePressure** * 1.10 + 75.0 kPa - 10.0 kPa) (Details on Supporting Tables Tab: **P0521_P06DD_P06DE_OP_LoStatePressure**)	within range No active DTC's	Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA CrankSensor_FA	≥ 10 passes 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 ≥ 70.0 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	< 5.00 percent Deadband: < 5 percent or > 95 percent	Engine Speed Enable Engine Speed Disable Oil Pressure Sensor In Use Diagnostic Status	> 400 rpm < 350 rpm Yes Enabled	800 failures out of 1,000 samples Performed every 6.25 msec	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	800 failures out of 1,000 samples Performed every 6.25 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Booster Pressure Sensor Performance	P0556	Determines if the Brake Booster Vacuum Sensor is stuck or skewed within the normal operating range by comparing the engine vacuum to the brake booster vacuum when the engine is producing a large amount of vacuum	Engine vs brake booster vacuum sensor values are compared when % throttle < value for a time period. When throttle once again > calibrated value, min and max vacuum sensor values are normalized and subtracted from a 1st order lag filter value of 1. A properly operating vacuum sensor would have a normalized result of 1 or greater. If the normalized result is greater than 1 it is considered 1. The 1st order lag filter value would be 0 in a passing system.		Diagnostic enabled/ disabled	Enabled	Pass counter incremented when enable conditions are met, pass achieved when counter >= 7	Type B, 2 Trips
					Type of vacuum source: CeBBVI_e_ManifoldVacuum			
					With a manifold vacuum source:		Performed every 100 msec	
					Throttle Area (with idle included) for time period of	<= 5.0 Percent for > 3.0 seconds		
					Difference in Brake Booster Vacuum	>= 0.3 kPa		
					For time period of AND	>= 0.2 Seconds		
					Vacuum Delta	>= 15.0 kPa		
					No active DTC's	Fault bundles: MAP_SensorFA TPS_FA BrakeBoosterSensorCktFA		
			1st order lag fail threshold	> 0.20				
			1st order lag re-pass threshold	< 0.5				
					With a mechanical pump vacuum source:			
					No active DTC's	Fault bundles: BrakeBoosterSensorCktFA		
					P057B	Not Active on Current Key Cycle		
					P057C	Not Active on Current Key Cycle		
					P057D	Not Active on Current Key		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						Cycle		
					P057E	Not Active on Current Key Cycle		
					Brake pedal position	<= 7.0 Percent for > 3.0 seconds		
					Engine mode	= Run for > 3.0 seconds		
					Difference in Brake Booster Vacuum	>= 0.3 kPa		
					For time period of AND Unfiltered normalized value of measured brake booster vacuum	>= 0.2 Seconds <= **P0556_BBVS_VacLowFlow** kPa (see supporting table)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Booster Pressure Sensor Circuit Low Voltage	P0557	Determines if the Brake Booster Pressure Sensor circuit voltage is too low	(Brake Booster Pressure Sensor Voltage) ÷ 5 Volts *100	< 5.00 percent	Brake booster diagnostic enabled/disabled Brake booster pressure sensor present	Enabled Present	320 failures out of 400 samples Performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Booster Pressure Sensor Circuit High Voltage	P0558	Determines if the Brake Booster Pressure Sensor circuit voltage is too high	(Brake Booster Pressure Sensor Voltage) ÷ 5 Volts *100	> 95.00 percent	Brake booster diagnostic enabled/disabled Brake booster pressure sensor present	Enabled Present	2,000 failures out of 2,400 samples Performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Mutil-Functon Switch Circuit	P0564	Detect when cruise control multi-function switch circuit (analog) voltage is in an invalid range	Cruise Control analog circuit voltage must be "between ranges" for greater than a calibratable period of time.	The cruise control analog voltage A/D count ratio is considerred to be "between ranges" when the ratio is measured in the following ranges: 0.28 -0.31, 0.415-0.445, 0.585 - 0.615 0.78 - 0.81, 1.005 - 1.035	CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 0.500 seconds	Type C, No SVS , "Emissions Neutral Diagnostics – special type C"

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Resume Circuit	P0567	Detects a failure of the cruise resume switch in a continously applied state	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	CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 89.000 seconds	Type C, No SVS , "Emissions Neutral Diagnostics – special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Set Circuit	P0568	Detects a failure of the cruise set switch in a continously applied state	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	CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 89.000 seconds	Type C, No SVS , "Emissions Neutral Diagnostics – special type C"

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Input Circuit	P0575	Determines if cruise switch state received from the BCM is valid.	If x of y rolling count / protection value faults occur, disable cruise for duration of fault	Message <> 2's complement of message Message rollling count<>previous message rolling count value plus one	Cruise Control Switch Serial Data Error Diagnostic Enable Serial communication to BCM Power Mode Engine Running	1.00 No loss of communication = RUN = TRUE	9 failures out of / 17 samples Performed on every received message 9 rolling count failures out of / 17 samples Performed on every received messagw	Type C, No SVS , "Emissions Neutral Diagnostics – special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	Brake Pedal Position Sensor Circuit Range / Performance Diagnostic Enable	1.00 ignition voltage > 10.00		MIL: Type A, 1 Trips
			Calculated EWMA value must be greater than calibratable theshold after calibratable number of tests have completed to report a "test passed" for P057B	EWMA value looked up in supporting table **P057B KtBRKI_K_FastTestPointWeight** P057B as a function of calculated brake pedal position delta EWMA value is > 0.80	calculated brake pedal position delta sample counter > 50.00 for fast test OR calculated brake pedal position delta sample counter > 1,000.00 for slow test	calculated brake pedal position delta > 4.70 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_CmpltTest PointWeight** P057B as a function of calculated brake pedal position delta EWMA value is less thatn 0.40	no DTC's active (P057C, P057D)	shift lever has been in park once this key cycle vehicle speed >= 5.00 accelerator pedal position < 5.00	total number of EWMA tests > 2.00	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Pedal Position Sensor Circuit Low	P057C	detects short to ground for brake pedal position sensor	If x of y samples are observed below failure threshold, default brake pedal position to zero percent.	5.00	Brake Pedal Position Sensore Low Voltage Diagnostic Enable	1.00	20 / 32.00 counts	MIL: Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Multi-function Circuit Low Voltage	P0580	detects short to ground failure for cruise multi-function switch circuit	Cruise Control analog circuit voltage must be in an "Open Short To Ground" range for greater than a calibratable period of time.	The cruise control analog voltage A/D count ratio is considerred to be "open short to ground when the ratio is measured in the following rangs: 0 - 0.185	CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 2.00 seconds	Type C, No SVS , "Emissions Neutral Diagnostics – special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Multi-function Circuit High Voltage	P0581	detects short to power failure for cruise multi-function switch circuit	Cruise Control analog circuit voltage must be in "Short To Power" range for greater than a calibratable period of time.	The cruise control analog voltage A/D count ratio is considered to be "short to power" when the ratio is measured in the following range: 1.005 - 1.035	CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 2.00 seconds	Type C, No SVS , "Emissions Neutral Diagnostics – special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Performance	P058A	This DTC monitors for a battery module internal fault	Battery Module signals an internal fault via LIN bus VeVITR_e_IBS_InternalFault	= CeVITR_e_DiagFailed	The diagnostic is enabled System Diagnostics Disabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit	= 1 (1 indicates enabled) = False Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Current Monitoring Performance	P058B	This DTC monitors for a battery module current fault	Battery Module signals an internal fault via LIN bus VeVITR_e_BatCurrRatDiag	= CeVITR_e_DiagFailed	The diagnostic is enabled System Diagnostics Disabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit	= 1 (1 indicates enabled) = False Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Voltage Monitoring Performance	P058D	This DTC monitors for a battery module voltage fault	Difference between 12V System Reference Voltage and IBS 12V Battery Voltage values	> 5.00 Volts	The diagnostic is enabled System Diagnostics Disabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit IBS Voltage and Current Data Available over LIN bus Battery Monitor Module Circuit Low Voltage Fault Active (P16D4) Battery Monitor Module Circuit High Voltage Fault Active (P16D5)	= 1 (1 indicates enabled) = False Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True = True = False = False	32 failed samples within 40 total samples Diagnostic runs in the 250 ms loop	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Active Grill Air Shutter A Performance /Stuck OFF	P059F	A 2-part diagnostic. Part 1 continuously monitors for failure to achieve a commanded shutter actuator position [Suspect Stuck Condtion] when X failures occur in Y samples after an electronic command latency delay. Part 1 failure enables Part 2 which makes a fixed number of repeat attempts to reach the commanded postion [ReTry to clear obstruction]. The DTC is set when the calibrated fault threshold count of repeat attempts is reached without achieving the original commanded shutter position.	Smart Shutter Actuator 1 Position Response AND Shutter 1 Diagnostic Delay Threshold count	<> Smart Shutter Actuator 1 Commanded Position percent AND Counter > 99.00 counts	a. Ignition Run_Crank Active, b. Ignition Run_Crank AND Ignition Accessory AND ECU Awake, c. Command Shutter1 Enable	a. = TRUE, b. = FALSE AND = FALSE AND = TRUE, c. = 1.00	1.00 failures out of 1.00 samples 1 sample / 100 milliseconds	Type B, 2 Trips
			Shutter 1 Performance Test count	= 5.00 counts	a. Ignition Run_Crank Active, b. Ignition Run_Crank AND Ignition Accessory AND ECU Awake, c. Command Shutter1 Enable	a. = TRUE, b. = FALSE AND = FALSE AND = TRUE, c. = 1.00	1-5 actuator cycles [1 cycle typically requires 10-25 seconds]	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if the calibration check sum is incorrect or the flash memory detects an uncorrectable error via the Error Correcting Code.	The Primary Processor's calculated checksum does not match the stored checksum value. Covers all software and calibrations.	1 failure if the fault is detected during the first pass. 5.00 failures if the fault occurs after the first pass is complete.			Diagnostic runs continuously in the background.	Type A, 1 Trips
			The Primary Processor's Error Correcting Code hardware in the flash memory detects an error. Covers all software and calibrations.	254 failures detected via Error Correcting Code			Diagnostic runs continuously via the flash hardware.	
			The Primary Processor's calculated checksum does not match the stored checksum value for a selected subset of the calibrations.	2 consecutive failures detected or 5 total failures detected.			Diagnostic runs continuously. Will report a detected fault within 200 ms.	
			The Secondary Processor's calculated checksum does not match the stored checksum value. Covers all software and calibrations.	1 failure if the fault is detected during the first pass. 5 failures if the fault occurs after the first pass is complete.			Diagnostic runs continuously in the background.	
				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.	
			ECC ROM fault detected in NVM Flash region ECC ROM Error Count >	 3			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 >	0.46319 s			When dual store updates occur.	

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

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 processsors.	Loss or invalid message of SPI communication from the Secondary Processor at initialization detected by the Primary Processor or loss or invalid message of SPI communication from the Secondary Processor after a valid message was received by the Primary Processor	Loss or invalid message at initialization detected or loss or invalid message after a valid message was recieved	Run/Crank voltage Run/Crank voltage	>= 6.41 Volts or >= 11.00 Volts, else the failure will be reported for all conditions	In the primary processor, 159 / 399 counts intermittent or 39 counts continuous; 39 counts continuous @ initialization. 12.5 ms /count in the ECM main processor	Type A, 1 Trips
			Loss or invalid message of SPI communication from the Primary Processor at initialization detected by the Secondary Processor or loss or invalid message of SPI communication from the Primary Processor after a valid message was received by the Secondary Processor	Loss or invalid message at initialization detected or loss or invalid message after a valid message was recieved			In the secondary processor, 20 / 200 counts intermittent or 0.1875 s continuous; 0.4750 s continuous @ initialization. 12.5 ms /count in the ECM secondary processor	
			Checks for stack over or underflow in secondary processor by looking for corruption of known pattern at stack boundaries. Checks number of stack over/ under flow 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	
			MAIN processor is verified by responding to a seed sent from the secondary with a key response to secondary. Checks number of incorrect keys	2 incorrect seeds within 8 messages, 0.2000 seconds		ignition in Run or Crank	150 ms for one seed continually failing	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			received > or Secondary processor has not received a new within time limit					
			Time new seed not received exceeded			always running	0.450 seconds	
			MAIN processor receives seed in wrong order			always running	3 / 17 counts intermittent. 50 ms/count in the ECM main processor	
			2 fails in a row in the Secondary processor's ALU check			KePISD_b_ALU_TestEnbld == 1 Value of KePISD_b_ALU_TestEnbld 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_ConfigRegTestEnbld == 1 Value of KePISD_b_ConfigRegTestEnbld is: 1 . (If 0, this test is disabled)	12.5 to 25 ms	
			Secondary processor detects an error in the toggling of a hardware discrete line controlled by the MAIN processor: number of discrete changes > = or < = over time window(50ms)	7 17		KePISD_b_MainCPU_SOH_FltEnbld == 1 Value of KePISD_b_MainCPU_SOH_FltEnbld is: 0 . (If 0, this test is disabled) time from initialization >= 0.4875 seconds	50 ms	
			Software background task first pass time to complete exceeds			Run/Crank voltage > 6.41	360.000 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			2 fails in a row in the MAIN processor's ALU check			KePISD_b_ALU_TestEnbld == 1 Value of KePISD_b_ALU_TestEnbld is: 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			KePISD_b_ConfigRegTestEnbld == 1 Value of KePISD_b_ConfigRegTestEnbld is: 1 . (If 0, this test is disabled)	12.5 to 25 ms	
			Checks number of stack over/under flow since last powerup reset >=	3		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	
			Voltage deviation >	0.4950		KePISD_b_A2D_CnvrtrTestEnbld == 1 Value of KePISD_b_A2D_CnvrtrTestEnbld is: 1 . (If 0, this test is disabled)	5 / 10 counts or 0.150 seconds continuous; 50 ms/count in the ECM main processor	
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		KeMEMD_b_FlashECC_CktTestEnbl == 1 Value of KeMEMD_b_FlashECC_CktTestEnbl is: 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.
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		KeMEMD_b_RAM_ECC_CktTestEnbl == 1 Value of KeMEMD_b_RAM_ECC_CktTestEnbl is: 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			KePISD_b_DMA_XferTestEnbld == 1 Value of KePISD_b_DMA_XferTestEnbld is: 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.		Table, f(Core, Loop Time). See supporting tables: **P0606_Program Sequence Watch Enable f(Core, Loop Time)** (If 0, this Loop Time 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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							processor	
			MAIN processor determines a seed has not changed within a specified time period within the 50ms task.	Previous seed value equals current seed value.		KePISD_b_SeedUpdKeyStorFltEnbl == 1 Value of KePISD_b_SeedUpdKeyStorFltEnbl 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.
Starter Relay Control Circuit Open (12VSS)	P0615	Controller specific output driver circuit diagnoses the Starter relay (12VSS) low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground.	Starter control diag enable = TRUE Engine speed Run Crank voltage	1.00 >= 0.00 RPM >= 11.00 volts	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.
Starter Relay Control Circuit Low Voltage (12VSS)	P0616	Controller specific output driver circuit diagnoses the Starter relay (12VSS) low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	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 Ohms impedance between signal and controller ground	Starter control diag enable = TRUE Engine speed Run Crank voltage	1.00 >= 0.00 RPM >= 6.41 volts	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.
Starter Relay Control Circuit High Voltage (12VSS)	P0617	Controller specific output driver circuit diagnoses the Starter relay low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	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 Ohms impedance between signal and controller power	Starter control diag enable = TRUE Engine speed Run Crank voltage	1.00 >= 0.00 RPM >= 6.41 volts	8 failures out of 10 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 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 Engine Speed	Voltage 11.00 volts 0 RPM	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.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	<= 0.5 Ohms impedance between signal and controller ground	Run/Crank Voltage Engine Speed	Voltage 11.00 volts 0 RPM	8 failures out of 10 samples 250 ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 0.5 Ohms impedance between signal and controller power	Run/Crank Voltage Engine Speed	Voltage 11.00 volts 0 RPM	8 failures out of 10 samples 250 ms / sample	Type A, 1 Trips Note: In certain controllers P0627 may also set (Fuel Pump Relay Control Open Circuit)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Fuel Injector Control Performance	P062B	This DTC determines the internal fuel injctor control module circuit is faulted. The faulted status is set on any failure that could potentially damage the drivers or injectors, or could result in uncontrolled fueling. The following general classes of failures shall be covered: Communication error with control circuit Internal corruption of control circuit values, Invalid interface values (from control circuit)	Internal ECU Boost Voltage OR Internal ECU Boost Voltage OR Driver Status OR Driver Status	>= 90 Volts <= 40 Volts = Not Ready = Uninitialized	Battery Voltage	>= 8 or >= 11 Enabled when a code clear is not active or not exiting device control Engine is not cranking Powertrain Relay Voltage within range	High Voltage - 160 failures out of 200 samples Low Voltage - 160 failures out of 200 samples Driver Status Not Ready- 160 failures out of 200 samples Driver Status Uninitialized - Uninitialized state for >= 100 counts All at 12.5ms per sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Powertrain Internal Control Module EEPROM Error	P062F	This DTC detects a NVM long term performance. There are two types of diagnostics that run during controller power up. One for HWIO reports that writing to NVM (at shutdown) will not succeed, and the other HWIO reports the assembly calibration integrity check has failed.	HWIO reports that writing to NVM (at shutdown) will not succeed				Diagnostic runs at controller power up.	Type B, 2 Trips
			HWIO reports the assembly calibration integrity check has failed				Diagnostic runs at controller power up.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
VIN Not Programmed or Mismatched - Engine Control Module (ECM)	P0630	This DTC checks that the VIN is correctly written	At least one of the programmed VIN digits	= 00 or FF	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 Vref1 and failing the diagnostic when the percent Vref1 is too low or too high or if the delta between the filtered percent Vref1 and non-filtered percent Vref1 is too large. This diagnostic only runs when battery voltage is high enough.	ECM percent Vref1 < or ECM percent Vref1 > or the difference between ECM filtered percent Vref1 and percent Vref1 >	4.875 % Vref1 5.125 % Vref1 0.0495 % Vref1	Diagnostic enabled AND [(Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged)]	= 1 > 6.41 Volts = 0.02 Seconds = FALSE > 8.41 Volts = TRUE	19 / 39 counts; or 0.1875 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.
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 controllers 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 >	4.875 % Vref2 5.125 % Vref2 0.0495 % Vref2	Diagnostic enabled AND [(Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged)]	= 1 > 6.41 Volts = 0.02 Seconds = FALSE > 8.41 Volts = TRUE	19 / 39 counts; or 0.1875 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.
Powertrain Relay Control (ODM) Open	P0685	Detects an open circuit in the Powertrain Relay driver. This diagnostic reports the DTC when an open circuit failure is present. Monitoring occurs when the output is powered off. A decision is made by comparing a voltage measurement to a controller specific voltage threshold.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	Open Circuit: ≥ 200 K Ω ohms impedance between output and controller ground	Run/Crank Voltage	Voltage ≥ 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0686 may also set (Powertrain Relay Control Short to Ground).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Powertrain Relay Control (ODM) Low	P0686	Detects a short to ground in the Powertrain Relay low side driver. This diagnostic reports the DTC when a short to ground failure is present. Monitoring occurs when the output is powered off. A decision is made by comparing a voltage measurement to a controller specific voltage threshold.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	Short to ground: ≤ 0.5 Ω impedance between output and controller ground	Run/Crank Voltage	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.
Powertrain Relay Control (ODM) High	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 Ω impedance between output and controller power	Run/Crank Voltage	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.
Powertrain Relay Feedback Circuit High	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 commanded “OFF” No active DTCs:	>= 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.
Cooling Fan 1 Relay Control Circuit Low Voltage (Output Driver Monitor)	P0691	Diagnoses the cooling fan 1 relay control low side driver circuit for circuit faults	Voltage low during driver off state (indicates short-to-ground)	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	Powertrain Relay Voltage	Voltage ≥ 11.00 volts	50.00 failures out of 63.00 samples 100 ms / sample	Type B, 2 Trips Note: In certain controllers P0480 may also set (Fan 1 Open Circuit).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan 1 Relay Control Circuit High Voltage (ODM)	P0692	Diagnoses the cooling fan 1 relay control low side driver circuit for circuit faults	Voltage high during driver on state (indicates short to power)	Short to power: ≤ 0.5 Ω impedance between signal and controller power	Powertrain Relay Voltage	Voltage ≥ 11.00 volts	50.00 failures out of 63.00 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 >	4.875 % Vref3 5.125 % Vref3 0.0495 % Vref3	Diagnostic enabled AND [(Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged)]	= 1 > 6.41 Volts = 0.02 Seconds = FALSE > 8.41 Volts = TRUE	19 / 39 counts; or 0.1875 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.
5 Volt Reference #4 Circuit	P06A3	Detects a continuous or intermittent short on the 5 volt reference circuit #4 by monitoring the reference percent Vref4 and failing the diagnostic when the percent Vref4 is too low or too high or if the delta between the filtered percent Vref4 and non-filtered percent Vref4 is too large. This diagnostic only runs when battery voltage is high enough.	ECM percent Vref4 < or ECM percent Vref4 > or the difference between ECM filtered percent Vref4 and percent Vref4 >	4.875 % Vref4 5.125 % Vref4 0.0495 % Vref4	Diagnostic enabled AND [(Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged)]	= 1 > 6.41 Volts = 0.02 Seconds = FALSE > 8.41 Volts = TRUE	19 / 39 counts; or 0.1875 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Knock Sensor Processor 1 Performance	P06B6	This diagnostic checks for a fault with the internal test circuit (sensor #1) used only for the '20 kHz' method of the Open Circuit Diagnostic. A fault is present when the signal level from the 20 kHz range of the FFT output falls between the Open Test Circuit thresholds.	FFT Diagnostic Output	**> P06B6_P06B7_OpenTestCktThrshMin** **AND** **< P06B6_P06B7_OpenTestCktThrshMax** **See Supporting Tables**	Diagnostic Enabled? Engine Run Time Engine Speed Cumlative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above) Engine Air Flow	Yes ≥ 2.0 seconds > 400 RPM and < 8,500 RPM ≥ 250 Revs ≥ 20 mg/cylinder and ≤ 2,000 mg/cylinder	First Order Lag Filter with Weight Coefficient Weight Coefficient = 0.0200 Updated each engine event	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Knock Sensor Processor 2 Performance	P06B7	This diagnostic checks for a fault with the internal test circuit (sensor #2) used only for the '20 kHz' method of the Open Circuit Diagnostic. A fault is present when the signal level from the 20 kHz range of the FFT output falls between the Open Test Circuit thresholds.	FFT Diagnostic Output	**> P06B6_P06B7_OpenTestCktThrshMin** **AND** **< P06B6_P06B7_OpenTestCktThrshMax** **See Supporting Tables**	Diagnostic Enabled? Engine Run Time Engine Speed Cumlative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above) Engine Air Flow	Yes ≥ 2.0 seconds > 400 RPM and < 8,500 RPM ≥ 250 Revs ≥ 20 mg/cylinder and ≤ 2,000 mg/cylinder	First Order Lag Filter with Weight Coefficient Weight Coefficient = 0.0200 Updated each engine event	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
5 Volt Reference #5 Circuit	P06D2	Detects a continuous or intermittent short on the 5 volt reference circuit #5 by monitoring the reference percent Vref5 and failing the diagnostic when the percent Vref5 is too low or too high or if the delta between the filtered percent Vref5 and non-filtered percent Vref5 is too large. This diagnostic only runs when battery voltage is high enough.	ECM percent Vref5 < or ECM percent Vref5 > or the difference between ECM filtered percent Vref5 and percent Vref5 >	4.875 % Vref5 5.125 % Vref5 0.0495 % Vref5	Diagnostic enabled AND [(Run/Crank voltage for Time period AND Starter engaged) OR (Run/Crank voltage AND Starter engaged)]	= 1 > 6.41 Volts = 0.02 Seconds = FALSE > 8.41 Volts = TRUE	19 / 39 counts; or 0.1875 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.
Two Stage Oil Pump Control Circuit Open	P06DA	Controller specific output driver circuit diagnoses the two stage oil pump low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	Open Circuit ≥ 200 k Ω impedance between output and controller ground	Diagnostic Status Powertrain Relay Voltage Run/Crank Active Cranking State	Enabled ≥ 11.00 = True = False	>= 40 errors out of 50 samples. Performed every 100 msec	Type B, 2 Trips Note: In certain controllers P06DB may also set (Two Stage Oil Pump Control Circuit Short To Ground)

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 Short To Ground	P06DB	Controller specific output driver circuit diagnoses the two stage oil pump low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	Short to Ground Circuit ≤ 0.5 Ω impedance between output and controller ground	Diagnostic Status Powertrain Relay Voltage Run/Crank Active Cranking State	Enabled ≥ 11.00 = True = False	>= 40 errors out of 50 samples. Performed every 100 msec	Type A, 1 Trips Note: In certain controllers P06DA may also set (Two Stage Oil Pump Control Circuit Open)

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 Short To Power	P06DC	Controller specific output driver circuit diagnoses the two stage oil pump low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	Short to Power ≤ 0.5 Ω impedance between output and controller power	Diagnostic Status Powertrain Relay Voltage Run/Crank Active Cranking State	Enabled ≥ 11.00 = True = False	>= 40 errors out of 50 samples. Performed every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Two Stage Oil Pump Control Circuit Performance - Two Sided	P06DD	Diagnoses the two stage oil pump is stuck in the high pressure state. This diagnostic includes an intrusive test and a passive test. Intrusive test: The oil pump control is cycled off (high pressure) and on (low pressure) Y = 15 times at calibratable intervals. If a change in oil pressure above a calibration is not detected then the oil pressure is checked to determine if it is stuck. It takes X-out-of-Y failures to fail and set the appropriate code. Passive test: After the intrusive test passes, then a passive test will begin to run. The passive test will monitor the oil pressure changes associated with oil pump control state changes. If the passive test determines that the oil pressure change was less then desired then the intrusive test is retriggered.	<u>Fail from passing state:</u> Oil Pressure delta is less than a minimum delta pressure on a state change and the measured filtered oil pressure is above a threshold	Oil Pressure delta = ABS [Filtered Oil Pressure at beginning of state change - filtered oil pressure after 1.5 seconds] Oil Pressure delta < **P06DD_P06DE_OP_StateChangeMin** AND Filtered Oil Pressure ≥ (**P0521_P06DD_P06DE_OP_HiStatePressure** + **P0521_P06DD_P06DE_OP_LoStatePressure**) ÷ 2 (see P06DD details on Supporting Tables Tab **P06DD_P06DE_OP_StateChangeMin** **P0521_P06DD_P06DE_OP_HiStatePressure** **P0521_P06DD_P06DE_OP_LoStatePressure**)	<u>Common Criteria:</u> Two Stage Oil Pump is Present Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 10,000 RPM for longer than 30.0 seconds) No active DTC's for diagnsotic enable: Check oil pump TFTKO as a diagnostic enable when Enabled. No active DTC's for control enable: <u>Active Criteria:</u> One Sided Performance Test = Disabled	TRUE ≥ 10.0 seconds ≥ 70.0 kPa FALSE Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA CrankSensor_FA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA OilPmpTFTKO Enabled : OilPmpTFTKO Enabled Fault bundles for control disable : OilPmpTFTKO EngineTorqueEstInaccurate EngOilPressureSensorFA PowertrainRelayFault CrankSensor_FA EngOilTempFA Disabled	≥ 12 errors out of 15 samples. Run once per trip or activiated by the Passive Test	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Oil Pump in Low State	> 1.5 seconds		
					Modelled Oil Temperature within range	50.0 deg C ≤ Oil Temp ≤ 110.0 deg C		
					Filtered Engine Speed within range	1,350 RPM ≤ Filtered Engine Speed ≤ 2,500 RPM		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds] ≤ 150 RPM		
					Engine Torque within range	**P06DD_P06DE_MinEnableTorque_OP** ≤ Indicated Requested Engine Torque ≤ **P06DD_P06DE_MaxEnableTorque_OP** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_MinEnableTorque_OP** **P06DD_P06DE_MaxEnableTorque_OP**)		
					Filtered Oil Pressure within range	Filtered Engine Oil Pressure > **P06DD_P06DE_MinOilPressThresh** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_MinOilPressThresh**)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Expected Oil Pressure Delta within range	100.0 kPa < ABS [**P0521_P06DD_P06DE_OP_HiStatePressure** - **P0521_P06DD_P06DE_OP_LoStatePressure**] < 250.0 kPa		
					<u>Passive Criteria:</u>			
					Active Test Passed	TRUE		
					Filtered Engine Speed within range	1,000 RPM ≤ Filtered Engine Speed ≤ 4,500 RPM		
					Modelled Oil Temperature within range	40.0 deg C ≤ Oil Temp ≤ 120.0 deg C		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.50 seconds] ≤ 1,000 RPM		
					Oil Pressure Delta within a range	Oil Pressure Delta < **P06DD_P06DE_OP_StateChangeMin** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_OP_StateChangeMin**)		
			<u>Fast Pass Condition</u> Oil Pressure delta is less than a minimum delta pressure on a state change and the measured filtered oil pressure is	Oil Pressure delta = ABS [Filtered Oil Pressure at beginning of state change -	<u>Common Criteria:</u> Two Stage Oil Pump is Present Engine Running	 TRUE ≥ 10.0 seconds	0 errors out of 5 samples. Run once per trip or activiated by the Passive Test	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						RPM		
					Engine Torque within range	**P06DD_P06DE_MinEnableTorque_OP** ≤ Indicated Requested Engine Torque ≤ **P06DD_P06DE_MaxEnableTorque_OP** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_MinEnableTorque_OP** **P06DD_P06DE_MaxEnableTorque_OP**)		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds] ≤ 150 RPM		
					Filtered Oil Pressure within range	Filtered Engine Oil Pressure > **P06DD_P06DE_MinOilPressThresh** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_MinOilPressThresh**)		
					Expected Oil Pressure Delta within range	100.0 kPa < ABS [**P0521_P06DD_P06DE_OP_HiStatePressure** - **P0521_P06DD_P06DE_OP_LoStatePressure**] < 250.0 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Two Stage Oil Pump Control Circuit StuckOn - Two Sided	P06DE	Diagnoses the two stage oil pump is stuck in the low pressure state. This diagnostic includes an intrusive test and a passive test. Intrusive test: The oil pump control is cycled off (high pressure) and on (low pressure) Y times at calibratable intervals. If a change in oil pressure above a calibration is not detected then the oil pressure is checked to determine if it is stuck. It takes X-out-of-Y failures to fail and set the appropriate code. Passive test: After the intrusive test passes, then a passive test will begin to run. The passive test will monitor the oil pressure changes associated with oil pump control state changes. If the passive test determines that the oil pressure change was less then desired then the intrusive test is retriggered.	<u>Fail from a passing state:</u> Oil Pressure delta is less than a minimum delta pressure on a state change and the measured filtered oil pressure is below a threshold	Oil Pressure delta = ABS [Filtered Oil Pressure at beginning of state change - filtered oil pressure after 1.5 seconds] Oil Pressure delta < **P06DD_P06DE_OP_StateChangeMin** (see P06DE details on Supporting Tables Tab) Filtered Oil Pressure ≤ **P0521_P06DD_P06DE_OP_HiStatePressure** (**re - P0521_P06DD_P06DE_OP_LoStatePressure**) **÷ 2** (see P06DE details on Supporting Tables Tab)	<u>Common Criteria</u>: Two Stage Oil Pump is Present Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 10,000 RPM for longer than 30.0 seconds) No active DTC's for diagnsotic enable: Check oil pump TFTKO as a diagnostic enable when Enabled. No active DTC's for control enable: <u>Active Criteria</u>: One Sided Performance	TRUE ≥ 10.0 seconds ≥ 70.0 kPa FALSE Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA CrankSensor_FA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA Enabled : OilPmpTFTKO Enabled Fault bundles for control disable : OilPmpTFTKO EngineTorqueEstInaccurate EngOilPressureSensorFA PowertrainRelayFault CrankSensor_FA EngOilTempFA Disabled	≥ 12 errors out of 15 samples. Run once per trip or activiated by the Passive Test	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Test = Disabled			
					Oil Pump in Low State	> 1.5 seconds		
					Modelled Oil Temperature within range	50.0 deg C ≤ Oil Temp ≤ 110.0 deg C		
					Filtered Engine Speed within range	1,350 RPM ≤ Filtered Engine Speed ≤ 2,500 RPM		
					Engine Torque within range	**P06DD_P06DE_MinEnableTorque_OP** ≤ Indicated Requested Engine Torque ≤ **P06DD_P06DE_MaxEnableTorque_OP** (see P06DE details on Supporting Tables Tab)		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds] ≤ 150 RPM		
					Filtered Oil Pressure within range	Filtered Engine Oil Pressure > **P06DD_P06DE_MinOilPressThresh** (see P06DD details on Supporting Tables Tab)		
					Expected Oil Pressure Delta within range	100.0 kPa < ABS [**P0521_P06DD_P06DE_OP_HiStatePressure** - **P0521_P06DD_P06DE_OP_LoStatePressure**] < 250.0 kPa		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				P06DD_P06DE_OP_StateChangeMin (P06DD Performance Test Details on Supporting Tables Tab) Filtered Oil Pressure ≤ **P0521_P06DD_P06DE_OP_HiStatePressu** (**re** - **P0521_P06DD_P06DE_OP_LoStatePressure**) / 2 (P06DD Performance Test Details on Supporting Tables Tab)	> 10,000 RPM for longer than 30.0 seconds) No active DTC's for diagnsotic enable: Check oil pump TFTKO as a diagnostic enable when Enabled. No active DTC's for control : <u>Active Criteria:</u> One Sided Performance Test = Disabled Oil Pump in Low State Modelled Oil Temperature within range Filtered Engine Speed within range Engine Torque within range	Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA CrankSensor_FA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA Enabled : OilPmpTFTKO Enabled Fault bundles for control disable : OilPmpTFTKO EngineTorqueEstInaccurate EngOilPressureSensorFA PowertrainRelayFault CrankSensor_FA EngOilTempFA Disabled > 1.5 seconds 50.0 deg C ≤ Oil Temp ≤ 110.0 deg C 1,350 RPM ≤ Filtered Engine Speed ≤ 2,500 RPM **P06DD_P06DE_MinEnableTorque_OP** ≤		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						Indicated Requested Engine Torque ≤ **P06DD_P06DE_MaxEnableTorque_OP** (P06DD Performance Test Details on Supporting Tables Tab)		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds] ≤ 150 RPM		
					Filtered Oil Pressure within range	Filtered Engine Oil Pressure > **P06DD_P06DE_MinOilPressThresh** (see P06DD details on Supporting Tables Tab)		
					Expected Oil Pressure Delta within range	100.0 kPa < ABS [**P0521_P06DD_P06DE_OP_HiStatePressure** - **P0521_P06DD_P06DE_OP_LoStatePressure**] < 250.0 kPa		

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Position Switch A/B Correlation	P07BE	Correlation diagnosic compares the two switches behind the Park pushbutton	Compares Park Switch A and Park Switch B "PRESSED" and "RELEASED" states. Park 1 and Park 2 are both:	=Valid, but not equal continuously = valid states (RELEASED or PRESSED), but disagree.	Not Fault Active Diagnostic System Disable Calibration: Park Comparison Diagnostics Enable Calibration: Vehicle speed:	P07B3, P07B4, P07B5, P07B9, P07BA, P07BB =FALSE = TRUE <= Park Request Spd, calibrated with a hysteresis loop: 10.50 and 10.00 .	4,800 failures out of 6,000 samples 12.5 ms rate	DTC Type B, two trips.

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Temperature Erratic	P100C	This DTC monitors for an erratic Temperature signal via LIN bus from the Battery Monitor Module	Communication of the Temperature signal from the Battery Monitor Module has become erratic or is incorrect for out of total samples	>= 4 counts >= 5 counts	The diagnostic is enabled All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= 1 (1 indicates enabled) >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 11.00 Volts	LIN bus communication executes in 500ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Internal Temperature Circuit Erratic	P100D	This DTC monitors for an erratic Temperature Circuit signal via LIN bus from the Battery Monitor Module	Communication of the Temperature Circuit signal from the Battery Monitor Module has become erratic or is incorrect for out of total samples	>= 4 counts >= 5 counts	The diagnostic is enabled All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= 1 (1 indicates enabled) >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 11.00 Volts	LIN bus communication executes in 500ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Heater Supply Voltage Sense Circuit Range/ Performance	P103B	The P103B diagnostic determines if the heater supply circuit is rational by comparing the heater supply voltage to the run crank voltage and calculating the difference. The heater supply voltage input is connected to the O2 heater supply circuit inside the vehicle relay center. It is representative of the voltage supplied to the O2 heaters. The O2 heater voltage is used by the HWIO to calculate the O2 heater resistance on switching type O2 sensors (non-WRAF). With a fault set, the resistance calculation is performed with run crank voltage. The diagnostic failure counter is incremented if the voltage difference is greater than the threshold. This DTC is set based on the fail and sample counters.	The absolute value of Heater Supply Voltage delta from Run Crank voltage	> 2.00 volts	Powertrain relay in range (Relay in range is defined as relay voltage Run Crank signal active	= True > 11.00 volts) = True (Please see “**Run/Crank Active conditiions**” in Supporting Tables)	8 failures out of 10 samples 250 ms / sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Heater Supply Voltage Sense Circuit Low	P103C	The P103C diagnostic determines if the heater supply circuit is low by comparing the heater supply voltage to the threshold. The heater supply voltage input is connected to the O2 heater supply circuit inside the vehicle relay center. It is representative of the voltage supplied to the O2 heaters. The O2 heater voltage is used by the HWIO to calculate the O2 heater resistance on switching type O2 sensors (non-WRAF). With a fault set, the resistance calculation is performed with run crank voltage. The diagnostic failure counter is incremented if the heater supply voltage is less than the threshold. This DTC is set based on the fail and sample counters.	Heater Supply Voltage	< 2.00 volts	Powertrain relay in range (Relay in range is defined as relay voltage Run Crank signal active	= True > 11.00 volts) = True (Please see “**Run/Crank Active conditiions**” in Supporting Tables)	8 failures out of 10 samples 250 ms / sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Inlet Airflow System Performance (single turbo)	P1101	Detects a performance failure in the Manifold Pressure (MAP) sensor, Turbocharger Boost Pressure sensor, Throttle Position sensor (TPS) or Mass Air Flow (MAF) sensor that cannot be uniquely identified as a failure in one individual sensor. This diagnostic can set when more than one of these sensors has a performance concern. This diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from these four sensors. These modeled values are compared against the actual sensor values to see if they are similar. If they are similar, then the model passes. If they are not similar, then that model is considered to be failed. Certain combinations of model passes and model failures can be interpreted to be caused by a performance issue with	See table **P0101, P0106, P010B, P0121, P0236, P1101: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix** for combinations of model failures that can set this DTC. MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered MAP1 model fails when ABS(Measured MAP – MAP Model 1) Filtered MAP2 model fails when ABS(Measured MAP – MAP Model 2) Filtered MAP3 model fails when ABS(Measured MAP – MAP Model 3) Filtered TIAP1 model fails when ABS(Measured TIAP – TIAP Model 1) Filtered TPS model fails when Filtered Throttle Model Error TIAP Correlation model fails when High Engine Air Flow is TRUE AND Measured TIAP -	> 20.0 grams/sec > 25.0 kPa > 23.0 kPa > 24.0 kPa > 30.0 kPa > 225 kPa*(g/s)	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria (Coolant Temp OR OBD Max Coolant Achieved Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables.	>= 400 RPM <= 6,100 RPM >= -9 Deg C = TRUE) <= 125 Deg C = FALSE) >= -20 Deg C <= 125 Deg C >= 0.50 Modeled Air Flow Error multiplied by **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM** and **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est** MAP Model 1 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM**	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		the system, but no single failed sensor can uniquely be identified. In this case, the Inlet Airflow System Performance diagnostic will fail.	measured MAP - offset as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Offset** OR Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Offset** TIAP Correlation is valid when High Engine Air Flow has been TRUE for a period of time OR Low Engine Air Flow has been TRUE for a period of time High Engine Air Flow is TRUE when Mass Air Flow	> 30.0 kPa > 30.0 kPa > 0.8 seconds > 0.8 seconds > a threshold in gm sec as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min Air Flow**	No Active DTCs: No Pending DTCs:	MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** MAP Model 3 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP3 Residual Weight Factor based on RPM** TIAP Model 1 Error multiplied by **P0101, P0106, P0121, P0236, P1101: TIAP Residual Weight Factor based on RPM** Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTempSensorFA TC_BoostPresSnsrCktFA AmbientAirDefault 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.
			AND Manifold Pressure	> a threshold in kPa as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min MAP**		MnfdTempSensorCktFP		
			AND Filtered Mass Air Flow - Mass Air Flow	< 1.3 gm/sec				
			Low Engine Air Flow is TRUE when Mass Air Flow	< a threshold in gm sec as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max Air Flow**				
			AND Manifold Pressure	< a threshold in kPa as a function of engine speed See table **P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max MAP**				
			AND Mass Air Flow - Filtered Mass Air Flow	< 2.0 gm/sec				

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	P111E	This DTC detects either a biased high or low ECT (Engine Coolant temperature) sensor. This is done by comparing the ECT sensor output to two other temperature sensor outputs after a soak condition.	**Sensor usage definitions:** **Sensor1 =** CeECTR_e_ECT_Snsr (Sensor1 is the temp sensor most impacted by the block heater (if equipped)) **Sensor2 =** CeECTR_e_OAT_Snsr **Sensor3 =** CeECTR_e_IAT_Snsr ========== A failure will be reported if any of the following occur: 1) Sensor1 power up absolute temp difference to Sensor2 and Sensor3 is (Sensor1 fast fail) . 2) Sensor1 power up temp is greater than Sensor2 and Sensor3 in this range: (and a block heater has not been detected) 3) Sensor1 power up temp is lower than Sensor2 and Sensor3 by this amount: 4) Sensor1 power up temp is ≥ Sensor2 and	 ≥ 50.0 ºC ≥ 15.8 and < 50.0 ºC ≤ 15.8 Deg ºC	No Active DTC's Engine Off Soak Time Propulsion Off Soak Time Non-volatile memory initization Test complete this trip Test aborted this trip Test disabled this trip Ambient LowFuelCondition Diag ========== Block Heater detection is **enabled** when either of the following occurs: 1) Sensor1 power up temp is greater than Sensor2 and Sensor3 in this range: 2) Cranking time ==========	VehicleSpeedSensor_FA IAT_SensorCircuitFA THMR_RCT_Sensor_Ckt_FA ECT_Sensor_Ckt_FA EngineModeNotRunTimerError EngineModeNotRunTimer_FA OAT_PtEstFiltFA OAT_PtEstRawFA PSAR_PropSysInactveCrs_FA DRER_DiagSystemDsbl > 25,200 seconds > 0 seconds = Not occurred = False = False = False ≥ -9 ºC = False ========== ≥ 15.8 ºC and < 50.0 ºC < 10.0 Seconds ==========	1 failure to set DTC 1 sec/ sample Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Sensor3 by 15.8 ºC and the time spent cranking the engine without starting is ≥ 10.0 seconds with the LowFuelConditionDiag	= False	Block Heater is **detected** and diagnostic is aborted when 1) or 2) occurs. 1a) IAT monitoring is enabled after the following Vehicle drive constraints 1b) Drive time 1c) Vehicle speed 1d) Additional Vehicle drive time is provided to 1b when Vehicle speed is below 1c as follows: 1e) IAT drops from power up IAT 2a) ECT monitoring is enabled after engine start in the following engine run time window 2b) Sensor1 temp derivative during the test is: 2c) Consectutive samples of 2b) being true are: ========== Diagnostic is **aborted** when 3) or 4) occurs: 3) Engine run time with vehicle speed below 1b 4) Engine off time (i.e. auto stop) during Block heater detection	 > 400 Seconds with > 14.9 MPH and 0.50 times the seconds with vehicle speed below 1b ≥ 5.0 ºC 5.0 <= seconds <= 30.0 < -0.10 ºC/sec ≥ 4 samples ========== ≥ 1,800 Seconds ≥ 180.0 Seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT SIDI High Pressure Rail Temperature Sensor Performance	P111F	This DTC Diagnoses Fuel Temperature sensors rationality by comparing Primary sensor (T1) vs. Secondary sensor (T2)	Fuel Temperature Error (Absolute delta between sensor1 and sensor2)	> 20.00 degC	Fuel Temperature Rationality Diagnostic Enabled No Fault Active on No Fault Pending on	True Enabled when a code clear is not active or not exiting device control Temperature sensors 1 out of range Low or High Fault Active (P0182, P0182) Temperature sensors 2 out of range Low or High (P0187, P0188) SENT Communication Fault Active (P16E4, P16E5) SENT Intenal Error Fault Active (P126E, P126F) Fuel Temperature Sensor SENT Message Error Fault Active (P128C, P128D) SENT Communication Fault Pending (P16E4, P16E5) Fuel Temperature Sensor SENT Message Error Fault Pending (P128C, P128D)	100.00 failures out of 125.00 samples 100 ms per Sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 low side circuit shorted to high side circuit	P1248	Controller specific output driver circuit diagnoses injector 1 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold	Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 1 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 low side circuit shorted to high side circuit	P1249	Controller specific output driver circuit diagnoses injector 2 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold	Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 1 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 low side circuit shorted to high side circuit	P124A	Controller specific output driver circuit diagnoses injector 3 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold	Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 1 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 4 low side circuit shorted to high side circuit	P124B	Controller specific output driver circuit diagnoses injector 4 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold	Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 1 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Over Temperature	P1255	To detect if an internal fuel pump driver over-temperature condition exists under normal operating conditions	Fuel Pump Driver Circuit Board temperature (Fuel Pump Driver Overtemperature enumeration)	T>= 160 degC (Fuel Pump Power Module smart device reports Faulted, Not Faulted or Indeterminate)	a) Chassis Fuel Pres Sys Type configuration selection b) Diagnostic Enabled c] FPPM Driver Status Alive Rolling Count Sample Faulted d] Diagnostic feedback received e] Run_Crank Ignition Switch Position Circuit VoltageSystem Voltage	a) == FCBR ECM FPPM Sys b) == TRUE c] <> True d] == TRUE e] > 7.00 volts	3 failures / 15 samples 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.
SENT Fuel Rail Temperature Sensor 1 Internal Fault - Error Code	P126E	This DTC Diagnoses the SENT Fuel Temperature Sensor 1 internal failure	Fuel Temperature Sensor 1 SENT digital read value	>= 4,089.00	No Fault Active on No Fault Pending on	Enabled when a code clear is not active or not exiting device control SENT Communication Fault Active (P16E4, P16E5) Fuel Temperature Sensor SENT Message Error Fault Active (P128C) Fuel Temperature Sensor SENT Message Error Fault Pending (P128C)	50.00 failures out of 62.00 samples 100 ms per Sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT Fuel Rail Temperature Sensor 2 Internal Fault - Error Code	P126F	This DTC Diagnoses the SENT Fuel Temperature Sensor 2 internal failure	Fuel Temperature Sensor 2 SENT digital read value	>= 4,089.00	No Fault Active on No Fault Pending on	Enabled when a code clear is not active or not exiting device control SENT Communication Fault Active (P16E4, P16E5) Fuel Temperature Sensor SENT Message Error (P128D) Fuel Temperature Sensor SENT Message Error Fault Pending (P128D)	50.00 failures out of 62.00 samples 100 ms per Sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT Fuel Rail High Pressure Sensor 2 Out of Range	P127C	This DTC diagnose SENT high pressure sensor 2 that is too low out of range. If the sensor digital value (represnting the refernce voltage) is below the lower digital threshold, the low fail counter then increments. If the low fail counter reaches its threshold then a fail is reported. A pass is reported for this DTC if the low sample counter reaches its threshold.	High Pressure Rail Sensor 2 SENT digital read value	=< 94			Time Based: 400 Failuer out of 500 Samples 6.25 ms per Sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 Not Fault Pending	Enabled when a code clear is not active or not exiting device control True P16E4 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 Not Fault Pending	Enabled when a code clear is not active or not exiting device control True P16E4 P16E5 P128F	400 failures out of 500 samples 6.25 ms per Sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT Fuel Rail Pressure &Temperature Sensor Temperature 1 Message Incorrect	P128C	This DTC diagnoses the the communication errors on the temperature 1 serial data channel	Serial Message 1 Age	>= 0.04 ms	SENT signal Serial waveform diagnostics enable SENT power up delay No Fault Active	True >= 0.00 seconds P16E4 P16E5	114 failures out of 142 samples 6.25 ms per sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT Fuel Rail Pressure & Temperature Sensor Temperature 2 Message Incorrect	P128D	This DTC diagnoses the the communication errors on the temperature 2 serial data channel	Serial Message 2 Age	>= 0.04 ms	SENT signal Serial waveform diagnostics enable SENT power up delay No Fault Active	True >= 0.00 seconds P16E4 P16E5	114 failures out of 142 samples 6.25 ms per sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SENT Fuel Rail Pressure & Temperature Sensor Pressure Message Incorrect	P128F	This DTC determines if there is any SENT signal waveform for discrepancies (i.e. too many pulse, too few pulse, clock shift). The 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 > 1.94 ms	SENT signal Serial waveform diagnostics enable SENT power up delay No Fault Active on	True >= 0.00 seconds Enabled when a code clear is not active or not exiting device control P16E4 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 Module-Ignition Switch Run/ Start Position Circuit Low [FPPM applications only]	P129D	To detect if the Run/ Start position circuit voltage is short to low / open	FPPM Run_Crank Active status	<> ECM Run_Crank Active status	a) FPPM configuration KeFRPR_e_ChassisFuel PresSysType b) Diagnostic KeFRPR_b_FPPM_RunC rnkRatlEnbld c) FPPM Control Status Alive Rolling Count result d) Diagnostic feedback received e) System Voltage	a) == CeFRPR_e_ECM_FPPM _Sys b) == TRUE c) == Valid d) == TRUE e) >= 0.0 v	64 failures / 80 samples 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.
Fuel Pump Driver Module-Ignition Switch Run/ Start Position Circuit Low [FPPM applications only]	P129D	To detect if the Run/ Start position circuit voltage is short to low / open	FPPM Run_Crank Active status	<> ECM Run_Crank Active status	a) FPPM configuration KeFRPR_e_ChassisFuel PresSysType b) Diagnostic KeFRPR_b_FPPM_RunC rnkRatlEnbld c) FPPM Control Status Alive Rolling Count result d) Diagnostic feedback received e) System Voltage	a) == CeFRPR_e_ECM_FPPM _Sys b) == TRUE c) == Valid d) == TRUE e) >= 0.0 v	64 failures / 80 samples 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.
Fuel Pump Driver Control Module Signal Message Counter Incorrect [FPPM applications only]	P129E	To detect if the command message received as serial data from the engine control module is valid The "rolling count check" value is created by adding an appended hexadecimal calculation to the pump duty cycle command value. In order to achieve a desired fuel pressure, a hexadecimal equivalent value representing the necessary fuel pump current pulse "On" time (duty cycle as a percent value) is transmitted to the FPPM. The corresponding "check" value is transmitted as well. At the FPPM, the received duty cycle command value is used to create an expected "rolling count" value using the same calculation method as the ECM. The expected "rolling count" value calculated at the receiving power module (smart device) is compared to the transmitted "rolling count" value. If these do not match, a fault condition is reported	FPPM Received Duty Cycle Rolling Count	<> Transmitted Duty Cycle Rolling Count (ECM) (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	a) Chassis Fuel Pres Sys Type configuration selection b) Diagnostic Enabled c) FPPM Control Rolling Count Faulted d) FPPM Diagnostic data received [$0CE] e) FPPM Diagnostic Data Validity Enabled f) Diagnostic System Disabled g) Communication Faulted h) Run_Crank Ignition Switch Position Circuit Voltage j) Run_Crank Ignition Status k) Sensor Bus Relay On	a) == FCBR ECM FPPM Sys b) == TRUE c) <> True d) == TRUE e) == TRUE f) <> True g) <> True h) > 7.00 Volts j) == TRUE k) == TRUE	64 failures / 80 samples 1 sample / 12.5 millisec	Type B, 2 Trips
			FPPM Received Duty Cycle Protection Value	<> Transmitted Duty Cycle Protection Value (ECM) (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	a) Chassis Fuel Pres Sys Type configuration selection b) Diagnostic Enabled c) FPPM Control Rolling Count Faulted d) FPPM Diagnostic data received [$0CE] e) FPPM Diagnostic Data Validity Enabled f) Diagnostic System Disabled g) Communication Faulted h) Run_Crank Ignition Switch Position Circuit	a) == FCBR ECM FPPM Sys b) == TRUE c) <> True d) == TRUE e) == TRUE f) <> True g) <> True h) > 7.00 Volts	64 failures / 80 samples 1 sample / 12.5 millisec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		forward to the ECM where X/Y diagnostic counting is performed.			Voltage j) Run_Crank Ignition Status k) Sensor Bus Relay On	 j) == TRUE k) == TRUE		

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 accomplished by comparing the Fuel Control Enable circuit voltage state [high or low] measured by the Fuel Pump Driver Control Module to the state of Fuel Control Enable signal in the ECM. When the measured state does not match the expected state, the fail counter increments.	FPPM Fuel Control Enable Circuit Voltage State	<> Fuel Control Enable State (ECM)	a) Chassis Fuel Pres Sys Type configuration selection b) Diagnostic Enabled c) Diagnostic System Disabled d) Run_Crank Ignition Sw Position Status Active Timer [expired] e) FPPM Control Data Rolling Count Faulted f) Diagnostic serial data received g) Run_Crank Ignition Switch Position Circuit Voltage	a) == FCBR ECM FPPM Sys b) == TRUE c) <> True d) >= 0.00 seconds e) <> True f) == TRUE g) > 7.00 volts	40 failures / 80 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 Status Signal Message Counter Incorrect [FPPM applications only]	P12A8	To detect if the control status message transmitted as serial data from the driver control module is valid. The "rolling count check" value is created by adding an appended hexadecimal calculation to each control command value. The corresponding "check" value is transmitted to the FPPM as well as the actual command. At the FPPM, the received command value is used to create an expected "rolling count" value using the same calculation method as the ECM. The expected "rolling count" value calculated at the receiving power module (smart device) is compared to the transmitted "rolling count" value. If these do not match, a fault condition is reported forward to the ECM where X/Y diagnostic counting is performed.	FPPM Control Status Alive Rolling Count	<> ECM Control Status Alive Rolling Count (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	a) Chassis Fuel Pres Sys Type configuration selection b) Diagnostic Enabled c) FPPM Diagnostic serial data received d) Run_Crank Ignition Switch Position Circuit Voltage	a) == FCBR ECM FPPM Sys b) == TRUE c) == TRUE d) > 0.00 Volts	64 failures / 80 samples 1 sample / 12.5 millisec	Type B, 2 Trips
			FPPM Power Consumption Alive Rolling Count	<> ECM Power Consumption Alive Rolling Count (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	a) Chassis Fuel Pres Sys Type configuration selection b) Diagnostic Enabled c) FPPM Diagnostic serial data received d) Run_Crank Ignition Switch Position Circuit Voltage	a) == FCBR ECM FPPM Sys b) == TRUE c) == TRUE d) > 0.00 Volts	64 failures / 80 samples 1 sample / 12.5 millisec	
			FPPM Driver Status Alive Rolling Count	<> ECM Driver Status Alive Rolling Count (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	a) Chassis Fuel Pres Sys Type configuration selection b) Diagnostic Enabled c) FPPM Diagnostic serial data received d) Run_Crank Ignition Switch Position Circuit Voltage	a) == FCBR ECM FPPM Sys b) == TRUE c) == TRUE d) > 0.00 Volts	64 failures / 80 samples 1 sample / 12.5 millisec	
			FPPM Hardware Status Alive Rolling Count	<> ECM Hardware Status Alive Rolling Count (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	a) Chassis Fuel Pres Sys Type configuration selection b) Diagnostic Enabled c) FPPM Diagnostic serial data received d) Run_Crank Ignition Switch Position Circuit Voltage	a) == FCBR ECM FPPM Sys b) == TRUE c) == TRUE d) > 0.00 Volts	64 failures / 80 samples 1 sample / 12.5 millisec	

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.
Cold Start Emissions Reduction System Fault	P1400	Model based test computes power from exhaust flow and thermal energy resulting from elevated idle speed and retarded spark advance. Detects if the cold start emission reduction system has failed resulting in the delivered power being out of range.	Average desired accumulated exhaust power - Average actual accumulated exhaust power (too much energy delivered to catalyst) Average desired accumulated exhaust power - Average actual accumulated exhaust power (too little energy delivered to catalyst) (EWMA filtered) Average Power = output of **P1400_EngineSpeedResidual_Table** * output of **P1400_SparkResidual_Table** NOTE: Desired accumulated power would use the desired catalyst light off spark and desired engine speed and the actual accumuated power would use the final commanded spark and actual engine speed. Refer to the Supporting Tables for details	< -32.00 KJ/s (high RPM failure mode) > 42.77 KJ/s (low RPM failure mode)	To enable the diagnostic, the Cold Start Emission Reduction Strategy must be Active per the following: Catalyst Temperature AND Engine Coolant AND Engine Coolant AND Barometric Pressure The Cold Start Emission Reduction strategy must not be exiting. The strategy will exit per the following: Catalyst Temperature AND Engine Run Time OR Engine Run Time OR Barometric Pressure	< 350.00 degC > -10.00 degC <= 66.00 degC >= 72.00 KPa >= 900.00 degC >= 45.00 seconds > **P050D_P1400_CatalystLightOffExtendedEngineRunTimeExit** This Extended Engine run time exit is a function of percent ethanol and Catmons NormRatioEWMA. Refer to "Supporting Tables" for details. < 72.00 KPa	Runs once per trip when the cold start emission reduction strategy is active Frequency: 100ms Loop Test completes after 10 seconds of accumulated qualified data.	EWMA Based - Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Other Enable Criteria:			
					OBD Manufacturer Enable Counter	0		
					Vehicle Speed	< 1.24 MPH		
					Allow diagnostic to calculate residual in an off-idle state. If the value of the OffIdleEnable is equal to 1 then the "DriverOffAccelPedal" will not be checked. However, if the value of OffIdleEnable is 0 then driver must be off the accel pedal	0 (A value of 1 allows diagnostic to run and calculate the residual while off idle. A value of 0 requires calculation of the residual at idle)		
					A change in throttle position (tip-in/tip-out) will initiate a delay in the calculation of the average qualified residual value. Therefore when the:			
					Pedal Close Delay Timer	> 5.00 seconds		
					the diagnostic will continue the calculation.			
					A change in gear will initiate a delay in the calculation of the average qualified residual value to			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					allow time for the actual engine speed and actual final commanded spark to achieve their desired values. Therefore, when the: Gear Shift Delay Timer the diagnostic will continue the calculation For Manual Transmission vehicles: Clutch Pedal Position Clutch Pedal Position The diagnostic will delay calculation of the residual value and potentially weight the residual calculation differently based on engine run time. This is to ensure the diagnostic is operating in idle speed control as well as during the peak catalyst light off period. The time weighting factor must be :	> 3.00 seconds > 75.00 % < 12.00 % > 0 These are scalar values that are a function of engine run time. Refer to		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Engine Speed Request Circuit	P150C	This DTC monitors for an error in communication with the Transmission Engine Speed Request signal in $19D	Communication of the Alive Rolling Count or Protection Value in the Transmission Engine Speed signal over CAN bus is incorrect for out of total samples	>= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= Is available >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 11.00 Volts	Executes in 25ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Throttle Position Steady State Actuation Fault	P1516	Detect an inablity to maintain a steady state throttle position.	The absolute difference between desired and indicated throttle position is >	2.00 percent	Run/Crank voltage TPS minimum learn is not active AND Throttle is being Controlled Throttle is considered in a steady state condition when the desired throttle position over a 12.5 ms period is For a settling time period Ignition voltage failure is false	> 6.41 Volts < 0.25 percent > 4.00 seconds P1682	0.49 ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Communication Error with Active Grill Air Shutter Module “A”	P151E	This DTC monitors for an internal error or error in communication with the Active Grill Air Shutter Module A	Communication of the Alive Rolling Count from the Shutter Module A over LIN bus is incorrect or the Shutter Module A signals has an internal error for out of total samples	 >= 8.00 counts >= 10.00 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= Is available >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 11.00 Volts	LIN bus communication executes in 500ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Switch State Undetermined	P155A	Detects when cruise switch state cannot be determined, such as low voltage conditions	cruise switch state is received as "undetermined" for greater than a calibratable time	fail continuously for greater than 3.0 seconds			fail continuously for greater than 3.0 seconds	Type C, No SVS, "Emissions Neutral Diagnostics – special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Actuator Voltage Signal Message Counter Incorrect	P155E	This DTC monitors for an error in communication with the DC/DC Converter Actuator Voltage Signal	Communication of the Alive Rolling Count or Protection Value from the DC/DC Converter over CAN bus is incorrect for out of total samples	>= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= Is available >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 11.00 Volts	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Ignition Switch Run/ Start Position Signal Message Counter Incorrect	P156D	This DTC monitors for an error in communication with the DC/DC Converter Run/ Crank Terminal Status Signal	Communication of the Alive Rolling Count or Protection Value from the DC/DC Converter over CAN bus is incorrect for out of total samples	>= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= Is available >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 11.00 Volts	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Crank Control Signal Message Counter Incorrect	P156E	This DTC monitors for an error in communication with the DC/DC Converter Crank Control Terminal Signal	Communication of the Alive Rolling Count or Protection Value from the DC/DC Converter over CAN bus is incorrect for out of total samples	>= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= Is available >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 11.00 Volts	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	Type of cruise system in GMLAN $4E9 does not match with that in the Engine Control Module for a fix time.	2.5 seconds	DID $40 from BCM says cruise system is present (ECM recieves programmble information from Body Control Module) OR ECM will not receive Programmable information for Cruise from Body Control Module	 True	fail continuously for greater than 2.5 seconds.	Type C, No SVS "Emissions Neutral Diagnostics – Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Front Object Detection Control Module Torque Request Signal Message Counter Incorrect	P15F6	Detects rolling count or protection value errors in Collision Preparation System Axle Torque Command serial data signal	If x of y rolling count / protection value faults occur, disable collision preparation system for duration of fault		Front Object Detection Module Torque Request Serial Data Error Diagnostic Enable	0.00	4 / 10 counts	Type X, No MIL , "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.
Automatic Braking Engine Torque Request Signal Message Incorrect	P15F8	Detects rolling count or protection value errors Rear Virtual Bumper Axle Torque Command serial data signal	If x of y rolling count / protection value faults occur, disable rear virtual bumper or collision preparation system for duration of fault		Automatic Braking Engine Torque Request Serial Data Error Diagnostic Enable	0.00	4 / 10 counts	Type X, No MIL , "Emissions Neutral Diagnostics – special type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Sensor Signal Message Counter Incorrect	P15FF	This DTC monitors for an internal error or error in communication with the Battery Monitor Signal	Communication of the Alive Rolling Count from the Battery Monitor Module in frame 1E over LIN bus is incorrect or the Battery Monitor Module signals it has an internal error for out of total samples Or Communication of the Alive Rolling Count from the Battery Monitor Module in frame 15 over LIN bus is incorrect or the Battery Monitor Module signals it has an internal error for out of total samples Or Communication of the Alive Rolling Count from the Battery Monitor Module in frame 16 over LIN bus is incorrect or the Battery Monitor Module signals it has an internal error for out of total samples Or Communication of the Alive Rolling Count from	>= 8.00 counts >= 10.00 counts >= 8.00 counts >= 10.00 counts >= 8.00 counts >= 10.00 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= Is available >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 11.00 Volts	Fastest periodic communication rate to Battery Monitor Module on LIN bus executes at 250ms.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			the Battery Monitor Module in frame 17 over LIN bus is incorrect or the Battery Monitor Module signals it has an internal error for	>= 8.00 counts				
			out of total samples	>= 10.00 counts				
			Or					
			Communication of the Alive Rolling Count from the Battery Monitor Module in frame 18 over LIN bus is incorrect or the Battery Monitor Module signals it has an internal error for	>= 8.00 counts				
			out of total samples	>= 10.00 counts				
			Or					
			Communication of the Alive Rolling Count from the Battery Monitor Module in frame 19 over LIN bus is incorrect or the Battery Monitor Module signals it has an internal error for	>= 8.00 counts				
			out of total samples	>= 10.00 counts				
			Or					
			Communication of the Alive Rolling Count from the Battery Monitor Module in frame 1D over LIN bus is incorrect or the					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Battery Monitor Module signals it has an internal error for out of total samples Or Communication of the Alive Rolling Count from the Battery Monitor Module in frame 1A over LIN bus is incorrect or the Battery Monitor Module signals it has an internal error for out of total samples Or Communication of the Alive Rolling Count from the Battery Monitor Module in frame 1B over LIN bus is incorrect or the Battery Monitor Module signals it has an internal error for out of total samples Or Communication of the Alive Rolling Count from the Battery Monitor Module in frame 1C over LIN bus is incorrect or the Battery Monitor Module signals it has an internal error for	>= 8.00 counts >= 10.00 counts >= 8.00 counts >= 10.00 counts >= 8.00 counts >= 10.00 counts >= 8.00 counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			out of total samples	>= 10.00 counts				

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 current monitor	P163A	This DTC Diagnoses the current from the control area and compares it with calibrated thresholds to set current high and low flags	SIDI fuel pump High Current Test Current SIDI fuel pump Low Current Test Current	 >= 11.00 Amps <= 0.10 Amps	Battery Voltage Low Side Fuel Pressure Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP or TFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) and Cam or Crank Sensor Not FA and IAT,IAT2,ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and Device control commanded pressure is false and Device control pump ckt enabled on is false andEngine movement detected is true and Manufacturers enable	>= 11 Volts > 0.300 MPa Enabled when a code clear is not active or not exiting device control Engine is not cranking	Current High/ Low 10 seconds failures out of 12.50 seconds sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active and Barometric Pressure Inlet Air Temp Fuel Temp	 >= 70.0 KPA >= -10.0 degC -10 <= Temp degC <= 132		

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 commanded on AND (Run/Crank voltage > Table, f(IAT). See supporting tables: **P1682_PT Relay Pull-in Run/Crank Voltage f(IAT)** OR PT Relay Ignition voltage) AND Run/Crank voltage	 > 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.
TPS SENT Comm Circuit Low (Gasoline applications ONLY)	P16A0	Detects a continuous or intermittent short low or open fault in the TPS SENT Communication Circuit by monitoring the voltage and failing the diagnostic when the voltage for the wave pulse is below state threshold as defined by SAE J2716 SENT Protocol. This diagnostic only runs when battery voltage is high enough.	Voltage for wave pulse is below state threshold as defined by SAE J2716 SENT Protocol	0.5 V	Run/Crank voltage	> 6.41 Volts	79 / 159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
TPS SENT Comm Circuit High (Gasoline applications ONLY)	P16A1	Detects a continuous or intermittent short high fault in the TPS SENT Communication Circuit by monitoring the voltage and failing the diagnostic when the voltage for the wave pulse is above state threshold as defined by SAE J2716 SENT Protocol. This diagnostic only runs when battery voltage is high enough. Detects a High Circuit Fault in the TPS SENT Communication Circuit	Voltage for wave pulse is above state threshold as defined by SAE J2716 SENT Protocol	4.1 V	Run/Crank voltage	> 6.41 Volts	79 / 159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
TPS SENT Comm Circuit Performance (Gasoline applications ONLY)	P16A2	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 above a low time threshold or above a high time threshold or if the message age limit is greater than a time threshold. This diagnostic only runs when battery voltage is high enough. Detects a Message Fault in the TPS SENT Communication Circuit	Message Pulse < Message Pulse > or Message Age Limit >= or Signal CRC fails	0.125977 ms 0.209991 ms 3.125 ms	Run/Crank voltage	> 6.41 Volts	79 / 159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 commanded on AND (Run/Crank voltage > Table, f(IAT). See supporting tables: **P1682_PT Relay Pull-in Run/Crank Voltage f(IAT)** OR PT Relay Ignition voltage) AND Run/Crank voltage	 > 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 High Voltage - (GEN III Controllers ONLY)	P16B3	Detects high voltage in the engine controls ignition relay feedback circuit 2. This diagnostic reports the DTC when high voltage is present. Monitoring occurs when the relay state is inactive.	Engine controls ignition relay feedback circuit 2 high voltage	Relay voltage >= 4.00	Powertrain relay high diag enable Powertrain relay state	= 1.00 = INACTIVE	50 failures out of 63 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Circuit Low Voltage	P16D4	This DTC monitors for a battery module low voltage circuit fault	Battery Module signals a low voltage circuit fault via LIN bus VeVITR_U_12VBattVolt	< 3.00 Volts for 200 fail counts out of 250 sample counts	The diagnostic is enabled System Diagnostics Disabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit	= 1 (1 indicates enabled) = False Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Circuit High Voltage	P16D5	This DTC monitors for a battery module high voltage circuit fault	Battery Module signals a high voltage circuit fault via LIN bus VeVITR_U_12VBattVolt	> 26.00 Volts for 200 fail counts out of 250 sample counts	The diagnostic is enabled System Diagnostics Disabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit	= 1 (1 indicates enabled) = False Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Current Low	P16D6	This DTC monitors for a battery module current low fault	Battery Module signals a current low fault via LIN bus VeVITR_I_12VBattCurrRaw	< -1400 Amps for 200 fail counts out of 250 sample counts	The diagnostic is enabled System Diagnostics Disabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit	= 1 (1 indicates enabled) = False Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Module Monitor Timer Performance	P16DC	This DTC monitors for a battery module timer performance fault	Battery Module shall fail when either of the following criteria are met. Case 1: Wake Up Test A: LIN Bus Off Timer / 1,800.00 seconds or B: (LIN Bus Off Timer + 1,800.00 seconds) / 1,800.00 seconds or C: (LIN Bus Off Timer - 1,800.00 seconds) / 1,800.00 seconds Case 2: Sequential Test Sequential Test is enabled	If the calculated wakeup value is smaller than 24.00 counts, then the smaller value will be outputed. If the calculated wakeup value is greater than 24.00 counts, then the calibration itself is outputed. If any outputs above are not not equal to the IBS maximum down counter counts, the diagnostic fails. This portion of the diagnostic is not used. = 0 (1 indicates enabled)	The diagnostic is enabled System Diagnostics Disabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit Historical Temperature Data Trigger Request Module Off Timer Fault Active Run Crank Low Timer Error Code Clear Request IBS Measure Temperaure Data Available	= 1 (1 indicates enabled) = False Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True = 1 (initializes to 0 then transitions to 1 once data is available- NEED TO SEE POSITIVE RISING EDGE) = False = False = False (latched when set True) = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					TPTKO OR TFTKO IBS Down Counter Value Spurious Reset	= False (when KeVITD_b_TimerPerf_DFIRDisable = 0) Calibration is set to 0 Not equal to 25.00 = False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Current High	P16DD	This DTC monitors for a battery module current high fault	Battery Module signals a current high fault via LIN bus VeVITR_I_12VBattCurrRaw	> +1400 Amps for 200 fail counts out of 250 sample counts	The diagnostic is enabled System Diagnostics Disabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit	= 1 (1 indicates enabled) = False Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Random Access Memory (RAM) Error	P16E1	This DTC monitors for a battery module RAM memory fault	Battery Module signals a RAM memory fault via LIN bus VeVITR_e_IBS_IntRAM_ Fault	= CeVITR_e_DiagFailed	The diagnostic is enabled System Diagnostics Disabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit	= 1 (1 indicates enabled) = False Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Read Only Memory (ROM) Error	P16E2	This DTC monitors for a battery module ROM memory fault	Battery Module signals a ROM memory fault via LIN bus VeVITR_e_IBS_IntROM_ Fault	= CeVITR_e_DiagFailed	The diagnostic is enabled System Diagnostics Disabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit	= 1 (1 indicates enabled) = False Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True	Diagnostic runs in the 250 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Data Incompatible	P16E3	This DTC monitors for a battery module data incompatible fault	Battery Module data received over LIN bus is incompatible. (Measured by any of the following)		The historical mode diagnostic is enabled and / or The continuous mode diagnostic is enabled	= 1 (1 indicates enabled) = 1 (1 indicates enabled)	Diagnostic runs in the 250 ms loop	Type B, 2 Trips
			Historical Test	Upon IBS wakeup, if any of the below Historical Test conditions are satisfied, the diagnostic fails.	System Diagnostics Disabled Power Mode 12V System Reference Voltage LIN Bus Off or Battery Module Communication Faults Active Outside Air Temperature Outside Air Temperature Validity Bit IBS Configuration Data Available over LIN bus Historical Test Only Host Controller MEC Counter	= False Not equal off > 9.00 Volts = False > -20.00 Celsius and < 50.00 Celsius = True = True <= 0	
			Absolute value of IBS battery capacity C20 data (IBS Return Nominal C20 - 70.00 Ah)	> 5.00 Ah				
			or					
			IBS Returns a battery type that is not equal to	CeBSER_e_IBS_Cfg BatAGM				
			or					
			Absolute value of (IBS Return Battery Calibration#1 U40@25 C - 12.08 V)	> 0.50 Volts				
			or					
			Absolute value of (IBS Return Battery Calibration#1 U80@25 C - 12.64 V)	> 0.50 Volts				
			Continuous Test	If any of the below conditions are satisfied for 16.00 fail counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				out of 20.00 sample counts, the diagnostic fails.				
			Absolute value of IBS battery capacity C20 data (IBS Return Nominal C20 - 70.00 Ah)	> 5.00 Ah				
			or					
			IBS Returns a battery type that is not equal to	CeBSER_e_IBS_Cfg BatAGM				
			or					
			Absolute value of (IBS Return Battery Calibration#1 U40@25 C - 12.08 V)	> 0.50 Volts				
			or					
			Absolute value of (IBS Return Battery Calibration#1 U80@25 C - 12.64 V)	> 0.50 Volts				

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 Communication Circuit 3 Low Voltage	P16E4	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	<= 35 = 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.
SENT Fuel Rail Pressure & Temperature Sensor Communication Circuit 3 High Voltage	P16E5	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	<= 35 = 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.
Control Module Serial Peripheral Interface Bus 1	P16F0	This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor before receiving a valid message.		Run/Crank voltage	> 6.41 Volts	39 / 399 counts continuous; 12.5 ms /count in the ECM main processor	Type A, 1 Trips
			This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor after receiving a valid message.		Run/Crank voltage	> 6.41 Volts	159 / 399 counts continuous; 12.5 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 Redundant Memory Performance (Gasoline applications ONLY)	P16F3	Detect Processor Calculation faults due to RAM corruptions, ALU failures and ROM failures For all of the following cases: If the individual diagnostic threshold is equal to 2048 ms, this individual case is not applicable. If any of the following cases are X out of Y diagnostics and the fail (x) is greater than the sample (Y), this individual case is also not applicable.	Equivance Ratio torque compensation exceeds threshold	-50.26 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	Type A, 1 Trips
			Absolute difference between Equivance Ratio torque compensation and its dual store out of bounds given by threshold	50.26 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of Accessory torque and its redundant calculation is out of bounds given by threshold range	50.26 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Absolute difference of Filtered Air-per-cylinder and its redundant calculation is out of bounds given by threshold range	60.59 mg	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference between the previous Final Advance and the current Final Advance not Adjusted for Equivalence Ratio is out of bounds given by threshold range	15.00 degrees		Engine speed >0rpm	Up/down timer 425 ms continuous, 0.5 down time multipier	
			Torque Learn offset is out of bounds given by threshold range	High Threshold 0.00 Nm Low Threshold 0.00	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				Nm				
			One step ahead calculation of air-per-cylinder and two step ahead is greater than threshold	80.00 mg		Engine speed > 815 rpm	Up/down timer 451 ms continuous, 0.5 down time multipier	
			Difference between Unmanaged Spark and PACS Spark is greater than threshold	15.00 degrees	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded Predicted Engine Torque and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Zero pedal axle torque is out of bounds given by threshold range	High Threshold 768.89 Nm Low Threshold -65,535.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Creep Coast Axle Torque is out of bounds given by threshold range	High Threshold 768.89 Nm Low Threshold -65,535.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Absolute difference of Friction torque and its redundant calculation is out of bounds given by threshold range	50.26 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 multipier	
			Launch spark is active but the launch spark redundant path indicates it should not be active	N/A		Engine speed < 7,800.00 or 7,900.00 rpm (hysteresis pair)	Up/down timer 151 ms continuous, 0.5 down time multipier	
			Rate limited vehicle speed and its dual store do not equal	N/A		Time since first CAN message with vehicle speed >= 0.500 sec	10 / 20 counts; 25.0msec/count	

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 multipier	
			Commanded engine torque due to slow actuators and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			TOS to wheel speed conversion factor is out of bounds given by threshold range	High Threshold: 1.10 T/C Range Hi 0.10 T/C Range Lo Low Threshold: 1.10 T/C Range Hi 0.10 T/C Range Lo	Ignition State	Accessory, run or crank	255 / 6 counts; 25.0msec/count	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Cylinders active greater than commanded	2 cylinders		Engine run flag = TRUE > 2.00 s Number of cylinder events since engine run > 24 No fuel injector faults active	Up/down timer 451 ms continuous, 0.5 down time multipier	
			Transfer case neutral request from four wheel drive logic does not match with operating conditions	N/A	Ignition State	Accessory, run or crank Transfer case range valid and not over-ridden FWD Apps only	7.00 / 10.00 counts; 25.0msec/count	
			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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							multipier	
			Predicted torque for uncorrected zero pedal determination is greater than calculated limit.	Table, f(Engine, Oil Temp). **P16F3_Speed Control External Load f(Oil Temp, RPM)** + 50.26 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Engine Predicted Request Without Motor is greater than its redundant calculation plus threshold	49.26 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Engine Immediate Request Without Motor is greater than its redundant calculation plus threshold	49.26 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							down time multipier	
			Positive Torque Offset is greater than its redundant calculation plus threshold OR Positive Torque Offset is less than its redundant calculation minus threshold	50.26 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Commanded Predicted Engine Request is greater than its redundant calculation plus threshold	50.26 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, down time	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Regeneration Brake Assist is not within a specified range	Brake Regen Assist < 0 Nm or Brake Regen Assist > 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Cylinder Spark Delta Correction exceeds the absolute difference as compared to Unadjusted Cylinder Spark Delta	15.00 degrees	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			1. Cylinder Torque Offset exceeds step size threshold OR	1. 50.26 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			2. Sum of Cylinder Torque Offset exceeds sum threshold	2. 50.26 Nm				
			Engine Capacity Minimum Immediate Without Motor is greater than its dual store plus threshold	50.26 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Engine Capacity Minimum Engine Off is greater than threshold	0 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 multipier	
			Commanded Immediate Engine Request is greater than its redundant calculation plus threshold	50.26 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing (event based) calculation does not equal its redundant calculation	N/A		Engine speed greater than 0rpm	Up/down timer 151 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Engine Speed Lores Intake Firing timing (event based) calculation does not equal its redundant calculation	N/A		Engine speed greater than 0rpm	Up/down timer 151 ms continuous, 0.5 down time multipier	
			Idle speed control calculated predicted minimum torque request exceeds calculated torque limit	Table, f(Oil Temp, RPM). See supporting tables: **P16F3_Speed Control External Load f(Oil Temp, RPM)** + 50.26 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Idle speed control calculated predicted minimum torque without reserves exceeds calculated torque limit	Table, f(Oil Temp, RPM). See supporting tables: **P16F3_Speed Control External Load f(Oil Temp, RPM)** +	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				50.26 Nm				
			Difference between Driver Requested Immediate Torque primary path and its secondary exceeds threshold	768.89 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Driver Immediate Request is less than its redundant calculation minus threshold	768.89 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded Immediate Request is greater than its redundant calculation plus threshold	768.89 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 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.
			OR Commanded Immediate Request is less than its redundant calculation minus threshold				multipier	
			Commanded Immediate Response Type is set to Inactive	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Difference between Cruise Axle Torque Arbitrated Request and Cruise Axle Torque Request exceeds threshold	28.83 Nm		Cruise has been engaged for more than 4.00 seconds	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Desired engine torque request greater than redundant calculation plus threshold	49.26 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Engine min capacity above threshold	50.26 Nm	Ignition State	Accessory, run or crank	Up/down timer 98 ms continuous, 0.5 down time multipier	
			No fast unmanaged retarded spark above the applied spark plus the threshold	15.00 Degree		Engine speed greater than 0rpm	Up/down timer 425 ms continuous, 0.5 down time multipier	
			Absolute difference of adjustment factor based on temperature and its dual store above threshold	2.76 m/s	Ignition State	Accessory, run or crank	Up/down timer 135 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			1. Absolute difference of redundant calculated engine speed above threshold	500 RPM		Engine speed greater than 0 RPM	Up/down timer 151 ms continuous, 0.5 down time multipier	
			After throttle blade pressure and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Speed Control's Preditcted Torque Request and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Engine oil temperature and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 319 ms continuous, 0.5 down time multipier	
			Desired throttle position greater than redundant calculation plus threshold	10.00 percent	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of the rate limited pre-throttle pressure and its redundant calculation greater than threshold	0.06 kpa	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Throttle desired torque above desired torque plus threshold	50.26 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Desired filtered throttle torque exceeds the threshold plus the higher of desired throttle torque or modeled throttle torque	50.26 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Torque feedback proportional term is out of allowable range or its dual store copy does not match	High Threshold 25.13 Nm Low Threshold -25.13 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Torque feedback integral term magnitude or rate of change is out of allowable range or its dual store	High Threshold 47.12 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			copy do not match	Low Threshold -50.26 Nm Rate of change threshold 3.14 Nm/loop			down time multipier	
			Difference of Final Torque feedback proportional plus integral term and its redundant calculation is out of bounds given by threshold range	High Threshold 50.26 Nm Low Threshold - 50.26 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of torque desired throttle area and	High Threshold	Ignition State	Accessory, run or crank	Up/down timer 475	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			its redundant calculation is out of bounds given by threshold range	2.63 % Low Threshold - 2.63 %			ms continuous, 0.5 down time multipier	
			Difference of torque model coefficients and its redundant calculation is out of bounds given by threshold range	High Threshold 0.0000380 Low Threshold - 0.0000380	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Difference of base friction torque and its redundant calculation is out of bounds given by threshold range	High Threshold 50.26 Nm Low Threshold - 50.26 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Accessory drive friction torque is out of bounds given by threshold range	High Threshold 50.26 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			AC friction torque is greater than commanded by AC control software or less than threshold limit	High Threshold 40.00 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of Oil temperature delta friction torque and its redundant calculation is out of bounds given by threshold range	High Threshold 50.26 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				Low Threshold - 50.26 Nm				
			Generator friction torque is out of bounds given by threshold range	High Threshold 50.26 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Absolute difference between the Supercharger friction torque and its redundant calculation greater than threshold	50.26 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Filtered Torque error magnitude or its increase rate of change is out of	High Threshold 50.26		Engine speed >0rpm MAF, MAP and Baro DTCs are false	Up/down timer 475 ms continuous,	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			allowable range or its dual store copy do not match	Nm Low Threshold -50.26 Nm Rate of change threshold 3.14 Nm/loop			0.5 down time multipier	
			Torque error compensation is out of bounds given by threshold range	High Threshold 50.26 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Delta Torque Baro compensation is out of bounds given by threshold	High Threshold 2.84	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous,	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			range	Nm Low Threshold -0.79 Nm			0.5 down time multipier	
			1. Difference of reserve torque value and its redundant calculation exceed threshold OR 2. Reserve request does not agree with operating conditions or Difference of final predicted torque and its redundant calculation exeed threshold OR 3. Rate of change of reserve torque exceeds threshold, increasing direction only OR 4. Reserve engine torque above allowable capacity threshold	1. 49.26 Nm 2. N/A 3. 49.26 Nm 4. 49.26 Nm	3. & 4.: Ignition State	1. & 2.: Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 50.26 Nm 3. & 4.: Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Engine Vacuum and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of the calculated Intake Manifold Pressure during engine event versus during time event is greater than threshold	Table, f(Desired Engine Torque). See supporting tables: **P16F3_Delta MAP Threshold f(Desired Engine Torque)**		Engine speed >0rpm	Up/down timer 151 ms continuous, 0.5 down time multipier	
			Min. Axle Torque Capacity is greater than threshold	0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Driver Predicted Request is greater than its redundant calculation plus threshold OR	768.89 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Driver Predicted Request is less than its redundant calculation minus threshold					
			Cold Delta Friction Torque and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Predicted torque for zero pedal determination is greater than calculated limit.	Table, f(Oil Temp, RPM). See supporting tables: **Speed Control External Load f(Oil Temp, RPM)** + 50.26 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Commanded Predicted	1 Nm	Ignition State	Accessory, run or crank	Up/down timer	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Axle Torque and its dual store do not match				475 ms continuous, 0.5 down time multipier	
			Steady State Estimated Engine Torque and its dual store are not equal	N/A		AFM not changing from Active to Inactive and preload torque not changing and one loop after React command Engine speed >0rpm	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Difference of Weighting factor for number of cylinders fueled and its redundant calculation is above threshold	0.26		Engine run flag = TRUE > 10.00 s	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Difference of minimum spark advance limit and its redundant calculation is out of bounds given by threshold range	15.00 degrees	Ignition State	Accessory, run or crank	Up/down timer 151 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Difference of commanded spark advance and adjusted delivered is out of bounds given by threshold range	15.00 degrees		Engine speed >0rpm	Up/down timer 425 ms continuous, 0.5 down time multipier	
			Absolute difference between Estimated Engine Torque and its dual store are above a threshold	50.26 Nm		Engine speed >0rpm	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Absolute difference between Estimated Engine Torque without reductions due to torque control and its dual store are above a threshold	50.26 Nm		Engine speed >0rpm	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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) > 50.26 Nm	Up/down timer 451 ms continuous, 0.5 down time multipier	
			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	50 Nm		Engine speed >0rpm	Up/down timer 175 ms continuous, 0.5 down time multipier	
			One step ahead calculation of air-per-cylinder greater than two step ahead calculation by threshold for time	Threshold: Dynamically calculated based on current engine conditions Fault Pending Threshold: 100		Engine speed > 815 rpm	Up/down timer 451 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				ms				
			Rate limited cruise axle torque request and its dual store do not match within a threshold	28.83 Nm	Ignition State	Accessory, run or crank	Up/down timer 163 ms continuous, 0.5 down time multipier	
			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	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 multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			3. Absolute difference of Calculated accelerator pedal position and its dual store do not equal					
			Commanded axle torque is greater than its redundant calculation by threshold	768.89 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded axle torque is less than its redundant calculation by threshold	1,153.33 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Preload timer and its redundant calculation do not equal	N/A	Ignition State	Accessory, run or crank AFM apps only	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			AC friction torque is greater than commanded by AC control software	40.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing (time based) calculation does not equal its redundant calculation	N/A		Engine speed >0rpm	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of the calculated spark offset for equivalence ratio and its redundant cacluation is greater than a threshold	15.00 degrees		Engine speed >0rpm	Up/down timer 151 ms continuous, 0.5 down time multipier	
			Transmission Torque Request cacluations do not equal their dual stores	N/A		Run or Crank = TRUE > 0.50 s	16 / 32 counts; 25.0msec/count	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Absolute difference of the predicted motor torque ACS and its redundant cacluation is greater than a threshold	0.01 Nm			Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Absolute difference of maximum throttle area and its redundant cacluation is greater than a threshold	15 mm2			Up/down timer 135 ms continuous, 0.5 down time multipier	
			Absolute difference of Desired TIAP and its redundant cacluation is greater than a threshold	5.00 kPa			Up/down timer 475 ms continuous, 0.5 down time multipier	
			Pedal learns and their redundant calculation do not equal		Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Throttle learns and their redundant calculation do not equal		Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Desired Throttle Position and its redundant calculation do not equal		Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Transmission Range Control Performance	P16F4	Determines if the Electronic Transmission Range Select control module software incorrectly processes a range request which would result in an unsafe condition	Driver Requested Arbitrated Range Commanded OR: Transmission range control routine Transmission range control routine Transmission range control routine	is issued unexpectedly OR ≠ expected range Does not issue Park or Neutral command quickly enough in response to driver request Issues a request to Drive, Low or Manual without a matching input by the customer within a calibrated time T1. Issues a request to Reverse without a matching input by the customer within a calibrated time limit T2.	TRCR Global Diagnostic Enable CodeClearFunction AND ManufacturingModeActive AND: External: Run/Crank OR Accessory/Wakeup Internal: From the time when RunCrankActive until ActualRange AND Accessory/Wakeup	= True =False =False =True = True =True =Park =False	200 , 200 , 200 , 2,050 , 200 or 200 msec, depending on conditions. T1 = 200 msec T2 = 200 msec	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Powerflow Engaged Signal Message Incorrect	P1772	Detects error on ARC & PV reported by CHCM/ ECM about signal $197 from TCM on HS GMLAN	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1 OR The primary signal value does not equal the protection value	Current ARC ≠ Previous ARC +1 Primary Value ≠ Protection Value	Battery voltage A diagnostic code clear event or diagnostic re-enable event is not in progress for:	within proper operating range for at least 3,000 msec for a time > 3,000 msec	8 failures out of 10 samples 12.5 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IMS State Signal Message Incorrect	P1773	Detects error on ARC & PV reported by CHCM/ ECM about signal $197 from TCM on HS GMLAN	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1 OR The primary signal value does not equal the protection value	Current ARC ≠ Previous ARC +1 Primary Value ≠ Protection Value	Battery voltage A diagnostic code clear event or diagnostic re-enable event is not in progress for:	within proper operating range for > 3,000 msec for a time > 3,000 msec	8 failures out of 10 samples 12.5 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Availability Signal Message Incorrect	P1778	Detects error on ARC & PV reported by CHCM / ECM about signal $3F5 from TCM on HS GMLAN	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1 OR The primary signal value does not equal the protection value	Current ARC ≠ Previous ARC +1 Primary Value ≠ Protection Value	Battery voltage A diagnostic code clear event or diagnostic re-enable event is not in progress:	within proper operating range for 3,000 msec for a time > 3,000 msec	8 failures out of 10 samples Signal in the 250 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Unexpected Range Change Detected	P1787	Detects an unexpected change in transmission range.	Actual Arbitrated Transmission Range The internal system only diagnoses range changes in and out of Park.	≠ Previous Value	Actual Tranmission Range Range Change Achievement Diag	= Good value = Not running	1,500 ms	DTC Type B, Two Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switches Primary Signal Message Counter Incorrect	P187F	Detects error on ARC & PV reported by ECM about signal $1E4 from TRS on PT Sensor Bus from SIB (Shifter Buttons)	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1 OR The primary signal value does not equal the protection value	Current ARC ≠ Previous ARC +1 Primary Value ≠ Protection Value	Battery voltage AND A diagnostic code clear event or diagnostic re-enable event is not in progress for:	within proper operating range for 3,000 msec for a time > 3,000 msec	8 failures out of 10 samples Signal received in 25 ms message	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switches Secondary Signal Message Counter Incorrect	P188A	Detects error on ARC & PV reported by ECM about signal $2C2 from TRS on PT Exp Bus	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1 OR The primary signal value does not equal the protection value	Current ARC ≠ Previous ARC +1 Primary Value ≠ Protection Value	Battery voltage A diagnostic code clear event or diagnostic re-enable event is not in progress for:	within proper operating range for 3 seconds for a time > 3,000 msec	8 failures out of 10 samples Signal received in 50 ms message.	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Signal Message Counter Incorrect	P188B	This DTC monitors for an error in communication with the Transmission Range Signal	Communication of the Alive Rolling Count or Protection Value of the Transmission Range Signal Signal over CAN bus is incorrect for out of total samples	>= 8.00 counts >= 10.00 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	= Is avaialble >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 11.00 Volts	Executes in 250ms loop.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Position Switch A/B Circuit Stuck Off	P189D	Compares Park Switch A and Park Switch B "PRESSED" and "RELEASED" states	When either is “PRESSED” for 100 ms then pressed event is entered. Fault is incremented if other switch	 Is not pressed during event.	Not Fault Active Controller is on Park button switch signals: Vehicle Speed Comprehensive correlation diagnostics:	P07B3, P07B4, P07B5, P07B9, P07BA, P07BB >~100 ms =valid <= Park Request Spd, calibrated with a hysteresis loop: 10.50 and 10.00 . =True	7 synchronized failures in a row. *note: these samples can accumulate over key-cycles	DTC Type B, Two trips. MIL is set on the second occurrence of the fault.

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	Power Mode Engine Running Status of traction in GMLAN message ($4E9) Ignition Voltage	= Run = True = Traction Present > 6.41 volts	>= 4 failures out of 10 Performed every 12.5ms	Type C, No SVS
			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	Run/Crank Activ	> 0.50 seconds	>= 4 failures out of 10 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			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.
Transmission Range Selector Switch "A" Circuit Correlation	P18CD	Compares Switch "A" with other relevant TRS Switches Switch "A" = Drive Input 1	Valid switch status "pressed" or "released", but disagree		Not Fault Active	P17E3, P17E4, P17E5	40 failures out of 50 samples 12.5 ms loop	DTC Type B Two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "B" Circuit Correlation	P18CF	Compares Switch "B" with other relavent TRS Switches Switch "B" = Drive Input 2	Valid switch status "pressed" or "released", but disagree		Not Fault Active	P17E6, P17E7, P17E8	40 failures out of 50 samples 12.5 ms loop	DTC Type B Two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "C" Circuit Correlation	P18D1	Compares Switch "C" with other relevant TRS Switches Switch "C" = Drive Input 3	Valid switch status "pressed" or "released", but disagree		Not Fault Active	P17E9, P17EA, P17EB	40 failures out of 50 samples 12.5 ms loop	DTC Type B Two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "D" Circuit Correlation	P18D3	Compares Switch "D" with other relavent TRS Switches Switch "D" = Neutral Input 1	Valid switch status "pressed" or "released", but disagree		Not Fault Active	P17EC, P17ED, P17EE	40 failures out of 50 samples 12.5 ms loop	DTC Type B Two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "E" Circuit Correlation	P18D5	Compares Switch "E" with other relevant TRS Switches Switch "E" = Neutral Input 2	Valid switch status "pressed" or "released", but disagree		Not Fault Active	P17EF, P17F0, P17F8	40 failures out of 50 samples 12.5 ms loop	DTC Type B Two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "F" Circuit Correlation	P18D7	Compares Switch "F" with other relevant TRS Switches Switch "F" = Neutral Input 3	Valid switch status "pressed" or "released", but disagree		Not Fault Active	P17F9, P17FD, P17FE	40 failures out of 50 samples 12.5 ms loop	DTC Type B Two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "G" Circuit Correlation	P18D9	Compares Switch "G" with other relavent TRS Switches Switch "G" = Reverse Input 1	Valid switch status "pressed" or "released", but disagree		Not Fault Active	P1803, P1805, P1806	40 failures out of 50 samples 12.5 ms loop	DTC Type B Two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "H" Circuit Correlation	P18DB	Compares Switch "H" with other relevant TRS Switches Switch "H" = Reverse Input 2	Valid switch status "pressed" or "released", but disagree		Not Fault Active	P1807, P180C, P180D	40 failures out of 50 samples 12.5 ms loop	DTC Type B Two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "J" Circuit Correlation	P18DD	Compares Switch "J" with other relevant TRS Switches Switch "J" = Reverse Input 3	Valid switch status "pressed" or "released", but disagree		Not Fault Active	P180E, P180F, P1812	40 failures out of 50 samples 12.5 ms loop	DTC Type B Two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switch "L" Stuck On	P18E1	Detects TRC Switch "L" is stuck on. Switch "L" = Manual/ Low Input	Valid switch status "pressed" for a longer than expected time.		Not Fault Active	P186B, P186C, P186D	4,800 failures out of 6,000 samples 12.5 ms loop	DTC Type B Two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switches A-B-C Stuck On	P18E9	Detects when TRS Switches A, B and C are stuck on A, B, C are Drive Button switches	Valid switches "PRESSED" for extended time		Not Fault Active	P17E3, P17E4, P17E5, P17E6, P17E7, P17E8, P17E9, P17EA, P17EB	4,800 failures out of 6,000 samples 12.5 ms rate	DTC Type B Two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switches D-E-F Stuck On	P18EA	Detects when TRS Switches D, E and F are stuck on D, E, F are Neutral Button switches	Valid switches "PRESSED" for extended time		Not Fault Active	P17EC, P17ED, P17EE, P17EF, P17F0, P17F8, P17F9, P17FD, P17FE	4,800 failures out of 6,000 samples 12.5 ms rate	DTC Type B Two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Selector Switches G-H-J Stuck On	P18EB	Detects when TRS Switches G, H and J are stuck on G, H, J are Reverse Button switches	Valid switches "PRESSED" for extended time		Not Fault Active	P1803, P1805, P1806, P1807, P180C, P180D, P186B, P186C, P186D	4,800 failures out of 6,000 samples 12.5 ms rate	DTC Type B Two trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Actuator Solenoid Circuit Low– Bank 1	P2088	Controller specific output driver circuit diagnoses the CAM phaser oil control valve solenoid high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	≤ 0.5 Ω impedance between signal and controller ground	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Actuator Solenoid Circuit High – Bank 1	P2089	Controller specific output driver circuit diagnoses the CAM phaser oil control valve solenoid high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	≤ 0.5 Ω impedance between signal and controller power	System supply Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Camshaft Actuator Solenoid Circuit Low – Bank 1	P2090	Controller specific output driver circuit diagnoses the CAM phaser oil control valve solenoid high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	≤ 0.5 Ω impedance between signal and controller ground	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Camshaft Actuator Solenoid Circuit High – Bank 1	P2091	Controller specific output driver circuit diagnoses the CAM phaser oil control valve solenoid high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	≤ 0.5 Ω impedance between signal and controller power	System supply voltage Output driver Ignition switch	> 11.00 Volts On Crank or Run	20 failures out of 25 samples 250 ms /sample, continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Post Catalyst Fuel Trim System Too Lean Bank 1	P2096	Determines if the post catalyst O2 sensor based fuel control system is indicating a lean exhaust gas condition. If the lean condition is such that the control system utilizes all or most of its available high limit authority (high limit = 100% authority), then P2096 will set. The monitor can be calibrated to fail based on the Average Integral Offset % Authority, the Average Total Offset % Authority or both combined. The Average Total Offset metric consists of the average of the Integral Offset+ Proportional Offset. Note: When the post catalyst O2 voltage is too lean, the post catalyst O2 integral and proportional offset control is increased (positive % authority). This applies a lean bias to fuel control in an attempt to counteract the lean condition. A perfectly balanced control system (no rich or lean bias required) is represented by integral	The Average Integral Offset % Authority AND The Average Total Offset % Authority (Note: any value greater than or equal to +100% effectively nullifies the Average Total Offset % Authority criteria) High Vapor Feature: The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions are present. This HV condition is indicated when the purge valve is open AND percent vapor is >= 24 % for >= 3.0 seconds AND the % Authority metric is approaching the failure threshold. Diagnosis resumes if the purge valve is closed OR the percent vapor is <= 20 % for >= 3.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary.	>= 99.0 % >= 50.0 % If the P2096 is actively failing then the Average Integral Offset must be < 99.0 % and the Average Total Offset must be < 50.0 % for the diagnostic to report a pass.	The diagnostic is enabled during: Deceleration Idle Cruise Light Acceleration Heavy Acceleration Ambient Air Pressure Engine AirFlow Intake Manifold Pressure Induction Air Temperature Start-up Coolant Temp. PTO Intrusive diag. fuel control Ethanol Estimation in Progress O2 Heater Learned Resistance Long Term Secondary Fuel Trim Enabled for (see "**Long Term Secondary Fuel Trim Enable Criteria**" in Supporting Tables) High Vapor Conditions Green Cat System Condition	 No No Yes Yes Yes >= 70 kPa >= 0.0 g/s <= 10,000.0 >= 10 kPa <= 256 >= -20 deg. C <= 150 >= -20 deg. C (or OBD Coolant Enable Criteria = TRUE) Not Active Not Active Not Active = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") >= 0.1 seconds Not Present = Not Valid, Green Cat System condition is considered valid until the	Frequency: Continuous Monitoring in 100ms loop. The Integral and Total Offset % Authority metrics are sampled every 100ms and an average is calculated every 70.0 seconds (700 samples) before comparing to their respective failure thresholds.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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).				accumulated air flow is greater than 360,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and airflow is above 18 grams/sec.		
					No Fault Active for:	AmbientAirDefault AIR System FA Ethanol Composition Sensor FA ECT_Sensor_FA EGRValveCircuit_FA EGRValvePerformance_FA IAT_SensorFA CamSensorAnyLocationFA EvapEmissionSystem_FA EvapFlowDuringNonPurge_FA FuelTankPressureSnsrCkt_FA EvapPurgeSolenoidCircuit_FA EvapSmallLeak_FA EvapVentSolenoidCircuit_FA FuelInjectorCircuit_FA MAF_SensorFA MAF_SensorTFTKO MAP_SensorFA MAP_EngineVacuumStatus EngineMisfireDetected_FA A/F Imbalance Bank1 O2S_Bank_1_Sensor_1_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						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 (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).	 300 300 300 300 300		

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	Determines if the post catalyst O2 sensor based fuel control system is indicating a rich exhaust gas condition. If the rich condition is such that the control system utilizes all or most of its available low limit authority (low limit = -100% authority), then P2097 will set. The monitor can be calibrated to fail based on the Average Integral Offset % Authority, the Average Total Offset % Authority or both combined. The Average Total Offset metric consists of the average of the Integral Offset+ Proportional Offset. Note: When the post catalyst O2 voltage is too rich, the post catalyst O2 integral and proportional offset control is decreased (negative % authority). This applies a lean bias to fuel control in an attempt to counteract the rich condition. A perfectly balanced control system (no rich or lean bias required) is represented by integral	The Average Integral Offset % Authority AND The Average Total Offset % Authority (Note: any value less than or equal to -100% effectively nullifies the Average Total Offset % Authority criteria) High Vapor Feature: The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions are present. This HV condition is indicated when the purge valve is open AND percent vapor is >= 24 % for >= 3.0 seconds. Diagnosis resumes if the purge valve is closed OR the percent vapor is <= 20 % for >= 3.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary.	<= -99.0 % <= -50.0 % If the P2097 is actively failing then the Average Integral Offset must be > -99.0 % and the Average Total Offset must be > -50.0 % for the diagnostic to report a pass.	Same as P2096	Same as P2096	Frequency: Continuous Monitoring in 100ms loop. The Integral and Total Offset % Authority metrics are sampled every 100ms and an average is calculated every 70.0 seconds (700 samples) before comparing to their respective failure thresholds.	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Throttle Actuator Position Performance	P2101	1) Detect a throttle positioning error. This is determined if the difference between measured throttle position and modeled throttle position is greater than a threshold or less than a threshold. This diagnostic only runs when the engine is running and the ignition voltage is high enough and there is not an ignition votage failure and the throttle position minimum learn is not active and the throttle is being controlled 2) Throttle control is driving the throttle in the incorrect direction. This is determined if the throttle position is greater than a threshold percent and the powertrain relay voltage is high enough and the throttle position minimum learn is active 3) Throttle control exceeds the reduced power limit. This is determined if the throttle position is greater and a threshold and the powertrain relay voltage is high enough and reduced power is active.	Difference between measured throttle position and modeled throttle position >	10.00 percent	Run/Crank voltage TPS minimum learn is not active and Throttle is being Controlled AND (Engine Running or Ignition Voltage) OR Ignition Voltage	> 6.41 Volts > 5.50 Volts > 8.41 Volts	15 counts; 12.5 ms/count in the primary processor	Type A, 1 Trips
			OR Difference between modeled throttle position and measured throttle position >	10.00 percent	Ignition voltage failure is false (P1682)			
			Throttle Position >	36.00 percent	Powertrain Relay voltage TPS minimum learn active	> 6.41 Volts = TRUE	11 counts; 12.5 ms/count in the primary processor	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Accelerator Pedal Position (APP) Sensor 1 Lo	P2122	Detects a continuous or intermittent short low or open in the APP sensor #1 by monitoring the APP1 sensor percent Vref and failing the diagnostic when the APP1 percent Vref is too low. This diagnostic only runs when battery voltage is high enough. Detects a continuous or intermittent short low or open in the APP sensor #1 on the Main processor.	APP1 percent Vref	< 0.4625 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P06A3	19 / 39 counts; or 14 counts continuous; 12.5 ms/count in the main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 >	4.7500 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P06A3	19 / 39 counts; or 14 counts continuous; 12.5 ms/count in the main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 <	0.3250 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P0697	19 / 39 counts; or 14 counts continuous; 12.5 ms/count in the main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 >	2.6000 % Vref	Run/Crank voltage No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts P0697	19 / 39 counts; or 14 counts continuous; 12.5 ms/count in the main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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) >	5.000 % Vref	Run/Crank voltage No TPS sensor faults No 5V reference error or fault for # 4 5V reference circuit	> 6.41 Volts (P0122, P0123, P0222, P0223) P06A3	79 / 159 counts; or 58 counts continuous; 3.125 ms/count in the main processor	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 high side circuit shorted to ground	P2147	Controller specific output driver circuit diagnoses Injector 1 high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>= 11 Volts >= 1 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 high side circuit shorted to power	P2148	Controller specific output driver circuit diagnoses Injector 1 high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 1 volt between signal and controller power	Battery Voltage Engine Run Time	>= 11 Volts >= 1 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 high side circuit shorted to ground	P2150	Controller specific output driver circuit diagnoses Injector 2 high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>= 11 Volts >= 1 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 high side circuit shorted to power	P2151	Controller specific output driver circuit diagnoses Injector 2 high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	 <= 1 volt between signal and controller power	Battery Voltage Engine Run Time	>= 11 Volts >= 1 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 high side circuit shorted to ground	P2153	Controller specific output driver circuit diagnoses Injector 3 high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>= 11 Volts >= 1 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 high side circuit shorted to power	P2154	Controller specific output driver circuit diagnoses Injector 3 high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 1 volt between signal and controller power	Battery Voltage Engine Run Time	>= 11 Volts >= 1 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 4 high side circuit shorted to ground	P2156	Controller specific output driver circuit diagnoses Injector 4 high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>= 11 Volts >= 1 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 4 high side circuit shorted to power	P2157	Controller specific output driver circuit diagnoses Injector 4 high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 1 volt between signal and controller power	Battery Voltage Engine Run Time	>= 11 Volts >= 1 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Minimum Throttle Position Not Learned	P2176	Detect when the throttle position minimum learn on the main processor is not learned. This diagnostic detects this by monitoring if the throttle position is greater than a threshold and the number of learn attempts is greater than a threshold. This diagnostic only runs when the battery voltage is high enough and the throttle position minimum learn is active. Throttle position sensors were not in the minmum learn window after multiple attempts to learn the minimum.	During TPS min learn on the Main processor, TPS percent Vref > AND Number of learn attempts >	0.5740 % Vref 10 counts	Run/Crank voltage TPS minimum learn is active No previous TPS min learn values stored in long term memory	> 6.41 Volts = TRUE	2.0 secs	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor 1 / 2 Correlation	P2199	Detects when the Intake Air Temperature (IAT) sensor and IAT2 sensor values do not correlate with each other. These two temperature sensors are both in the induction system, although they do have different sensor time constants and different positional relationships with components that produce heat. If these two temperature values differ by a large enough amount, the Intake Air Temperature 1 / 2 Correlation Diagnostic will fail. This diagnostic is enabled if the Powertrain Relay voltage is high enough.	ABS (IAT - IAT2)	> 55.0 deg C	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Bank 1 Air-Fuel Ratio Imbalance	P219A	This monitor determines if there is an Air Fuel Imbalance in the fueling system for a cylinder on a 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). The observed Variance is dependent on engine speed and load and is normalized by comparing it to a known "good system" result for that speed and load, and generating a Ratio metric. The Ratio metric is calculated by selecting the appropriate threshold calibration from a 17x17 table (see Supporting Table	Filtered Ratio > The Ratio metric is calculated by selecting the appropriate threshold calibration from a 17x17 table (see Supporting Table **P219A Variance Threshold Bank1 Table**) and subtracting it from the measured Variance. The result is then divided by a normalizer calibration from another 17 x 17 table (see Supporting Table **P219A Normalizer Bank1 Table**). This quotient is then multiplied by a quality factor calibration from a 17 x 17 table (see Supporting Table **P219A Quality Factor Bank1 Table**). This result is referred to as the Ratio. Note that the quality factor ranges between 0 and 1 and represents robustness to false diagnosis in the current operating region. Regions with low quality factors are not used.	0.30 If the diagnostic has reported a failure on the prior trip, the Filtered Ratio must fall below 0.18 in order to report a pass. This feature prevents the diagnostic from toggling between failing and passing when the Filtered Ratio remains near the initial failure threshold of 0.30 .	System Voltage Fuel Level Engine Coolant Temperature Cumulative engine run time Diagnostic enabled at Idle (regardless of other operating conditions) Engine speed range Engine speed delta during a short term sample period Mass Airflow (MAF) range Cumulative delta MAF during a short term sample period Filtered MAF delta between samples Note: first order lag filter coefficient applied to MAF = 0.050 Air Per Cylinder (APC) APC delta during short term sample period	no lower than 10.0 Volts for more than 0.2 seconds > 10.0 percent AND no fuel level sensor fault > -20 deg. C (or OBD Coolant Enable Criteria = TRUE) > 0.0 seconds No 1,200 to 4,279 RPM < 250 RPM 0 to 1,000 g/s < 5 g/s < 0.20 g/s 190 to 715 mg/cylinder < 100 mg/cylinder	Minimum of 1 test per trip, up to 5 tests per trip during RSR or FIR. The front O2 sensor voltage is sampled once per cylinder event. Therefore, the time required to complete a single test (when all enable conditions are met) decreases as engine speed increases. For example, 9.00 seconds of data is required at 1000 rpm while double this time is required at 500 rpm and half this time is required at 2000 rpm. This data is collected only when enable conditions are met, and as such significantly more operating time is required than is indicated above. Generally, a report will be	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		P219A Variance Threshold Bank1 Table) and subtracting it from the measured Variance. The result is then divided by a normalizer calibration from another 17 x 17 table (see Supporting Table **P219A Normalizer Bank1 Table**). This quotient is then multiplied by a quality factor calibration from a 17 x 17 table (see Supporting Table **P219A Quality Factor Bank1 Table**) . This result is referred to as the Ratio. Note that the quality factor ranges between 0 and 1 and represents robustness to false diagnosis in the current operating region. Regions with low quality factors are not used. 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			Filtered APC delta between samples Note: first order lag filter coefficient applied to APC = 0.250 Spark Advance Throttle Area (percent of max) Intake Cam Phaser Angle Exhaust Cam Phaser Angle 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:	< 9.99 percent 0 to 100 degrees 0 to 200 percent -10 to 100 degrees 0 to 100 degrees >= 0.99 >= 0.0 seconds (Please see "**Closed Loop Enable Clarification**" and "**Long Term FT Enable Criteria**" in Supporting Tables)	made within 5 minutes of operation. For RSR or FIR, 10 tests must complete before the diagnostic can report.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Ratio. The range of the Filtered Ratio metric is application specific since both the emissions sensitivity and relationship between imbalance and the Variance metric are application specific. Some applications may need to command a unique cam phaser value before performing the above calculations since cam phasing has been shown to have an impact on overall signal quality. This application Does Not Use this feature.			Device Control AIR pump CASE learn EGR EVAP Engine Over Speed Protection Idle speed control PTO Injector base pulse width O2 learned htr resistance Rapid Step Response (RSR): RSR will trigger if the Ratio result from the last test is AND it exceeds the last Filtered ratio by Once triggered, the filtered ratio is reset to: Fast Initial Response (FIR): FIR will trigger when an NVM reset or code clear occurs. Once triggered, the filtered ratio is reset to: No Fault Active for:	Not active Not on Not active Not intrusive Not intrusive Not Active Normal Not Active Above min pulse limit = Valid (the O2 heater resistance has learned since NVM reset) >= 0.30 >= 0.30 0.00 0.00 EngineMisfireDetected_FA MAP_SensorFA MAF_SensorFA ECT_Sensor_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						TPS_ThrottleAuthorityDefaulted FuelInjectorCircuit_FA AIR System FA EvapExcessPurgePsbl_FA CamSensorAnyLocationFA FuelTrimSystemB1_FA O2S_Bank_1_Sensor_1_FA O2S_Bank_1_Sensor_2_FA WRAF_Bank_1_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure (BARO) Sensor Performance (single turbo)	P2227	Detects a performance failure in the Barometric Pressure (BARO) sensor, such as when a BARO value is stuck in range. If the engine has been off for a sufficient amount of time, the pressure values in the induction system will have equalized. The BARO sensor value is checked to see if it is within the normal expected atmospheric pressure range. If it is not, then the BARO performance diagnostic will fail. If the BARO sensor value is within the normal expected atmospheric range, then Manifold Pressure (MAP), Turbocharger Boost Pressure and BARO are compared to see if their values are similar. If the MAP and Turbocharger Boost Pressure sensor values are similar, but the BARO value is not similar, then a BARO performance diagnostic will fail. When the engine is	**Engine Running:** Difference between Baro Pressure reading and Estimated Baro when distance since last Estimated Baro update OR Difference between Baro Pressure reading and Estimated Baro when distance since last Estimated Baro update	 > 15.0 kPa <= 1.06 miles > 20.0 kPa > 1.06 miles	No Active DTCs:	AmbPresSnsrCktFA IAT_SensorFA MAF_SensorFA AfterThrottlePressureFA TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA TC_BoostPresSnsrFA	320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips
			Engine Not Rotating: Barometric Pressure OR Barometric Pressure OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure) AND ABS(Turbocharger Boost Pressure - Baro Pressure)	 < 50.0 kPa > 115.0 kPa > 10.0 kPa <= 10.0 kPa > 10.0 kPa	Time between current ignition cycle and the last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	 > 10.0 seconds EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA AAP2_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP	4 failures out of 5 samples 1 sample every 12.5 msec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		running, there is an estimate of barometric pressure that is determined with the Turbocharger Boost Pressure sensor, engine air flow and engine speed. If the BARO value from the sensor is not similar to this barometric pressure estimate, then the BARO performance diagnostic will fail.						

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 (boosted applications, Gen III)	P2228	Detects a continuous short to ground in the Barometric Pressure (BARO) signal circuit by monitoring the BARO sensor output voltage and failing the diagnostic when the BARO voltage is too low. The BARO sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	BARO Voltage	< 39.3 % of 5 Volt Range (This is equal to 50.0 kPa)			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.
Barometric Pressure (BARO) Sensor Circuit High (boosted applications, Gen III)	P2229	Detects a continuous short to power or open circuit in the Barometric Pressure (BARO) signal circuit by monitoring the BARO sensor output voltage and failing the diagnostic when the BARO voltage is too high. The BARO sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	BARO Voltage	> 90.0 % of 5 Volt Range (This is equal to 115.0 kPa)			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.
Barometric Pressure (BARO) Sensor Circuit Intermittent	P2230	Detects a noisy or erratic signal in the barometric pressure (BARO) circuit by monitoring the BARO sensor and failing the diagnostic when the BARO signal has a noisier output than is expected. When the value of BARO in kilopascals (kPa) is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of BARO readings. The result of this summation is called a “string length”. Since the BARO signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic BARO signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current BARO reading - BARO reading from 12.5 milliseconds previous)	> 100 kPa 80 consecutive BARO readings			4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbo/Super Charger Bypass Valve - Mechanical Turbocharger with wastegate. Not supercharger with mechanical compressor	P2261	This DTC indicates the compressor recirculation valve being stuck closed. This diagnostic is active at coast down let off conditions, where an airflow pulsation criteria is used as basis of this diagnostic.	When measuring time accumulated air mass flow derivate boost pressure is high pass filtered with filter frequency ********** A failure is detected when Acc. Filtered Air Mass Flow or Acc.Der.Filtered boost pressure	< 0.80 Second, = 31.40 Hz ********** > 28.00 g/s > 5,000.00 kPa/s	Diagnostic enabled ********** Engine speed ********** Bypass valve commanded open duty cycle For at least ********** Pressure ratio over the compressor relative limit Condition keep true for x seconds extra ********** Negative transient -> TRUE Relative boost and Pressure derivate Hysteresis negative transient -> FALSE Relative boost or Pressure derivate ********** No Active DTCs:	False ********** >= 1,200 rpm ********** > 6.00 % >= 0.20 s ********** > refer to **P00C4 P2261: Compressor Surge Line** in Supporting Tables 1.50 s ********** TRUE >= 20.00 kPa <= -250.00 kPa/s < 3.00 kPa > 50.00 kPa/s ********** BSTR_b_TurboBypassCktFA BSTR_b_BoostSnsrFA MAF_SensorFA	8 Failed tests out of 10 tests 25ms/ sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Signal Stuck Lean Bank 1 Sensor 2	P2270	The P2270 diagnostic is the first in a sequence of six intrusive secondary O2 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, & P013B. This DTC determines if the secondary O2 sensor is stuck in a normal lean voltage range and thereby can no longer be used for secondary O2 sensor fuel control or for catalyst monitoring. This diagnostic increases the delivered fuel while monitoring the sensor signal and the accumulated mass air flow. This fault is set if the secondary O2 sensor does not achieve the required rich voltage before the accumulated mass air flow threshold is reached.	Post O2 sensor signal AND The Accumulated mass air flow monitored during the Stuck Lean Voltage Test	< 800 mvolts > 100 grams	No Active DTC's B1S2 DTC's Not active this key cycle System Voltage Learned heater resistance Green O2S Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA O2S_Bank_ 1_TFTKO O2S_Bank_ 2_TFTKO P013A, P013B, P013E, P013F, P2270 or P2271 > 10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid, Green O2S condition is considered valid until the accumulated 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 only enabled when airflow	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						is above 18.0 grams/sec.		
					Low Fuel Condition	= False		
					Only when FuelLevelDataFault	= False		
					Pedal position	≤ 4.0 %		
					Engine Airflow	2.0 ≤ gps ≤ 20.0		
					Closed loop integral	0.80 ≤ C/L Int ≤ 1.08		
					Closed Loop Active	= TRUE (Please see "**Closed Loop Enable Clarification**" in Supporting Tables).		
					Decel Fuel Cut Off	not inhibited		
					Evap	not in control of purge		
					Ethanol Estimation in Progress	= Not Active (Please see "**Ethanol Estimation in Progress**" in Supporting Tables).		
					Post fuel cell	= Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info.		
					Crankshaft Torque	< 125.0 Nm		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater (post sensor) on Time	≥ 30.0 sec		
					Transmission Temp	≥ -41.0 ºC		

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 2.0 seconds, and then the Force Cat Rich intrusive stage is requested. ========== During Stuck Lean test the following must stay TRUE or the test will abort: Commanded Fuel Crankshaft Torque	550 ≤ ºC ≤ 910 = DFCO possible ========== 1,150 ≤ RPM ≤ 3,500 1,100 ≤ RPM ≤ 3,650 40.4 ≤ MPH ≤ 77.7 36.0 ≤ MPH ≤ 80.8 0.96 ≤ EQR ≤ 1.08 < 110.0 Nm		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Signal Stuck Rich Bank 1 Sensor 2	P2271	The P2271 diagnostic is the fourth in a sequence of six intrusive secondary O2 monitors which include DTCs P2270, P013E, P013A, P2271, P013F, & P013B. This DTC determines if the secondary O2 sensor is stuck in a normal rich voltage range and thereby can no longer be used for secondary O2 sensor fuel control or for catalyst monitoring. This diagnostic commands fuel cut off while monitoring the sensor signal and the accumulated mass air flow. This fault is set if the secondary O2 sensor does not achieve the required lean voltage before the accumulated mass air flow threshold is reached.	Post O2 sensor signal AND The Accumulated mass air flow monitored during the Stuck Rich Voltage Test	> 100 mvolts > 40.0 grams	No Active DTC's B1S2 DTC's Not Active this key cycle System Voltage Learned heater resistance Green O2S Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA O2S_Bank_ 1_TFTKO O2S_Bank_ 2_TFTKO P013A, P013B, P013E, P013F or P2270 > 10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid, Green O2S condition is considered valid until the accumulated 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 only enabled when airflow	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						is above 18.0 grams/sec.		
					Low Fuel Condition Only when FuelLevelDataFault	= False = False		
					Fuel State	= DFCO possible		
					DTC's Passed	= P2270 = P013E = P013A		
					========== After above conditions are met: DFCO mode is continued (w/o driver initiated pedal input).	==========		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SIDI High Pressure Pump Performance	P228C	This DTC determines if the high pressure pump is not able to maintain target pressure. The fault is set if the measured fuel rail pressure is lower than desired fuel pressure by a value that can impact emission and drivability for a number of pump events.	Fuel Pressure Error (Desired Pressure - Measure Pressure)	>= **P228C P2C1F - High Pressure Pump Control (HPC) fail threshold of pressure too low** Mpa (see supporting tables)	High Pressure Pump Performance Diagnostic Enable Battery Voltage Low Side Fuel Pressure Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP or TFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) andCam or Crank Sensor Not FA and IAT,IAT2,ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and Device control commanded pressure is false and Device control pump ckt enabled on is false and	True >= 11 Volts > 0.300 MPa Enabled when a code clear is not active or not exiting device control Engine is not cranking	Positive Pressure Error - 10.00 second failures out of 12.50 second samples	Type A, 1 Trips

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 >= -10.0 degC -10 <=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,ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and Device control commanded pressure is false and Device control pump ckt	True >= 11 Volts > 0.300 MPa Enabled when a code clear is not active or not exiting device control Engine is not cranking	Negative Pressure Error - 10.00 second failures out of 12.50 second samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 >= -10.0 DegC -10 <= Temp degC <= 132		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #1 CIRCUIT LOW	P2300	Diagnoses Cylinder #1 Ignition Control (EST) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	≤ 100 Ω impedance between signal and controller ground	Engine running Ignition Voltage	 > 11.0	50 Failures out of 63 Samples 100 msec rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #1 CIRCUIT High	P2301	Diagnoses Cylinder #1 Ignition Control (EST) output driver circuit for a Short to Power fault. Controller specific output driver circuit diagnoses the low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	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 Ω impedance between signal and controller power	Engine running Ignition Voltage	 > 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #2 CIRCUIT Low	P2303	Diagnoses Cylinder #2 Ignition Control (EST) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	≤ 100 Ω impedance between signal and controller ground	Engine running Ignition Voltage	 > 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #2 CIRCUIT High	P2304	Diagnoses Cylinder #2 Ignition Control (EST) output driver circuit for a Short to Power fault	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 Ω impedance between signal and controller power	Engine running Ignition Voltage	 > 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #3 CIRCUIT Low	P2306	Diagnoses Cylinder #3 Ignition Control (EST) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	≤ 100 Ω impedance between signal and controller ground	Engine running Ignition Voltage	 > 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #4 CIRCUIT Low	P2309	Diagnoses Cylinder #4 Ignition Control (EST) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	≤ 100 Ω impedance between signal and controller ground	Engine running Ignition Voltage	 > 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Control Torque Request Circuit	P2544	Determines if the torque request from the TCM is valid	Protect error - Serial Communication message 2's complement not equal ($189/$199)	Message <> two's complement of message	Diagnostic Status	Enabled	>= 16 failures out of 20 samples.	Type B, 2 Trips
					Power Mode	= Run	Performed on every received message	
			OR Rolling count error - Serial Communication message ($189/$199) rolling count index value	Message <> previous message rolling count value + one	Ignition Voltage	> 6.41 volts	>= 6 Rolling count errors out of 10 samples.	
					Engine Running	= True		
			OR		Run/Crank Active	> 0.50 Sec	Performed on every received message	
			Range Error - Serial Communication message - ($189/$199) TCM Requested Torque Increase	> 350 Nm	No Serial communication loss to TCM (U0101)	No loss of communication	>= 6 range errors out of 10 samples.	
							Performed on every received message	
			OR					
			Multi-transition error - Trans torque intervention type request change	Requested torque intervention type toggles from not increasing request to increasing request			>= 3 multi-transitions out of 5 samples. Performed every 200 msec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Hood Switch Performance	P257D	This DTC monitors the hood switch rationality	Hood Switch position is in an invalid position. Type of Switch: CeHSWR_e_Enumerated With an enumerated type switch the hood switch reading is invalid in these ranges With a discrete type switch the hood switch reading is invalid when With a percentage type switch the hood switch reading is invalid in these ranges With a resistance type switch the hood switch reading is invalid in these ranges	 1281 Ohms to 1404 Ohms Hood Switch 1 and Hood Switch 2 are in the same state (States not equal is proper function) 71.50 % to 67.80 % or 45.70 % to 43.40 % or 17.20 % to 14.60 % 6,775.00 Ohms to 2,350.00 Ohms or 2,280.00 Ohms to 750.00 Ohms or 720.00 Ohms to 300.00 Ohms	The diagnostic is enabled Enabled when Run/Crank is active only, otherwise Run/Crank is not used as an enable	= 1 (1 indicates enabled) = 1 (1 indicates Run/ Crank active enabled)	80 failed samples within 100 total samples Diagnostic runs in the 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Hood Switch Short to Ground / Low Voltage	P257E	This DTC monitors the hood switch for a short to ground or low voltage condition	Hood Switch position reading is outside an expected bounds for Type of Switch: CeHSWR_e_Enumerated With an enumerated type switch the bound is hood switch reading With a discrete type switch the bounds are With a percentage type switch the bound is hood switch reading With a resistance type switch the bound is hood switch reading	 <= 325 Ohms Hood Switch 1 and Hood Switch 2 are in the same state (States not equal is proper function) <= 14.60 % <= 300.00 Ohms	The diagnostic is enabled Enabled when Run/Crank is active only, otherwise Run/Crank is not used as an enable	= 1 (1 indicates enabled) = 1 (1 indicates Run/ Crank active enabled)	80 failed samples within 100 total samples Diagnostic runs in the 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Hood Switch Short to Voltage / High Voltage	P257F	This DTC monitors the hood switch for a short to voltage or high voltage condition	Hood Switch position reading is outside an expected bounds for Type of Switch: CeHSWR_e_Enumerated With an enumerated type switch the bound is hood switch reading With a discrete type switch the bounds are With a percentage type switch the bound is hood switch reading With a resistance type switch the bound is hood switch reading	 >= 3620 Ohms Hood Switch 1 and Hood Switch 2 are in the same state (States not equal is proper function) >= 71.50 % >= 6,775.00 Ohms	The diagnostic is enabled Enabled when Run/Crank is active only, otherwise Run/Crank is not used as an enable	= 1 (1 indicates enabled) = 1 (1 indicates Run/ Crank active enabled)	80 failed samples within 100 total samples Diagnostic runs in the 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
VVT Lock Control Open Ckt Bnk1	P25CA	Controller specific output driver circuit diagnoses the VVL park pin system high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	≥ 200 K Ω impedance between signal and controller ground.	System supply voltage Output driver Ignition switch	> 11.00 Volts On Crank or Run	20 failures out of 25 samples 250 ms /sample, continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
VVT Lock Control Low Ckt Bnk1	P25CB	Controller specific output driver circuit diagnoses the VVL park pin system 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 Ω impedance between signal and controller ground	System supply voltage Output driver Ignition switch	> 11.00 Volts On Crank or Run	20 failures out of 25 samples 250 ms /sample, continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
VVT Lock Control Hi Ckt Bnk1	P25CC	Controller specific output driver circuit diagnoses the VVL park pin system 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 Ω impedance between signal and controller power	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.
Auxiliary Coolant Pump Relay Control Circuit	P2600	Controller specific output driver circuit diagnoses the Auxillary Coolant Pump Relay Control Circuit low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	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 Ω impedance between signal and controller ground.	Run Crank Ignition in Range Engine not cranking == Above is true and == Last Open Circuit Test	= True = True ========== not Indeterminate	5 failures out of 6 samples 1 sec/ sample Continuous	Type B, 2 Trips Note: In certian controllers P2602 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Coolant Pump Relay Control Circuit Low Voltage	P2602	Controller specific output driver circuit diagnoses the Auxiliary Coolant Pump Relay Control Circuit low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	≤ 0.5 Ω impedance between signal and controller ground	Run Crank Ignition in Range Engine not cranking == Above is true and == Last Open Circuit Test	= True = True ========== not Indeterminate	5 failures out of 6 samples 1 sec/ sample Continuous	Type B, 2 Trips Note: In certian controllers P2600 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Coolant Pump Relay Control Circuit High Voltage	P2603	Controller specific output driver circuit diagnoses the Auxiliary Coolant Pump Relay Control Circuit low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	≤ 0.5 Ω impedance between signal and controller power.	Run Crank Ignition in Range Engine not cranking == Above is true and == Last Open Circuit Test	= True = True ========== not Indeterminate	5 failures out of 6 samples 1 sec/ 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.
Crankshaft Position Signal Output Circuit Low	P2618	Controller specific output driver circuit diagnoses the crankshaft position output low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.	Short to ground: <= 0.5 Ohms impedance between signal and controller ground Open Circuit: >= 200 K Ohms impedance between signal and controller ground	Powertrain Relay Voltage Engine is not cranking Crankshaft Position Output is commanded high	>= 11.0 Volts	40 failures out of 50 samples 1 sample every 100 msec	Type C, No SVS Note: In certain controllers P2617 may also set (Crankshaft Position Signal Output Circuit / Open)

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	This DTC determines if the hardware timer does not initialize or count properly. There are two tests to ensure proper functioning of the timer: Count Up Test (CUT) and Range Test (RaTe). Count Up Test (CUT): Verifies that the HWIO timer is counting up with the proper increment. Range Test (RaTe): When the run/crank is not active both the hardware and mirror timers are started. The timers are compared when module shutdown is initiated or run/crank becomes active.	Count Up Test: Time difference between the current read and the previous read of the timer Range Test: The variation of the HWIO timer and mirror timer is	> 1.50 seconds > 0.25 %.			Count Up Test: 4 failures out of 20 samples 1 sec / sample Continuous while run/crank is not active and until controller shutdown is initiated. Range Test: Once per trip when controller shutdown is initiated or run/crank becomes active.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump "A" Low Flow / Performance	P2635	This DTC detects degradation in the performance of the electronically regulated fuel system	Filtered fuel rail pressure error	<= Low Threshold [Supporting Table] **P2635 Threshold Low** OR >= High Threshold [Supporting Table] **P2635 Threshold High**	a] Fuel Pres Sensor Circuit Low Fault Active (DTC P018C) b] Fuel Pres Sensor Circuit High Fault Active (DTC P018D) c] Fuel Pres Sensor Perf Fault Active (DTC P018B) d] Fuel Pump Circuit Low Fault Active (DTC P0231) e] Fuel Pump Circuit High Fault Active (DTC P0232) f] Fuel Pump Circuit Open Fault Active (DTC P023F) g] Reference Voltage Fault Status (DTC P0641) h] Fuel Pump Driver Control Module Overtemperature Fault Active (DTC P1255) j] Barometric Pressure Signal Valid (PPEI $4C1) k] Engine run time l] Emissions Fuel Level Low (PPEI $3FB) m] Fuel Pump Control Enabled	a] <> TRUE b] <> TRUE c] <> TRUE d] <> TRUE e] <> TRUE f] <> TRUE g] <> Active This Key h] <> TRUE j] == TRUE (for absolute fuel pressure sensor) k] >= 30 sec l] <> TRUE m] == TRUE	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.
					n] Fuel Pump Control state p] System Voltage q] Fuel flow rate r] Fuel Pressure Control System	n] == Normal p] 11V< System V <32V q1] > 0.047 gram/sec AND q2] <= Max allowed fuel flow rate [Supporting Table] **P2635 Max Fuel Flow** r1] Not responding to overperformance due to pressure buildup during Deceleration Fuel Cut Off OR r2] Not responding to a decreasing desired fuel pres commnad		

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 controllers 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 Ω 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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Starter Relay Drive Pinion Circuit Open (12VSS)	P26E4	Controller specific output driver circuit diagnoses the Tandem Starter Pinion Relay high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	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.	Starter relay pinion diag enable Engine speed Run Crank voltage	= 1.00 >= 0.00 RPM >= 11.00 volts	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.
Starter Relay Drive Pinion Circuit Low Voltage (12VSS)	P26E5	Controller specific output driver circuit diagnoses the Tandem Starter Pinion Relay high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	<= 0.5 Ohms impedance between signal and controller ground	Starter control diag enable Engine speed Run Crank voltage	= 1.00 >= 0.00 RPM >= 6.41 volts	8 failures out of 10 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.
Starter Relay Drive Pinion Circuit High Voltage (12VSS)	P26E6	Controller specific output driver circuit diagnoses the Tandem Starter Pinion Relay high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 0.5 Ohms impedance between signal and controller power	Starter control diag enable Engine speed Run Crank voltage	= 1.00 >= 0.00 RPM >= 11.00 volts	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.
Internal Control Module SIDI High Pressure Pump min/ max authority During Catalyst Warm Up	P2C1E	This DTC determines when the high pressure pump control has reached to its max or min authority during Cataylst Warm up	High Pressure Fuel Pump Delivery Angle OR High Pressure Fuel Pump Delivery Angle	>= 92 ° <= 0 °	Catalyst Warm Up High Pressure Pump Performance Diagnostic Enable Battery Voltage Low Side Fuel Pressure Barometric Pressure Inlet Air Temp Fuel Temp Catalyst Warm up enabled (See Definition in Supporting Material below) Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP or TFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) andCam or	True >= 11 Volts > 0.300 MPa Enabled when a code clear is not active or not exiting device control Engine is not cranking >= 70.0 KPA >= -10.0 degC -10 <= Temp degC <= 132 = True	Windup High/ Low 10.00 seconds failures out of 12.50 Seconds samples	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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) andCam or Crank Sensor Not FA and IAT,IAT2,ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and	True >= 11 Volts > 0.300 MPa = True Enabled when a code clear is not active or not exiting device control Engine is not cranking	Positive Pressure Error - 10.00 second failures out of 12.50 second samples	Type A, 1 Trips

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 >= -10.0 degC -10 <=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,ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not	True >= 11 Volts > 0.300 MPa = True Enabled when a code clear is not active or not exiting device control Engine is not cranking	Negative Pressure Error - 10.00 second failures out of 12.50 second samples	Type A, 1 Trips

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 >= -10.0 DegC -10 <= Temp degC <= 132		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Actuator Voltage Sensor Circuit 1 Low Voltage	P3051	Diagnoses the DC/DC Converter Actuator Voltage Sensor Circuit 1 for short to ground faults.	DC/DC Converter Actuator Voltage Raw Value 1	< 1 Volt	Diagnostic enabled Run/Crank or Accessory Battery Voltage	TRUE TRUE >= 6.60 Volts	640 failed samples out of 800 samples in 6.25 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Actuator Voltage Sensor Circuit 2 Low Voltage	P3052	Diagnoses the DC/DC Converter Actuator Voltage Sensor Circuit 2 for short to ground faults.	DC/DC Converter Actuator Voltage Raw Value 2	< 1 Volt	Diagnostic enabled Run/Crank or Accessory Battery Voltage	TRUE TRUE >= 6.60 Volts	640 failed samples out of 800 samples in 6.25 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Actuator Voltage Sensor Circuit 1 High Voltage	P3053	Diagnoses the DC/DC Converter Actuator Voltage Sensor Circuit 1 for short to battery faults.	DC/DC Converter Actuator Voltage Raw Value 1	> 28 Volt	Diagnostic enabled Run/Crank or Accessory Battery Voltage	TRUE TRUE >= 6.60 Volts	640 failed samples out of 800 samples in 6.25 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Actuator Voltage Sensor Circuit 2 High Voltage	P3054	Diagnoses the DC/DC Converter Actuator Voltage Sensor Circuit 2 for short to battery faults.	DC/DC Converter Actuator Voltage Raw Value 2	> 28 Volt	Diagnostic enabled Run/Crank or Accessory Battery Voltage	TRUE TRUE >= 6.60 Volts	640 failed samples out of 800 samples in 6.25 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Actuator Voltage 1 Performance	P3055	Detects DC/DC Converter Actuator Voltage 1 Performance issues	Bypass Mode: Absolute value of voltage difference between DC/ DC Converter Actuator Voltage Raw Value 1 and ECM Run/Crank	> 1 Volt	Diagnostic enabled Run/Crank or Accessory Engine running OR Engine stopped Battery Voltage	TRUE TRUE for > 160 loops in 6.25 ms loop for > 160 loops in 6.25 ms loop >= 6.60 Volts	640 failed samples out of 800 samples in a 6.25 ms loop	Type B, 2 Trips
			Stabilize Mode- Auto-Cranking: Absolute value of voltage difference between DC/ DC Converter Actuator Voltage Raw Value 1 and ECM Run/Crank	> 1 Volt	Diagnostic enabled Run/Crank or Accessory Engine auto-cranking Battery Voltage	TRUE TRUE for > 0 loops in 6.25 ms loop >= 6.60 Volts	16 failed samples out of 32 samples in a 6.25 ms loop	
			Stablize Mode-Auto-Cranking Events: Number of failed auto-cranking events exceeds threshold	> 2 failed auto-cranking events	Diagnostic enabled Run/Crank or Accessory Engine auto-cranking	TRUE TRUE has occurred	2 failed auto-crank events out of 3 consecutive auto-crank events	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Actuator Voltage 2 Performance	P3056	Detects DC/DC Converter Actuator Voltage 2 Performance issues	Bypass Mode: Absolute value of voltage difference between DC/ DC Converter Actuator Voltage Raw Value 2 and ECM Run/Crank	> 1 Volt	Diagnostic enabled Run/Crank or Accessory Engine running OR Engine stopped Battery Voltage	TRUE TRUE for > 160 loops in 6.25 ms loop for > 160 loops in 6.25 ms loop >= 6.60 Volts	640 failed samples out of 800 samples in a 6.25 ms loop	Type B, 2 Trips
			Stabilize Mode- Auto-Cranking: Absolute value of voltage difference between DC/ DC Converter Actuator Voltage Raw Value 2 and ECM Run/Crank	> 1 Volt	Diagnostic enabled Run/Crank or Accessory Engine auto-cranking Battery Voltage	TRUE TRUE for > 0 loops in 6.25 ms loop >= 6.60 Volts	16 failed samples out of 32 samples in a 6.25 ms loop	
			Stablize Mode-Auto-Cranking Events: Number of failed auto-cranking events exceeds threshold	> 2 failed auto-cranking events	Diagnostic enabled Run/Crank or Accessory Engine auto-cranking	TRUE TRUE has occurred	2 failed auto-crank events out of 3 consecutive auto-crank events	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Ignition Switch Run/ Start Position Ciruit High Voltage	P305B	Diagnoses the DC/DC Converter Ignition Switch Run/Start Position circuit for circuit high faults	DC/DC Converter Ignition Switch Run/Start Position	<> ECM Ignition Switch Run/Start Position	Diagnostic enabled Run/Crank Accessory Battery Voltage	TRUE FALSE TRUE >= 6.60 Volts	320 failed samples out of 400 samples in a 6.25 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Ignition Switch Run/ Start Position Ciruit Low Voltage	P305C	Diagnoses the DC/DC Converter Switch Run/ Start Position circuit for circuit low faults	DC/DC Converter Ignition Switch Run/Start Position	<> ECM Ignition Switch Run/Start Position	Diagnostic enabled Run/Crank Accessory Battery Voltage	TRUE TRUE TRUE >= 6.60 Volts	640 failed samples out of 800 samples in a 6.25 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Crank Control Circuit High Voltage	P305D	Diagnoses the DC/DC Converter Crank Control Circuit for circuit high faults	DC/DC Converter Crank Control	<> ECM Crank Control	Diagnostic enabled Run/Crank ECM Crank Control Battery Voltage	TRUE TRUE FALSE >= 6.60 Volts	640 failed samples out of 800 samples in a 6.25 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
DC/DC Converter Crank Control Circuit Low Voltage	P305E	Diagnoses the DC/DC Converter Crank Control Circuit for circuit low faults	DC/DC Converter Crank Control	<> ECM Crank Control	Diagnostic enabled Run/Crank or Accessory ECM Crank Control Battery Voltage	TRUE TRUE TRUE >= 6.60 Volts	24 failed samples out of 32 samples in a 6.25 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.
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures exceeds before the sample time of is reached	5 counts (equivalent to 0.06 seconds) 0.81 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds CAN hardware is bus OFF for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts > 0.1625 seconds	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.
Control Module Communication (Powertrain Expansion CAN Bus) Bus Off	U0074	CAN bus is monitored continuously while GMLAN frames are being transmitted.	Bus status= Monitored continuously while GMLAN frames are being transmitted. Upon notification of bus off condition (passed up to the application from the handler), the algorithm checks for this condition every 1000ms.	=off	Vehicle Power mode: Any virtual network that the module participates in is: ECU operational condition: U0074_00_ENABLE =	Off, Accessory, Run active In ECU_COMM_Actie state. True	1000ms	Depends on the node

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication Bus B Off	U0074	This DTC monitors for a BUS B off condition	Bus off failures exceeds before the sample time of is reached	5 counts (equivalent to 0.06 seconds) 0.81 seconds	General Enable Criteria: U0074 Normal CAN transmission on Bus B Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds CAN hardware is bus OFF for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts > 0.1625 seconds	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.
Control Module Communication Powertrain Sensor CAN Bus Off	U0076	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Bus status	=off	Controller On Ignition	= True for 3,000 msec = Run/Crank OR = Accessory	1.0 second	DTC Type B, Two Trips.

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With TCM	U0101	Detects that CAN serial data communication has been lost with the TCM Transmission Control Module on HS GMLAN.	CAN messages are monitored continuously while GMLAN frames are being transmitted. Message $0C1 and/or $197 and/or $1F5 and/or $3F5:	=Undetected.	Controller On: Ignition: Non-OBD Control Modules: Vehicle Power Mode condition: OBD Control Modules, e.g. ECM: Accessory Wake Up: Virtual Network condition: Bus off DTC U0073 U0101_00_ENABLE=	=True = Run or Crank or Accessory RUN Active Any Virtual Network that the module participates in is active. Not fault active Enabled	Frame $0C1: 0.50 sec Frame $197: 0.50 sec Frame $1F5: 0.50 sec Frame $3F5: 1.00 sec	DTC Type B. Two trips.

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With TCM	U0101	This DTC monitors for a loss of communication with the transmission control module	Message is not received from controller for Message $0BD Message $0C7 Message $0F9 Message $189 Message $199 Message $19D Message $1AF Message $1F5 Message $4C9	 ≥ 10.0 seconds ≥ 0.5 seconds ≥ 0.5 seconds ≥ 0.5 seconds ≥ 0.5 seconds ≥ 0.5 seconds ≥ 0.5 seconds ≥ 0.5 seconds ≥ 10.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts > 0.4000 seconds	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.
					U0101 TCM	Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Battery Monitor Module	U01B0	This DTC monitors for a loss of communication with the Battery Monitor Module on LIN bus	Message is not received from controller for ECM has lost communication over the LIN bus with Battery Monitor Module for	>= 3 counts	The following criteria have been enabled for Power Mode Run/Crank Voltage	>= 400.00 milliseconds =Run >= 11.00 Volts	Between 100ms and 175ms due to rate of LIN communication to Battery Monitor Module.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Active Grill Air Shutter Module A	U0284	This DTC monitors for a loss of communication on the LIN bus with Shutter Module A	ECM has lost communication over the LIN bus with Device 0 / Shutter 1 for	>= 3.00 counts	The following criteria have been enabled for Power Mode Run/Crank Voltage	>= 400.00 milliseconds =Run >= 11.00 Volts	LIN bus communication executes in 500ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received From Body Control Module	U0422	Signal between the BCM and door switches is unreliable	Driver Door Ajar Switch Virtual Device Availability OR Driver Door Open Switch Virtual Device Availability	= INVALID = INVALID	Battery voltage A diagnostic code clear event or diagnostic re-enable event is not in progress for	within proper operating range for 3,000 msec. for a time 3,000 msec.	12.5 ms loop 8 failures out of 10 samples.	Special Type C No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Control Module LIN Bus 1	U1345	Detects that LIN serial data communication has been lost with the LIN Bus	Bus Status	= Off	Controller On Ignition	> 3,000 ms = Run/Crank OR = Accessory	1.0 second	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Transmission Control Module on Engine Control Module LIN Bus 1	U135E	Detects that LIN serial data communication has been lost with the LIN Bus	TCM to ECM: Message $01 Bus Status	= Undetected	Controller On Ignition	> 3,000 ms = Run/Crank OR = Accessory	1.0 second	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Fuel Pump Driver Control Module on Bus S	U18A2	This DTC monitors for a loss of communication with the Fuel Pump Driver Control Module on Bus S	Message is not received from controller for Message $0D5 Message $0D7	 ≥ 10.00 seconds ≥ 10.00 seconds	General Enable Criteria: U0076 Normal CAN transmission on Bus S Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) =Active > 11.00 Volts > 0.4000 seconds	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.
					U18A2 Fuel Pump Driver Control Module	Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With DC/ DC Converter Control Module on Bus B	U18A7	This DTC monitors for a loss of communication with the DC/DC Converter Control Module on Bus B	Message is not received from controller for Message $0A0 Message $1D2	 ≥ 10.0 seconds ≥ 10.0 seconds	General Enable Criteria: U0074 Normal CAN transmission on Bus B Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					not active for U18A7 DC/DC Converter Control Module	> 0.4000 seconds Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Transmission Range Selector Control Module on Powertrain Sensor CAN Bus	U18D2	Detects that CAN serial data communication has been lost with the TRS PT Sensor Bus	TRS Buttons Message: $2F3, $4C4, $1E4, TRS Linear Shifter Messages: $2F3, $4C4, $1EC	=Undetected	Controller On Ignition	> 3,000 ms = Run/Crank OR = Accessory	1.0 second	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Transmission Range Selector Control Module on Powertrain Expansion CAN Bus	U18D3	Detects that CAN serial data communication has been lost with the SIB PT Exp Bus	TRS Buttons Message: $2C2 TRS Linear Shifter Message: $2EC	=Undetected	Controller On Ignition	> 3,000 ms = Run/Crank OR = Accessory	1.0 second	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Invalid Data Received From Transmission Control Module on Chassis Control Module LIN Bus 2	U250D	Detects if Range Command Echo from TCM matches current Range Command (For Internal ETRS only)	Check Range Command Echo vs Range Command when Range Command Poke is called	Range Command Echo ≠ Range Command	Diagnostic Enable Calibration Recent Range Command Transition TCM LIN Node or Bus Fault Active	 = TRUE = FALSE = FALSE	80 failures out of 100 samples 50 ms loop	DTC Type B Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Lost Communication with ECM [FPPM applications only]	U2616	To detect lost serial data communication from the power driver controller to the ECM	Timer - Fuel System Control message not received (FPPM Received Data Communication Status)	t > 10 s (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate)	a) Chassis Fuel Pres Sys Type configuration selection b) Diagnostic Enabled c) Diagnostic System Disabled condition d) FPPM Control Alive Rolling Count Faulted e) FPPM serial data received [$0CE] f) Run_Crank Input Circuit Voltage g) Run_Crank Ignition Switch Position status h) Sensor Bus Relay On	a) == FCBR ECM FPPM Sys b) == TRUE c) <> True d) <> True e) == TRUE f) > 7.00 volts g) == TRUE h) == TRUE	64.00 failures / 80.00 samples 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.
Auto Start Stop Select Switch Signal Circuit For start stop conventional hybrid applications	P15A3	BCM to ECM Rolling Count check for CAN frame $1E1. -- Only utilize when calibration variable KeINFG_e_HybridType equals CeINFR_e_StartStopConv.	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 ≤ 318.14 MPH ≥ 5.0 seconds =CeINFR_e_StartStopConv	> 3 error counts for > 10.0 seconds 100 ms / sample	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Surge Solenoid Circuit Open	P171A	Controller specific transmission surge accumulator control circuit diagnoses the transmission surge accumulator and wiring for an open circuit fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission surge accumulator control circuit impedance	≥ 200 K Ω impedance between signal and controller ground	battery voltage AND battery voltage update battery enable time run/crank voltage diagnostic monitor enable	≥ 7.00 volts ≤ 32.00 volts ≥ 5.00 volts = 1 Boolean	fail time ≥ 0.188 seconds out of sample time ≥ 0.250 seconds 25 milliseconds update rate battery enable time ≥ 5.00 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Surge Solenoid Circuit Low	P171B	Controller specific transmission surge accumulator control circuit diagnoses the transmission surge accumulator and wiring for a ground short circuit fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission surge accumulator control circuit impedance	≤ 0.5 Ω impedance between signal and controller ground	battery voltage AND battery voltage update battery enable time run/crank voltage diagnostic monitor enable	≥ 7.00 volts ≤ 32.00 volts ≥ 5.00 volts = 1 Boolean	fail time ≥ 0.188 seconds out of sample time ≥ 0.250 seconds 25 milliseconds update rate battery enable time ≥ 5.00 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Surge Solenoid Circuit High	P171C	Controller specific transmission surge accumulator control circuit diagnoses the transmission surge accumulator and wiring for a short to power circuit fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission surge accumulator control circuit impedance	≤ 0.5 Ω impedance between signal and controller voltage source	battery voltage AND battery voltage update battery enable time run/crank voltage diagnostic monitor enable	≥ 7.00 volts ≤ 32.00 volts ≥ 5.00 volts = 1 Boolean	fail time ≥ 0.069 seconds out of sample time ≥ 0.081 seconds 25 milliseconds update rate battery enable time ≥ 5.00 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Surge Accumulator System Performance	P171D	Detects when the surge accumulator system, used to provide transmission hydraulic pressure, is not capable of supplying adequate hydraulic pressure during an engine auto-start. The transmission holding clutch pressures are commanded to meet the engine crank shaft torque output, to prevent clutch slip to those holding clutches, during the engine auto-start. The diagnostic monitors transmission input shaft speed during the auto-start event as the primary malfunction criteria. Measured input shaft speed that is excessive is an indication the holding clutches are slipping due to inadequate hydraulic pressure, as a result of a failed surge accumulator system.	Transmission turbine speed is greater than predicted turbine speed during autostart event, update initial fail count	≥ **P171D predicted turbine speed error** Refer to "Transmission Supporting Tables" for details	PRNDL state defaulted Transmission shift lever position Propulsion system active Ignition voltage Ignition voltage Transmission fluid temp Transmission fluid temp Hybrid state AutoStop duration min During autostop Engine speed was ********** If above conditions are met then the following must occur: Turbine speed Engine speed Hydraulic pressure delay time If above conditions are met then increment time-out timer. Time-out timer Note: The initial fail	= False = Forward range A = True > 9.00 volts < 31.99 volts > 0.00 °C < 110.00 °C = Engine off ≥ 1.200 seconds < 5.0 RPM ≥ 80.0 RPM ≥ 450.0 RPM ≥ **P171D hydraulic pressure delay** Refer to "Transmission Supporting Tables" for details ≤ 0.38 seconds	≥ 12 counts (initial fail count) Frequency =12.5ms Once the above counts are achieved then increment the final fail counter once. The final fail counter can only increment once per autostart event ≥ 3 counts (final fail counter) If above counter is greater than threshold then report DTC failed. Frequency = 12.5ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					counter must achieve it's fail threshold in less than the time-out time. ********** If vehicle is launched then: Transmission gear ratio Trans 1st gear ratio high Trans 1st gear ratio low Trans gear ratio not 1st gear high Trans gear ratio not 1st gear low Valid transmission gear ratio achieved time OR If vehicle is not launched but autostart occurs then: Turbine speed Turbine speed less then above threshold for Note: During an autostart event the lack of hydraulic pressure will result in momentary clutch slip in	 = 4.5600 1st gear ratio = 2.9700 2nd gear ratio = 2.0700 3rd gear ratio = 1.6800 4th gear ratio = 1.2700 5th gear ratio = 1.0000 6th gear ratio ≤ 1.120 times 1st gear ratio ≥ 0.880 times 1st gear ratio ≤ 1.070 times gear ratio ≥ 0.930 times gear ratio ≥ 0.500 seconds ≤ 5.00 RPM ≥ 0.500 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					the C1234 clutch. After the clutch slip event, the main transmission pump and clutch will gain capacity, clutch slip will go to zero. If the vehicle is launching (moving) then a valid transmission ratio can be achieved. Or if the brake is continually applied and an autostart occurs naturally, then no ratio can be measured. In this case turbine speed will return to near zero rpm. ********** DTCs not fault active	CrankSensor_FA Transmission Output Shaft Angular Velocity Validity Transmission Turbine Angular Velocity Validity Transmission Oil Temperature Validity P171A P171B P171C U0101 P182E P1915		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP)-Camshaft Position (CMP) Correlation Bank 1 Sensor A (end-park phaser)	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	4 cam sensor pulses less than or greater than nominal position in one cam revolution.	-7.9 Crank Degrees 12.1 Crank Degrees	Crankshaft and camshaft position signals are synchronized Engine is Spinning Cam phaser is in "parked" position No Active DTCs: Time since last execution of diagnostic Delay diagnostic if Engine RPM and Cam is Enabled for	 CrankSensor_FA P0340, P0341 < 1.0 seconds > 8,200.00 < 3.00	2 failures out of 3 tests. A failed test is 4 failures out of 5 samples. There is a delay after the first failed test to allow the camshaft position to return to the park position. This time is defined by the table **P0016, P0017, P0018, P0019: Cam Correlation Oil Temperature Threshold** . One sample per cam rotation	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP)-Camshaft Position (CMP) Correlation Bank 1 Sensor B (end-park phaser)	P0017	Detects cam to crank misalignment by monitoring if the cam sensor pulse for bank 1 sensor B occurs during the incorrect crank position, diagnostic passes when the cam sensor pulse is in the expected range	4 cam sensor pulses less than or greater than nominal position in one cam revolution..	-7.9 Crank Degrees 12.1 Crank Degrees	Crankshaft and camshaft position signals are synchronized Engine is Spinning Cam phaser is in "parked" position No Active DTCs: Time since last execution of diagnostic Delay diagnostic if Engine RPM and Cam is Enabled for	 CrankSensor_FA P0365, P0366 < 1.0 seconds > 8,200.00 < 3.00	2 failures out of 3 tests. A failed test is 4 failures out of 5 samples. There is a delay after the first failed test to allow the camshaft position to return to the park position. This time is defined by the table **P0016, P0017, P0018, P0019: Cam Correlation Oil Temperature Threshold** . One sample per cam rotation	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Radiator Coolant Temp Sensor Circuit Low Voltage	P00B3	Circuit Continuity This DTC detects a short to ground in the RCT (Radiator Coolant temperature) signal circuit or the RCT sensor. This is accomplished by monitoring the resitance of the circuit. If the resistance goes out of the expected range the DTC is set.	RCT Resistance (@ 150ºC)	< 42 Ohms	Engine run time OR IAT min	> 10.0 seconds ≤ 70.3 °C	5 failures out of 6 samples 1 sec/ 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.
Radiator Coolant Temp Sensor Circuit High Voltage	P00B4	Circuit Continuity This DTC detects a short to high or open in the RCT (Radiator Coolant temperature) signal circuit or the RCT sensor. This is accomplished by monitoring the resistance of the circuit. If the resistance goes out of the expected range the DTC is set.	RCT Resistance (@ -60ºC)	> 320,000 Ohms	Engine run time OR IAT min	> 60.0 seconds ≥ -9.0 °C	5 failures out of 6 samples 1 sec/ 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.
Engine Coolant Flow Insufficient	P00B7	This DTC detects a Insufficient Flow Condition in the main cooling circuit. This check is done when all known restrictions in the system such as a thermostat are open and allowing coolant to flow through the radiator. DTC indication can be caused by a stuck closed thermostat or other unexpected restriction in the cooling system.	Engine Coolant Temp (ECT) is AND Difference between ECT and RCT (Radiator Coolant Temp) is When above is present for fail counts start.	> 119.0 Deg C > 30.0 Deg C > 5 seconds	No Active DTC's Engine run time AND Engine Coolant Temp	THMR_RCT_Sensor_Ckt _FA THMR_ECT_Sensor_Ckt _FA > 30 seconds > 99.5 Deg C	30 failures out of 60 samples 1 sec/ 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.
Mass Air Flow System Performance (naturally aspirated)	P0101	Detects a performance failure in the Mass Air Flow (MAF) sensor, such as when a MAF value is stuck in range. This diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from other sensors. The other sensors are the Manifold Pressure (MAP) sensor and Throttle Position sensor (TPS). These modeled values are compared against the actual sensor values to see if they are similar. If they are similar, then the model passes. If they are not similar, then that model is considered to be failed. Certain combinations of model passes and model failures can be interpreted to be caused by a performance issue with the MAF sensor. In this case, the MAF Performance diagnostic will fail.	Filtered Throttle Model Error AND ABS(Measured Flow – Modeled Air Flow) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered	<= 200 kPa*(g/s) > 12.0 grams/sec > 25.0 kPa	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria (Coolant Temp OR OBD Max Coolant Achieved Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables.	>= 400 RPM <= 6,400 RPM >= -9 Deg C = TRUE) <= 129 Deg C = FALSE) >= -20 Deg C <= 125 Deg C >= 0.50 Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** 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**	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA 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.
Manifold Absolute Pressure Sensor Performance (naturally aspirated)	P0106	Detects a performance failure in the Manifold Pressure (MAP) sensor, such as when a MAP value is stuck in range. If the engine has been off for a sufficient amount of time, the pressure values in the induction system will have equalized. The MAP sensor value is checked to see if it is within the normal expected atmospheric pressure range. If it is not, then the MAP performance diagnostic will fail. The engine running portion of 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). These modeled values are compared against the actual sensor values to see if they are similar. If they are similar, then the model	**Engine Running:** Filtered Throttle Model Error AND ABS(Measured MAP – MAP Model 1) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered	 <= 200 kPa*(g/s) > 25.0 kPa > 25.0 kPa	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria (Coolant Temp OR OBD Max Coolant Achieved Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables. No Active DTCs:	>= 400 RPM <= 6,400 RPM >= -9 Deg C = TRUE) <= 129 Deg C = FALSE) >= -20 Deg C <= 125 Deg C >= 0.50 Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** MAP Model 1 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM** MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** MAP_SensorCircuitFA	Continuous Calculations are performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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.				EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP		
			Engine Not Rotating: 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 EngineModeNotRunTimerError MAP_SensorCircuitFA AAP_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP	4 failures out of 5 samples 1 sample every 12.5 msec	

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	Detects a performance failure in the Throttle Position sensor (TPS) sensor, such as when a TPS value is stuck in range. This diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from other sensors. The other sensors are the Manifold Pressure (MAP) sensor and Mass Air Flow (MAF) sensor. These modeled values are compared against the actual sensor values to see if they are similar. If they are similar, then the model passes. If they are not similar, then that model is considered to be failed. Certain combinations of model passes and model failures can be interpreted to be caused by a performance issue with the TPS sensor. In this case, the TPS Performance diagnostic will fail.	Filtered Throttle Model Error AND ABS(Measured MAP – MAP Model 2) Filtered	> 200 kPa*(g/s) <= 25.0 kPa	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria (Coolant Temp OR OBD Max Coolant Achieved Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables. No Active DTCs:	>= 400 RPM <= 6,400 RPM >= -9 Deg C = TRUE) <= 129 Deg C = FALSE) >= -20 Deg C <= 125 Deg C >= 0.50 Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No Pending DTCs:	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.
Thermostat Heater Control Open Circuit	P0597	Controller specific output driver circuit diagnoses the Thermostat Heater Control 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 Ω impedance between signal and controller ground.	Run Crank Ignition in Range Engine not cranking Run Crank active == Above is true and == Last Open Circuit Test	 = True = True = True ========== = not Indeterminate	5 failures out of 6 samples 1 sec/ sample Continuous	Type B, 2 Trips Note: In certian controllers P0598 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Thermostat Heater Control Circuit Low	P0598	Controller specific output driver circuit diagnoses the Thermostat Heater 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 Ω impedance between signal and controller ground	Run Crank Ignition in Range Engine not cranking Run Crank active == Above is true and == Last Ground Short Circuit Test	 = True = True = True ========== = not Indeterminate	5 failures out of 6 samples 1 sec/ sample Continuous	Type B, 2 Trips Note: In certian controllers P0597 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Thermostat Heater Control Circuit High	P0599	Controller specific output driver circuit diagnoses the Thermostat Heater 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 Ω impedance between signal and controller power.	Run Crank Ignition in Range Engine not cranking Run Crank active == Above is true and == Last Power Short Circuit Test	 = True = True = True ========== = not Indeterminate	5 failures out of 6 samples 1 sec/ 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.
Inlet Airflow System Performance (naturally aspirated)	P1101	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. This diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from these three sensors. These modeled values are compared against the actual sensor values to see if they are similar. If they are similar, then the model passes. If they are not similar, then that model is considered to be failed. Certain combinations of model passes and model failures can be interpreted to be caused by a performance issue with the system, but no	Filtered Throttle Model Error AND ABS(Measured Flow – Modeled Air Flow) Filtered OR ABS(Measured MAP – MAP Model 1) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered	> 200 kPa*(g/s) > 12.0 grams/sec > 25.0 kPa) > 25.0 kPa	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria (Coolant Temp OR OBD Max Coolant Achieved Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables.	>= 400 RPM <= 6,400 RPM >= -9 Deg C = TRUE) <= 129 Deg C = FALSE) >= -20 Deg C <= 125 Deg C >= 0.50 Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** 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**	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		single failed sensor can uniquely be identified. In this case, the Inlet Airflow System Performance diagnostic will fail.				MAP Model 1 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM** MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP		
					No Active DTCs: No Pending DTCs:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Radiator Coolant Temperature Sensor Not Plausible	P112F	This DTC detects either a biased high or low RCT (Radiator Coolant Temperature) sensor. This is done by comparing the RCT sensor output to two other temperature sensor outputs after a soak condition.	**Sensor usage definitions:** **Sensor1 =** CeECTR_e_ECT_Snsr (Sensor1 is the temp sensor most impacted by the block heater (if equipped)) **Sensor2 =** CeECTR_e_RCT_Snsr **Sensor3 =** CeECTR_e_IAT_Snsr ========== A failure will be reported if (based on the above calibrations): 1) Sensor2 (if RCT is Sensor2)power up absolute temp difference to Sensor1 and Sensor3 is: OR (based on usage) 2) Sensor3 (if RCT is Sensor3) power up absolute temp difference to Sensor1 and Sensor2 is:	 ≥ 15.8 ºC ≥ 15.8 ºC	No Active DTC's Engine Off Soak Time Propulsion Off Soak Time Non-volatile memory initization Test complete this trip Test aborted this trip Test disabled this trip Ambient LowFuelCondition Diag	VehicleSpeedSensor_FA IAT_SensorCircuitFA THMR_RCT_Sensor_Ckt_FA ECT_Sensor_Ckt_FA EngineModeNotRunTimerError EngineModeNotRunTimer_FA OAT_PtEstFiltFA OAT_PtEstRawFA PSAR_PropSysInactveCrs_FA DRER_DiagSystemDsbl > 25,200 seconds > 0 seconds = Not occurred = False = False = False ≥ -9 ºC = False	1 failure to set DTC 1 sec/ sample Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transfer Case Control Module Transfer Case Command State Rationality - 4WD high or 4WD low command not 4wd high or 4WD low ratio	P17D4	The diagnostic monitor compares measured transfer case ratio to the transfer case control module commanded transfer case state. When the measured transfer case gear ratio is 4WD neutral ratio, while, the transfer case control module command state is 4WD high ratio or 4WD low ratio, the DTC is set. The 4WD neutral ratio regions are considered ratios outside the nominal 4WD high and nominal 4WD low ratios. The 4WD ratio is calculated as transmission output shaft speed divided by the transfer case output shaft speed, both speed are measured values based on speed sensors.	transfer case contol module transfer case command state AND measured transfer case ratio is NOT in 4WD low ratio window AND measured transfer case ratio is NOT in 4WD high window AND measured transfer case ratio is NOT in 4WD low ratio window AND measured transfer case ratio is NOT in 4WD high window OR vehicle is stopped: transfer case output shaft speed transmission output shaft speed vehicle stopped secondary parameter thresholds met (measured transfer case ratio = transmission output speed / transfer case output speed)	≠ 4WD neutral 4WD low ratio window ≤ 3.00 ≥ 2.40 4WD high ratio window ≤1.30 ≥ 0.70 ≥ 2.90 ≤ 2.50 ≥ 1.20 ≤ 0.80 ≤ 10.0 RPM ≥ 500.0 RPM	vehicle stopped: transmission output shaft speed engine torque engine speed accelerator pedal position accelerator pedal position brake pedal position transmssion gear is forward gear: transmission output shaft speed engine torque engine speed accelerator pedal position accelerator pedal position brake pedal position transmssion gear is reverse gear: transmission output shaft speed engine torque engine speed accelerator pedal position accelerator pedal position brake pedal position diagnsotic monitor enable PTO active engine power limited DTCs not fault active	≥ 500.0 RPM ≥ 100.0 Nm ≥ 300.0 RPM ≥ 5.0 % hysteresis high NOT ≤ 3.0 % hysteresis low ≤ 100.0 % ≥ 500.0 RPM ≥ 80.0 Nm ≥ 300.0 RPM ≥ 5.0 % hysteresis high NOT ≤ 5.0 % hysteresis low ≤ 100.0 % ≥ 500.0 RPM ≥ 90.0 Nm ≥ 300.0 PRM ≥ 6.0 % hysteresis high NOT ≤ 3.0 % hysteresis low ≤ 100.0 % = 1 Boolean = FALSE = FALSE CrankSensor_FA VehicleSpeedSensor_FA EngineTorqueEstInaccurate P057B, P057C, P057D,	fail time ≥ 10.50 seconds out of sample time ≥ 15.00 seconds update rate 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.
			update rate 12.5 milliseconds			P057E, P279A, P279B, P279C, P0502, P0503, P0722, P0723, P2160, P2161		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transfer Case Speed Sensor Output (TCSS)	P2160	The diagnostic monitor detects no activity in the TCSS circuit due to an electrical fault, wiring fault or sensor fault. The TCSS signal is rationalized against operating conditions of the vehicle. If the vehicle is in motion, accelerator pedal, engine torque, transmission in gear, and no vehicle braking, and the TCSS signal registers below a threshold, the DTC will set.	transfer case output shaft speed sesnor raw speed	≤ 25.0 RPM	diagnotic monitor enable calibration transmission gear selector position AND engine torque AND engine torque NOT AND accelerator pedal position AND accelerator pedal position NOT transmission gear selector position AND engine torque AND engine torque NOT AND accelerator pedal position AND accelerator pedal position NOT run/crank voltage run/crank voltage engine power limited PTO active engine speed transmission output shaft speed update range change delay time when condition A or condition B or condition C (25 millisecond update rate):	= 1 Boolean = PARK OR NEUTRAL ≥ 8,191.75 Nm ≤ 8,191.75 Nm ≥ 100.00 % ≤ 8.00 % ≠ PARK AND ≠ NEUTRAL ≥ 80.00 Nm ≤ 35.00 ≥ 5.00 % ≤ 3.00 % ≥ 5.0 volts for 25 milliseconds ≥ 11.0 volts = FALSE Boolean = FALSE Boolean ≥ 300.0 RPM ≥ 181.0 RPM	fail time ≥ 4.50 seconds 25 millisecond update rate range change delay time ≥	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					condition A: transmission range state transmission range state previous loop (25 millisecond) condition B: test when transmission range state is reverse enable calibration AND transmission range state transmission range state previous loop (25 millisecond) condition C: test when transmission range state is neutral enable calibration AND transmission range state transmission range state previous loop (25 millisecond) P2161 test fail this key on P2160 test fail this key on P2160 fault active DTCs not fault active	 = drive8 or less = drive8 or less = 0 Boolean = REVERSE = REVERSE = 0 Boolean = NEUTRAL = NEUTRAL = FALSE Boolean = FALSE Boolean = FALSE Boolean Transmission Output Shaft Angular Velocity Validity CrankSensor_FA EngineTorqueEstInaccurate	**P2160 range change delay time** seconds Refer to "Transmission Supporting Tables" for details	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transfer Case Speed Sensor Output (TCSS)	P2161	The diagnostic monitor detects an unrealistic drop in the TCSS signal due to a sudden electrical fault, wiring fault or sensor fault. The TCSS signal is rationalized against operating conditions of the vehicle. If the vehicle is in motion, accelerator pedal, engine torque, transmission in gear, and no vehicle braking, and the TCSS signal drops above a delta threshold, a fail timer is enabled. When a TCSS drop occurs it is possible to enable the P2160 fail time as well as the PP2161 fail time. With both P2160 and P2161 fail timers active it is a race condition to either DTC.	transfer case speed sesnor raw speed delta, 25 millisecond update rate	≥ 650.0 RPM	diagnotic monitor enable calibration update range change delay time when condition A or condition B or condition C (25 millisecond update rate): condition A: transmission range state transmission range state previous loop (25 millisecond) condition B: test when transmission range state is reverse enable calibration AND transmission range state transmission range state previous loop (25 millisecond) condition C: test when transmission range state is neutral enable calibration AND transmission range state transmission range state previous loop (25 millisecond)	= 1 Boolean = drive8 or less = drive8 or less = 0 Boolean = REVERSE = REVERSE = 0 Boolean = NEUTRAL = NEUTRAL	fail time ≥ 3.00 seconds, 25 millisecond update rate, increment fail count fail count ≥ 5 counts, 25 millisecond update rate range change delay time ≥ **P2161 range change delay time** seconds Refer to "Transmission Supporting Tables" for details	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 voltage	≥ 5.0 volts for 25 milliseconds		
					run/crank voltage	≥ 11.0 volts		
					PTO active	= FALSE Boolean		
					transfer case mode	≠ transfer case mode previos loop (25 millisecond) update 4WD range change time		
					4WD range change time	≥ 5.00 seconds		
					engine speed	≥ 500.0 RPM		
					transmission output shaft speed loop to loop delta (25 millisecond)	≤ 4,095.0 RPM		
					AND			
					transmission output shaft speed	≥ 350.0 RPM		
					update stability time	≥ 0.00 seconds		
					stability time			
					transfer case raw output speed	> 150.0 RPM		
					AND			
					transfer case raw output speed last loop (25 millisecond)	> 150.0 RPM		
					update stability time			
					stability time	≥ 6.00 seconds		
					P2160 test fail this key on	= FALSE		
					P2160 fault active	= FALSE		
					DTCs not fault active	CrankSensor_FA TransmissionEngagedState_FA Transmission Output Shaft Angular Velocity Validity		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure (BARO) Sensor Performance (naturally aspirated)	P2227	Detects a performance failure in the Barometric Pressure (BARO) sensor, such as when a BARO value is stuck in range. If the engine has been off for a sufficient amount of time, the pressure values in the induction system will have equalized. The BARO sensor value is checked to see if it is within the normal expected atmospheric pressure range. If it is not, then the BARO performance diagnostic will fail. When the engine is running, there is an estimate of barometric pressure that is determined with the Manifold Pressure (MAP) sensor, throttle position, engine air flow and engine speed. If the BARO value from the sensor is not similar to this barometric pressure estimate, then the BARO performance diagnostic will fail.	**Engine Running:** Difference between Baro Pressure reading and Estimated Baro when distance since last Estimated Baro update OR Difference between Baro Pressure reading and Estimated Baro when distance since last Estimated Baro update	 > 15.0 kPa <= 1.24 miles > 20.0 kPa > 1.24 miles	No Active DTCs:	AmbPresSnsrCktFA IAT_SensorFA MAF_SensorFA AfterThrottlePressureFA TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA	320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips
			Engine Not Rotating: 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:	 > 5.0 seconds EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP	4 failures out of 5 samples 1 sample every 12.5 msec	

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 (non-boosted applications, Gen III)	P2228	Detects a continuous short to ground in the Barometric Pressure (BARO) signal circuit by monitoring the BARO sensor output voltage and failing the diagnostic when the BARO voltage is too low. The BARO sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	BARO Voltage	< 40.0 % of 5 Volt Range (This is equal to 50.9 kPa)			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.
Barometric Pressure (BARO) Sensor Circuit High (non-boosted applications, Gen III)	P2229	Detects a continuous short to power or open circuit in the Barometric Pressure (BARO) signal circuit by monitoring the BARO sensor output voltage and failing the diagnostic when the BARO voltage is too high. The BARO sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	BARO Voltage	> 90.0 % of 5 Volt Range (This is equal to 115.0 kPa)			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.
Transfer Case Control Module Transfer Case Command State Rationality - 4WD high command not 4WD high ratio	P279A	Monitor measured transfer case gear ratio is 4WD low ratio or neutral while the transfer case control module command state is 4WD high. The 4WD measured transfer case ratio is calculated as transmission output shaft speed divided by the transfer case output shaft speed, both speed are measured values based on speed sensors.	transfer case contol module transfer case command state AND measured transfer case ratio is in 4WD low ratio window OR measured transfer case ratio is in neutral window AND measured transfer case ratio is in 4WD low ratio window (measured transfer case ratio = transmission output speed / transfer case output speed) update rate 12.5 milliseconds	= 4WD high 4WD low ratio window ≤ 3.00 ≥ 2.40 neutral ratio window ≥ 1.30 ≤ 0.70 OR ≥ 3.00 ≤ 2.40 4WD low ratio window ≤ 2.90 ≥ 2.50	transmssion gear is forward gear: transmission output shaft speed engine torque engine speed accelerator pedal position brake pedal position transmssion gear is reverse gear: transmission output shaft speed engine torque engine speed accelerator pedal position brake pedal position diagnsotic monitor enable PTO active engine power limited DTCs not fault active	≥ 500.0 RPM ≥ 80.0 Nm ≥ 300.0 RPM ≥ 5.0 % ≤ 100.0 % ≥ 500.0 RPM ≥ 80.0 Nm ≥ 300.0 PRM ≥ 5.0 % ≤ 100.0 % = 1 Boolean = FALSE = FALSE CrankSensor_FA VehicleSpeedSensor_FA EngineTorqueEstInaccurate P057B, P057C, P057D, P057E P17D4, P279B, P279C P0502, P0503, P0722, P0723, P2160, P2161	fail time ≥ 7.00 seconds out of sample time ≥ 10.00 seconds update rate 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.
Transfer Case Control Module Transfer Case Command State Rationality - 4WD low command not 4WD low ratio	P279B	Monitor measures transfer case gear ratio is 4WD high ratio or neutral while the transfer case control module command state is 4WD low. The 4WD measured transfer case ratio is calculated as transmission output shaft speed divided by the transfer case output shaft speed, both speed are measured values based on speed sensors.	transfer case contol module transfer case command state AND measured transfer case ratio is in 4WD high ratio window OR measured transfer case ratio is in neutral window AND measured transfer case ratio is in 4WD high ratio window (measured transfer case ratio = transmission output speed / transfer case output speed) update rate 12.5 milliseconds	= 4WD low 4WD high ratio window ≤ 1.30 ≥ 0.70 neutral ratio window ≥ 1.30 ≤ 0.70 OR ≥ 3.00 ≤ 2.40 4WD high ratio window ≤ 1.20 ≥ 0.80	transmssion gear is forward gear: transmission output shaft speed engine torque engine speed accelerator pedal position brake pedal position transmssion gear is reverse gear: transmission output shaft speed engine torque engine speed accelerator pedal position brake pedal position diagnsotic monitor enable PTO active engine power limited DTCs not fault active	≥ 500.0 RPM ≥ 80.0 Nm ≥ 300.0 RPM ≥ 5.0 % ≤ 100.0 % ≥ 500.0 RPM ≥ 80.0 Nm ≥ 300.0 PRM ≥ 5.0 % ≤ 100.0 % = 1 Boolean = FALSE = FALSE CrankSensor_FA VehicleSpeedSensor_FA EngineTorqueEstInaccurate P057B, P057C, P057D, P057E P17D4, P279A, P279C P0502, P0503, P0722, P0723, P2160, P2161	fail time ≥ 7.00 seconds out of sample time ≥ 10.00 seconds update rate 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.
Transfer Case Control Module Transfer Case Command State Rationality - 4WD neutral command not 4WD neutral ratio	P279C	Monitor measured transfer case gear ratio is 4WD high ratio or 4WD low ratio while the transfer case control module command state is 4WD neutral. The 4WD measured transfer case ratio is calculated as transmission output shaft speed divided by the transfer case output shaft speed, both speed are measured values based on speed sensors.	transfer case contol module transfer case command state AND measured transfer case ratio is in 4WD low ratio window OR measured transfer case ratio is in 4WD high window AND measured transfer case ratio is in 4WD low ratio window or in 4WD high ratio window (measured transfer case ratio = transmission output speed / transfer case output speed) update rate 12.5 milliseconds	= 4WD neutral 4WD low ratio window ≤ 3.00 ≥ 2.40 4WD high ratio window ≥ 1.30 ≤ 0.70 4WD neutral ratio window ≤ 2.90 ≥ 2.50 OR ≤ 1.20 ≥ 0.80	transmssion gear is forward gear: transmission output shaft speed engine torque engine speed accelerator pedal position brake pedal position transmssion gear is reverse gear: transmission output shaft speed engine torque engine speed accelerator pedal position brake pedal position diagnsotic monitor enable PTO active engine power limited DTCs not fault active	 ≥ 500.0 RPM ≥ 80.0 Nm ≥ 300.0 RPM ≥ 5.0 % ≤ 100.0 % ≥ 500.0 RPM ≥ 80.0 Nm ≥ 300.0 PRM ≥ 5.0 % ≤ 100.0 % = 1 Boolean = FALSE = FALSE CrankSensor_FA VehicleSpeedSensor_FA EngineTorqueEstInaccurate P057B, P057C, P057D, P057E P17D4, P279A, P279B P0502, P0503, P0722, P0723, P2160, P2161	fail time ≥ 10.50 seconds out of sample time ≥ 15.00 seconds update rate 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.
Lost Communication With Transfer Case Control Module	U0102	This DTC monitors for a loss of communication with the transfer case control module	Message is not received from controller for Message $1CB Message $1CC	 ≥ 10.0 seconds ≥ 10.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts	Diagnostic runs in 12.5 ms loop	Type C, No SVS "Emissions Neutral Diagnostics – Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					not active for U0102 TCCM	> 0.4000 seconds Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Power Steering Control Module	U0131	This DTC monitors for a loss of communication with the Power Steering Control Module	Message is not received from controller for Message $1E5	 ≥ 10.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts > 0.4000 seconds	Diagnostic runs in 12.5 ms loop	Type C, No SVS "Safety Emissions Neutral Diagnostic"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					U0131 Power Steering Control Module	Not Active on Current Key Cycle is present on the bus		

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 occurred3) 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 > **P0196_FastFailTemp Diff** (See P0196 details on Supporting Tables Tab) AND < 16 degrees C < 16 degrees C AND < 16 degrees C	EOT Diagnostic main Status AND Engine Running Cold Start Specific EOT Test Conditions: Use Cold Start Diagnostic Engine Off Time Engine Off Timer Validity No active DTC's	Enabled = True Enabled > 540 Seconds = True Fault bundles: IgnitionOffTimer_FA IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA 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 > 540 Seconds = True	Cold Start Regular Test - one failure out of one sample - test performed once per second	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 <u>Fail Condition:</u> Absolute value of Powerup EOT - Powerup ECT 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	AND > -7 Deg C > -10 Deg C <= 5 Deg C AND <= 16 Deg C <= 16 Deg C > 16 Deg C AND > -7 Deg C > -10 Deg C <= 5 Deg C AND > 16 Deg C > 16 Deg C AND <= 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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			AND Absolute value of Powerup ECT - minIAT	AND <= 16 Deg C				
			Warmup Test <u>Warm Up Fail Condition:</u> EOT <u>Warm Up Test Pass Condition:</u> EOT	 < 90 Deg C => 90 Deg C	 EOT Diagnostic main enable Engine Running Warm Up EOT Test Specific Conditions: Use Warm Up EOT Diagnostic Power up ECT Power up ECT Total accumulated engine airflow since engine start DISABLE CONDITIONS (for all three tests)No active DTC's	 Enabled = True Disabled > -7 degrees C < 90 degrees C >= **P0196_TotalAccumulatedFlow** (See P0196 details on Supporting Tables Tab) Fault bundles: IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA EngOilTempSensorCircuit FA	Warm up Tests - one failure out of one sample - test performed once per second	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 <= 30.0 OR >= 0 and <= 30.0 > 30.0 AND > 30.0	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 <= 129 Deg C >= 56 and <= 129 Deg C >= 93 Deg C Enabled and >= ECT from 5 sec previous Fault bundles: IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA EngOilTempSensorCircuit FA IAT_SensorCircuitFA EngOilModeledTempValid	Continuous Test 210 failures out of 300 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	20 failures out of 50 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	20 failures out of 50 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.
Intake Air Temperature Sensor 2 Circuit Performance (applications with humidity sensor and manifold temperature sensor)	P0096	Detects an Intake Air Temperature 2 (IAT2) sensor value that is stuck in range by comparing the IAT2 sensor value against the IAT and IAT3 sensor values and failing the diagnostic if the IAT2 value is more different than the IAT and IAT3 values than is expected. If the engine has been off for a long enough period of time, the air temperature values in the engine compartment of the vehicle are considered to have equalized, and the diagnostic can be enabled. The diagnostic will fail if the IAT and IAT3 values are similar, and the IAT2 value is not similar to the IAT and IAT3 values. The diagnostic will also fail if none of the three sensor values are similar to each other, and the IAT2 value is furthest from the sensor value that is in the middle of the three sensor values. This diagnostic is executed once per	**Good Correlation Between IAT and IAT3:** ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT3)	> 25 deg C <= 25 deg C > 25 deg C	Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B, 2 Trips
			Not Good Correlation, IAT in middle: Power Up IAT is between Power Up IAT2 and Power Up IAT3 AND ABS(Power Up IAT2 - Power Up IAT3) AND ABS(Power Up IAT - Power Up IAT2) > ABS(Power Up IAT - Power Up IAT3)	> 25 deg C	Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error	Executes once at the beginning of each ignition cycle if enable conditions are met	
			Not Good Correlation, IAT3 in middle: Power Up IAT3 is between Power Up IAT and Power Up IAT2		Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds	Executes once at the beginning of each ignition cycle if enable conditions are met	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		ignition cycle if the enable conditions are met.	AND ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT3 - Power Up IAT2) > ABS(Power Up IAT3 - Power Up IAT)	> 25 deg C	No Active DTCs:	PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error		

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 Open	P00C8	Controller specific output driver circuit diagnoses High Pressure pump Control Solenoid high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground	Engine Speed Battery Voltage	>= 50 RPM >= 11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Manifold Absolute Pressure Sensor Circuit Low (Gen II)	P0107	Detects a continuous short to ground 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 low. The MAP sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	MAP Voltage	< 3.0 % of 5 Volt Range (This is equal to -11.3 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Manifold Absolute Pressure Sensor Circuit High (Gen II)	P0108	Detects a continuous short to power in the Manifold Absolute Pressure (MAP) signal circuit by monitoring the MAP sensor output voltage and failing the diagnostic when the MAP voltage is too high. The MAP sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	MAP Voltage	> 90.0 % of 5 Volt Range (This is equal to 350.0 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		ignition cycle if the enable conditions are met.	AND ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT3 - Power Up IAT) > ABS(Power Up IAT3 - Power Up IAT2)	> 25 deg C	No Active DTCs:	PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA EngineModeNotRunTimer Error		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Supercharger Inlet Absolute Pressure (SCIAP) Sensor Performance	P012B	Detects a performance failure in the Supercharger Inlet Absolute Pressure (SCIAP) sensor, such as when a SCIAP value is stuck in range. If the engine has been off for a sufficient amount of time, the pressure values in the induction system will have equalized. The SCIAP sensor value is checked to see if it is within the normal expected atmospheric pressure range. If it is not, then the SCIAP performance diagnostic will fail. If the SCIAP sensor value is within the normal expected atmospheric range, then Manifold Pressure (MAP), SCIAP and Barometric Pressure (BARO) are compared to see if their values are similar. If the MAP and BARO sensor values are similar, but the SCIAP value is not similar, then a SCIAP performance diagnostic will fail. The engine running portion of this	**<u>Engine Running:</u>** See table **P0101, P0106, P0121, P012B, P1101: Supercharger Intake Flow Rationality Diagnostic Failure Matrix** for combinations of model failures that can set this DTC. TPS model fails when Filtered Throttle Model Error MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered MAP1 model fails when ABS(Measured MAP – MAP Model 1) Filtered MAP2 model fails when ABS(Measured MAP – MAP Model 2) Filtered SCIAP1 model fails when ABS(Measured SCIAP – SCIAP Model 1) Filtered SCIAP2 model fails when ABS(Measured SCIAP – SCIAP Model 2) Filtered	> 400 kPa*(g/s) > 30.0 grams/sec > 30.0 kPa > 30.0 kPa > 25.0 kPa > 25.0 kPa	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables.	>= 400 RPM <= 6,200 RPM >= -9 Deg C = TRUE) <= 129 Deg C >= -20 Deg C <= 129 Deg C >= 0.50 Modeled Air Flow Error multiplied by **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM** and **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est** MAP Model 1 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM** MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM**	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from other sensors. The other sensors are the Mass Air Flow (MAF) sensor, Manifold Pressure (MAP) sensor and Throttle Position sensor (TPS). These modeled values are compared against the actual sensor values to see if they are similar. If they are similar, then the model passes. If they are not similar, then that model is considered to be failed. Certain combinations of model passes and model failures can be interpreted to be caused by a performance issue with the SCIAP sensor. In this case, the SCIAP Performance diagnostic will fail.				MAP Model 3 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP3 Residual Weight Factor based on RPM** TIAP Model 1 Error multiplied by **P0101, P0106, P0121, P0236, P1101: TIAP Residual Weight Factor based on RPM** Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** No Active DTCs: MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTempSensorFA SCIAP_SensorCircuitFA AmbientAirDefault No Pending DTCs: EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP MnfdTempSensorCktFP SCIAP_SensorCircuitFP		
			Engine Not Rotating: Supercharger Inlet		Time between current ignition cycle and the last time the engine was		4 failures out of 5 samples	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Pressure OR Supercharger Inlet Pressure OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Supercharger Inlet Pressure - Manifold Pressure) AND ABS(Supercharger Inlet Pressure - Baro Pressure)	< 50.0 kPa > 115.0 kPa <= 10.0 kPa > 10.0 kPa > 10.0 kPa	running Engine is not rotating No Active DTCs: No Pending DTCs:	> 8.0 seconds EngineModeNotRunTimer Error MAP_SensorCircuitFA SCIAP_SensorCircuitFA AAP2_SnsrCktFA MAP_SensorCircuitFP SCIAP_SensorCircuitFP AAP2_SnsrCktFP	1 sample every 12.5 msec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Supercharger Inlet Absolute Pressure (SCIAP) Sensor Circuit Low (Gen II)	P012C	Detects a continuous short to ground or open circuit in the Supercharger Inlet Absolute Pressure (SCIAP) signal circuit by monitoring the SCIAP sensor output voltage and failing the diagnostic when the SCIAP voltage is too low. The SCIAP sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	SCIAP Voltage	< 3.0 % of 5 Volt Range (This is equal to 6.1 kPa)	Continuous		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.
Supercharger Inlet Absolute Pressure (SCIAP) Sensor Circuit High (Gen II)	P012D	Detects a continuous short to power in the Supercharger Inlet Absolute Pressure (SCIAP) signal circuit by monitoring the SCIAP sensor output voltage and failing the diagnostic when the SCIAP voltage is too high. The SCIAP sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	SCIAP Voltage	> 97.0 % of 5 Volt Range (This is equal to 124.0 kPa)	Continuous		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.
O2S Slow Response Bank 2 Sensor 1) (For use with ESPD and w/o WRAF	P0153	This DTC determines if the Bank 2 primary O2 sensor has a slow response (in the Rich to Lean (R2L) or Lean to Rich (L2R) direction) and thereby can no longer be used for closed loop fuel control based on emission correlation testing. This diagnostic runs passively (see enable conditions) and monitors the time the O2 sensor signal is between an upper and lower voltage thresholds over the sample period. The diagnostic also monitors the O2 sensor signal for the number of Slope Time (ST) switches in each direction between the same upper and lower voltage thresholds over the sample period. When the required data is collected, an average R2L and L2R response time and individual R2L and L2R Slope Time (ST) switch count is calculated. This fault is set when the L2R and R2L response test results are compared to the	Fault condition present when the average response time is caluclated over the test time, and compared to the threshold. OR Slope Time L/R Switches OR Slope Time R/L Switches	Refer to **P0153_O2S Slow Response Bank 2 Sensor 1 Pass/Fail Threshold table** in the Supporting Tables tab < 3 < 3 The test averages the signal response time over 60.0 seconds when the signal is transitioning between 300 mvolts and 600 mvolts. An average rich to lean time and lean to rich time are each calculated separately. Note: the table listed above uses the following calibratable X axis: **P0153_KnEOSD_t_ST_LRC_LimRS2** and calibratable Y axis:	No Active DTC's Bank 2 Sensor 1 DTC's not active System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Only when FuelLevelDataFault Green O2S Condition	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA Ethanol Composition Sensor FA EngineMisfireDetected_FA = P0151, P0152 or P0154 > 10.0 Volts = Not active = Not active = Not active = Not active = False = False = Not Valid, Green O2S condition is considered valid until the accumulated air flow is greater than	Sample time is 60 seconds Frequency: Once per trip	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		"P0153_O2S Slow Response Bank 1 Sensor 1 "Pass/Fail Threshold Table" and the outcome determines a response faulted condition. Additionally, this fault is set when the L2R or R2L slope time switch count test results are less than the ST individual thresholds.		**P0153_KnEOSD_t_ST _RLC_LimRS2**		**Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S1, B2S1 in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 22.0 grams/sec.		
					O2 Heater on for Learned Htr resistance	≥ 40 seconds = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's")		
					Engine Coolant (Or OBD Coolant Enable Criteria	> 50 ºC = TRUE)		
					IAT	> -40 ºC		
					Engine run Accum	> 30 seconds		
					Time since any AFM status change	> 2.0 seconds		
					Time since Purge On to Off change	> 1.0 seconds		
					Time since Purge Off to On change	> 2.0 seconds		
					Engine airflow	15 ≤ grams/sec ≤ 55		
					Engine speed	1,000 ≤ RPM ≤ 3,000		
					Fuel Condition	< 87 % Ethanol		
					Baro	> 70 kpa		
					Air Per Cylinder	≥ 175 mGrams		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE (Please see "**Closed Loop Enable Clarification**" in		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						Supporting Tables).		
					LTM (Block Learn) fuel cell	= Enabled, refer to **Multiple DTC Use - Response Cell Enable Table** for additional info.		
					Transient Fuel Mass	≤ 100.0 mgrams		
					Baro	= Not Defaulted		
					Fuel Control State	not = Power Enrichment		
					Fuel State	DFCO not active		
					Commanded Proportional Gain	≥ 0.0 %		
					==========	==========		
					All of the above met for	> 3.5 seconds		

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 IAT Sensor)	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 DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 3 additional consecutive trips.	> 0.60 (EWMA Fail Threshold), ≤ 0.35 (EWMA Re-Pass Threshold)	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 at end of drive Estimate of Ambient Air Temperature Valid ****************************** Conditions for Estimate of	10 % ≤ Percent ≤ 90 % ≥ 600 seconds ≥ 5.0 miles ≥ 63 °C = TRUE) ≥ 70 kPa ≥ 10.0 miles ≤ refer to **P0442 Engine Off Time Before Vehicle Off Maximum as a Function of Estimated Ambient Temperature** in Supporting Tables. ≥ 8 hours ≥ 8 hours 0 °C≤Temperature≤ 35 °C ******************************	Once per trip, during hot soak (up to 2,400 sec.). No more than 2 unsuccessful attempts between completed tests.	Type A, 1 Trips EWMA Average run length is 8 to 12 trips under normal condition s Run length is 3 to 6 trips after code clear or non-volatile reset

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 Air Temperature to be valid: 1. Cold Start Startup delta deg C (ECT-IAT) OR 2. Short Soak and Previous EAT Valid Previous time since engine off OR 3. Less than a short soak and Previous EAT Not Valid Previous time since engine off AND Vehicle Speed AND Mass Air Flow Must expire Estimate of Ambient Temperature Valid Conditioning Time. **P0442 Estimate of Ambient Temperature Valid Conditioning Time as a Function of Ign Off Time** in Supporting Tables. OR 4. Not a Cold Start and greater than a Short Soak Previous time since	 ≤ 8 °C ≤ 7,200 seconds ≤ 7,200 seconds ≥ 53 mph ≥ 10 g/sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					engine off AND Vehicle Speed AND Mass Air Flow Must expire maximum value in Estimate of Ambient Temperature Valid Conditioning Time. Please see **P0442 Estimate of Ambient Temperature Valid Conditioning Time as a Function of Ign Off Time** in Supporting Tables. ********** 1. High Fuel Volatility During the volatility phase, pressure in the fuel tank is integrated vs. volatility time. If the integrated pressure is then test aborts and unsuccessful attempts is incremented. This value equates to an average integrated fuel tank pressure > 1,245 Pa. Please see **P0442 Volatility Time as a Function of Estimate of Ambient Temperature** in Supporting Tables. OR 2. Vacuum Refueling Detected	> 7,200 seconds ≥ 53 mph ≥ 10 g/sec ********** < -5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					See P0454 Fault Code for information on vacuum refueling algorithm. OR 3. Fuel Level Refueling Detected See P0464 Fault Code for information on fuel level refueling. OR 4. Vacuum Out of Range and No Refueling See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for information on fuel level refueling. OR 5. Vacuum Out of Range and Refueling Detected See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for information on fuel level refueling. OR 6. Vent Valve Override Failed Device control using an off-board tool to control the vent solenoid, cannot exceed	0.50 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					during the EONV test OR 7. Key up during EONV test No active DTCs: No Active DTC's TFTKO	 MAF_SensorFA ECT_Sensor_FA IAT_SensorFA VehicleSpeedSensor_FA IgnitionOffTimeValid AmbientAirDefault FuelLevelDataFault P0443 P0446 P0449 P0452 P0453 P0455 P0458 P0459 P0498 P0499 P0496		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Clutch Pedal Position Sensor Circuit Range / Performance	P0806	A Clutch Pedal position sensor range fault is detected, if Clutch Pedal Position Sensor is in a range indicative of a vehicle NOT in gear, when the vehicle is determined to be in gear. Gear determination is made by verifying that the ratio of engine RPM versus Transmission Output Speed (N/TOS) represents a valid gear. When this occurs a clutch pedal position error is measured and processed by a 1st order lag filter. When this clutch pedal position error exceeds the defined threshold, a this fault code is set.	Filtered Clutch Pedal Position Error when the vehicle is determined to be in gear	> 4 %	N/TOS Ratio: Transfer Case: Vehicle speed: Engine Torque: Clutch Pedal Position: OR No Active DTCs:	Must match actual gear (i.e. vehicle in gear) Not in 4WD Low range > 5.6 MPH > **P0806 EngTorqueThreshold Table** (see Supporting Tables) < **P0806 ResidualErrEnableLow Table** (see Supporting Tables) > **P0806 ResidualErrEnableHigh Table** (see Supporting Tables) ClutchPstnSnsrCktHi FA ClutchPstnSnsrCktLo FA CrankSensor_FA Transmission Output Shaft Angular Velocity Validity VehicleSpeedSensor_FA	12.5 ms loop Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Clutch Pedal Position Sensor Circuit Low	P0807	A continuous circuit Out-of-Range Low or open fault is detected by monitoring the percent voltage range of the clutch pedal position signal. This sensor by design is dead banded at both the high and low positions. If the voltage from the sensor is below the defined threshold value for the dead banded region, a fail counter increments. When the correct ratio of fail counts to samples occurs the fault code is set.	Clutch Position Sensor Circuit	< 4 % of Vref	Engine Not Cranking System Voltage	> 9.0 Volts	400 counts out of 500 samples 12.5 ms loop Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Clutch Pedal Position Sensor Circuit High	P0808	A continuous circuit Out-of-Range High fault is detected by monitoring the percent voltage range of the clutch pedal position signal. This sensor by design is dead banded at both the high and low positions. If the voltage from the sensor is above the defined threshold value for the dead banded region, a fail counter increments. When the correct ratio of fail counts to samples occurs the fault code is set.	Clutch Position Sensor Circuit	> 96 % of Vref	Engine Not Cranking System Voltage	> 9.0 Volts	400 counts out of 500 samples 12.5 ms loop Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Clutch Pedal Position Not Learned	P080A	During final assembly at the manufacturing facility an initial Clutch Pedal Applied Learn is established. This Learn is used to understand the variation in the clutch fully applied position vs. the clutch pedal position. This position is then adjusted over time based on a learning algorithm in the engine controller to adjust for clutch physical wear with usage. This Diagnostic is used to detect when this Applied Learn value is outside of defined range based on the thresholds set by the diagnostic. If the Applied Learn value is outside of the range of the threshold values this fault code is set. The OBD Manufacturer's enable counter is utilized to prevent the MIL from setting during the vehicle assembly before a Position lean can be completed in the manufacturing facility.	Fully Applied Learn Position OR	< 9.0 % > 36.0 %	OBD Manufacturer's Enable Counter	= 0	250 ms loop Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Run/Start Input Supply Source Relay Control/ Open	P10E1	Controller specific output driver circuit diagnoses the Dual Contact Relay low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver Off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground.			3 failures out of 4 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.
Run/Start Input Supply Source Relay Control Low	P10E2	Controller specific output driver circuit diagnoses the Dual Contact Relay 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.	<= 0.5 Ohms impedance between signal and controller ground			3 failures out of 4 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.
Run/Start Input Supply Source Relay Control High	P10E3	Controller specific output driver circuit diagnoses the Dual Contact Relay low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 0.5 Ohms impedance between signal and controller power			3 failures out of 4 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.
Run/Start Input Supply Source Relay Control Range/ Performance	P10E4	Rationality circuit diagnostic for the Run/ Start Input Supply Source Relay output to the ECM. The diagnostic compares the measured ECM Run/Crank input with the desired Run/Crank input	(ECM Run Crank Relay Commaded state is False AND Run Crank Voltage) OR (ECM Run Crank Relay Commaded state is True AND Run Crank Voltage)	>= 5.00 <= 2.00	Run/Start Input Supply Source Relay Control Range/Performance Enable (See Definition in Supporting Material below)	= True	128 failures out of s 160 amples 6.25 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Module-System Voltage Low [FPPM applications only]	P129B	Detects low voltage condition of the fuel pump power module. This diagnostic reports the DTC when the fuel pump power module input voltage drops below a calibrated value.	Input Voltage	< 7.00 volts	a) FPPM configuration KeFRPR_e_ChassisFuel PresSysType b) Diagnostic Enabled KeFRPR_b_FPPM_ BatVoltLoDiagEnbl c] Diagnostic System Disabled d] Engine Running e] FPPM Power Alive Rolling Counter Fault f] FPPM Diagnostic Info1 Received message $0D5 g] Sensed Battery Voltage [message $D5]	a) == CeFRPR_e_ECM _FPPM_Sys b) == TRUE c] <> TRUE d] == TRUE e] <> TRUE f] == TRUE g] >= 7.00 volts	64.00 failures / 80.00 samples [12.5 miilisec / sample]	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Module-System Voltage High [FPPM applications only]	P129C	Detects high voltage condition of the fuel pump power module. This diagnostic reports the DTC when the fuel pump power module input voltage exceeds a calibrated value.	Input Voltage	> 18.00 volts	a) FPPM configuration KeFRPR_e_ChassisFuel PresSysType b) Diagnostic Enabled KeFRPR_b_FPPM_ BatVoltLoDiagEnbl c] Diagnostic System Disabled d] FPPM Power Alive Rolling Counter Fault e] FPPM Diagnostic Info1 Received message $0D5 f] Sensed Battery Voltage [message $D5]	a) == CeFRPR_e_ECM _FPPM_Sys b) == TRUE c] <> TRUE d] <> TRUE e] == TRUE f] >= 7.00 volts	64.00 failures / 80.00 samples [12.5 miilisec / sample]	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear Position Sensor Indicates Incorrect Gear Ratio (gear shift lever position sensor rationality	P18C9	The gear position sensor is a single component containing an X-axis and a Y-axis sensor. The gear position sensor determines the manual transmission shift lever positon based on the PWM output of the X-axis and Y-axis sensors. Detects when transmission is mechanically in neutral and Gear Position Sensor is not indicating a neutral position.	Gear Position Sensor	= In Gear	Gear Position Sensor learn status Ignition voltage Transmission output speed Clutch pedal displacement Engine speed DTCs not fault active	= Learned ≥ 9.00 volts ≤ 10.00 rpm ≤ 10.00 pct ≥ 450.00 rpm TransmissionOutputRotationalStatusValidity ClutchPstnSnsr FA ClutchPstnSnsrNotLearned P18C4 P18C5 P18C6 P18C7 P18C8	≥ 6.00 seconds Once the above fail time is achieved then increment the fail counter once ≥ 2.00 fail counts	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure (BARO) Sensor Performance (supercharged)	P2227	Detects a performance failure in the Barometric Pressure (BARO) sensor, such as when a BARO value is stuck in range. If the engine has been off for a sufficient amount of time, the pressure values in the induction system will have equalized. The BARO sensor value is checked to see if it is within the normal expected atmospheric pressure range. If it is not, then the BARO performance diagnostic will fail. If the BARO sensor value is within the normal expected atmospheric range, then Manifold Pressure (MAP), Supercharger Inlet Pressure (SCIAP) and BARO are compared to see if their values are similar. If the MAP and SCIAP sensor values are similar, but the BARO value is not similar, then a BARO performance diagnostic will fail. When the engine is	**Engine Running:** Difference between Baro Pressure reading and Estimated Baro when distance since last Estimated Baro update OR Difference between Baro Pressure reading and Estimated Baro when distance since last Estimated Baro update	 > 20.0 kPa <= 0.06 miles > 20.0 kPa > 0.06 miles	No Active DTCs:	AmbPresSnsrCktFA IAT_SensorFA MAF_SensorFA AfterThrottlePressureFA TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA	320 failures out of 400 samples 1 sample every 12.5 msec	Type A, 1 Trips
			Engine Not Rotating: Barometric Pressure OR Barometric Pressure OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Supercharger Inlet Pressure - Manifold Pressure) AND ABS(Supercharger Inlet Pressure - Baro Pressure)	 < 50.0 kPa > 115.0 kPa > 10.0 kPa <= 10.0 kPa > 10.0 kPa	Time between current ignition cycle and the last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	 > 8.0 seconds EngineModeNotRunTimerError MAP_SensorCircuitFA SCIAP_SensorCircuitFA AAP2_SnsrCktFA MAP_SensorCircuitFP SCIAP_SensorCircuitFP AAP2_SnsrCktFP	4 failures out of 5 samples 1 sample every 12.5 msec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		running, there is an estimate of barometric pressure that is determined with the Turbocharger Boost Pressure sensor, engine air flow and engine speed. If the BARO value from the sensor is not similar to this barometric pressure estimate, then the BARO performance diagnostic will fail.						

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 (boosted applications, Gen II)	P2228	Detects a continuous short to ground or open circuit in the Barometric Pressure (BARO) signal circuit by monitoring the BARO sensor output voltage and failing the diagnostic when the BARO voltage is too low. The BARO sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	BARO Voltage	< 40.0 % of 5 Volt Range (This is equal to 50.9 kPa)			320 failures out of 400 samples 1 sample every 12.5 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure (BARO) Sensor Circuit High (boosted applications, Gen II)	P2229	Detects a continuous short to power in the Barometric Pressure (BARO) signal circuit by monitoring the BARO sensor output voltage and failing the diagnostic when the BARO voltage is too high. The BARO sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	BARO Voltage	> 90.0 % of 5 Volt Range (This is equal to 115.0 kPa)			320 failures out of 400 samples 1 sample every 12.5 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure Sensor C Circuit Low (Gen II)	P227C	Detects a continuous short to ground or open circuit in the Barometric Pressure (BARO) C signal circuit by monitoring the BARO C sensor output voltage and failing the diagnostic when the BARO C voltage is too low. The BARO C sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	BARO C Voltage	< 40.0 % of 5 Volt Range (This is equal to 50.9 kPa)			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.
Barometric Pressure Sensor C Circuit High (Gen II)	P227D	Detects a continuous short to power in the Barometric Pressure (BARO) C signal circuit by monitoring the BARO C sensor output voltage and failing the diagnostic when the BARO C voltage is too high. The BARO C sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	BARO C Voltage	> 90.0 % of 5 Volt Range (This is equal to 115.0 kPa)			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.
Cylinder Deactivation System Performance	P3400	Detects a performance failure in the cylinder deactivation system. This diagnostic will fail if one or more cylinders that has been commanded to deactivate does not deactivate. This diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates a modeled values of the Manifold Pressure (MAP) sensor using the Mass Air Flow (MAF) sensor. This is called the MAP2 Model. The MAP2 modeled value is compared against the actual MAP sensor values when all cylinders are active. An “all cylinder” MAP2 Model error is established with this comparison. When cylinders are deactivated, a “cylinder deactivation” MAP2 Model error is similarly established. If the “all cylinder” and “cylinder deactivation” MAP2 Model errors are similar, then air flow through the system	Current MAP Model 2 Error AND (All Cylinder MAP Model 2 Error) - (Current MAP Model 2 Error) Where: Current MAP Model 2 Error = (Measured MAP – MAP Model 2) Filtered Where: All Cylinder MAP Model 2 Error = (Measured MAP – MAP Model 2) Filtered stored the last time that all cylinders were active for a time greater than	< -8 kPa > -8 kPa > 2.0 seconds	**ReducedEngineCapacityMode_Enable** = TRUE for a time Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables. No Active DTCs: No Pending DTCs:	> 2.0 seconds >= 400 RPM <= 6,200 RPM >= -9 Deg C = TRUE) <= 129 Deg C >= -20 Deg C <= 129 Deg C >= 0.50 MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP	100 failures out of 200 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.
		when cylinders are deactivated is the expected value. All cylinders are properly deactivated. If these two MAP2 Model errors are not similar, then air flow through the system when cylinders are deactivated is different than the expected value. This indicates that a cylinder is pumping air when it should not. This cylinder is not properly deactivated. In this case, the Deactivation System Performance diagnostic will fail.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 1 Deactivation Solenoid Control Circuit/Open	P3401	Controller specific output driver circuit diagnoses the Cylinder 1 Deactivation 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.	Open Circuit: ≥ 200 k Ω impedance between output and controller ground	Diagnostic Status Powertrain Relay Voltage Engine RPM	Enabled ≥ 11.00 volts ≥ 400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips Note: In certain controllers P3403 may also set (Cylinder 1 Deactivation Solenoid Control Circuit/ Low)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 1 Deactivation Solenoid Control Circuit/Low	P3403	Controller specific output driver circuit diagnoses the Cylinder 1 Deactivation 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.	Short to Ground Circuit ≤ 0.5 Ω impedance between output and controller ground	Diagnostic Status Powertrain Relay Voltage Engine RPM	Enabled ≥ 11.00 volts ≥ 400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips Note: In certain controllers P3401 may also set (Cylinder 1 Deactivation Solenoid Control Circuit/ Open)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 1 Deactivation Solenoid Control Circuit/High	P3404	Controller specific output driver circuit diagnoses the Cylinder 1 Deactivation 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.	Short to Power ≤ 0.5 Ω impedance between output and controller power	Diagnostic Status Powertrain Relay Voltage Engine RPM	Enabled ≥ 11.00 volts ≥ 400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 4 Deactivation Solenoid Control Circuit/Open	P3425	Controller specific output driver circuit diagnoses the Cylinder 4 Deactivation 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.	Open Circuit: ≥ 200 k Ω impedance between output and controller ground	Diagnostic Status Powertrain Relay Voltage Engine RPM	Enabled ≥ 11.00 volts ≥ 400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips Note: In certain controllers P3427 may also set (Cylinder 4 Deactivation Solenoid Control Circuit/ Low)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 4 Deactivation Solenoid Control Circuit/Low	P3427	Controller specific output driver circuit diagnoses the Cylinder 4 Deactivation 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.	Controller specific output driver circuit diagnoses the Cylinder 1 Deactivation 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.	Short to Ground Circuit ≤ 0.5 Ω impedance between output and controller ground	Diagnostic Status Powertrain Relay Voltage Engine RPM	Enabled ≥ 11.00 volts ≥ 400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips Note: In certain controllers P3425 may also set (Cylinder 4 Deactivation Solenoid Control Circuit/ Open)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 4 Deactivation Solenoid Control Circuit/High	P3428	Controller specific output driver circuit diagnoses the Cylinder 4 Deactivation 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.Diagnoses cylinder 4 deactivation solenoid control low side driver circuit for circuit faults	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	Short to Power ≤ 0.5 Ω impedance between output and controller power	Diagnostic Status Powertrain Relay Voltage Engine RPM	Enabled ≥ 11.00 volts ≥ 400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 6 Deactivation Solenoid Control Circuit/Open	P3441	Controller specific output driver circuit diagnoses the Cylinder 6 Deactivation 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 low during driver off state (indicates open circuit)Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	Open Circuit: ≥ 200 k Ω impedance between output and controller ground	Diagnostic Status Powertrain Relay Voltage Engine RPM	Enabled ≥ 11.00 volts ≥ 400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips Note: In certain controllers P3443 may also set (Cylinder 6 Deactivation Solenoid Control Circuit/ Low)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 6 Deactivation Solenoid Control Circuit/Low	P3443	Controller specific output driver circuit diagnoses the Cylinder 6 Deactivation 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.	Short to Ground Circuit ≤ 0.5 Ω impedance between output and controller ground	Diagnostic Status Powertrain Relay Voltage Engine RPM	Enabled ≥ 11.00 volts ≥ 400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips Note: In certain controllers P3441 may also set (Cylinder 6 Deactivation Solenoid Control Circuit/ Open)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 6 Deactivation Solenoid Control Circuit/High	P3444	Controller specific output driver circuit diagnoses the Cylinder 6 Deactivation 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.	Short to Power ≤ 0.5 Ω impedance between output and controller power	Diagnostic Status Powertrain Relay Voltage Engine RPM	Enabled ≥ 11.00 volts ≥ 400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 7 Deactivation Solenoid Control Circuit/Open	P3449	Controller specific output driver circuit diagnoses the Cylinder 7 Deactivation 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.	Open Circuit: ≥ 200 k Ω impedance between output and controller ground	Diagnostic Status Powertrain Relay Voltage Engine RPM	Enabled ≥ 11.00 volts ≥ 400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips Note: In certain controllers P3451 may also set (Cylinder 7 Deactivation Solenoid Control Circuit/ Low)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 7 Deactivation Solenoid Control Circuit/Low	P3451	Controller specific output driver circuit diagnoses the Cylinder 7 Deactivation 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 low during driver off state (indicates an short circuit to Ground) Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	Short to Ground Circuit ≤ 0.5 Ω impedance between output and controller ground	Diagnostic Status Powertrain Relay Voltage Engine RPM	Enabled ≥ 11.00 volts ≥ 400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips Note: In certain controllers P3449 may also set (Cylinder 7 Deactivation Solenoid Control Circuit/ Open)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 7 Deactivation Solenoid Control Circuit/High	P3452	Controller specific output driver circuit diagnoses the Cylinder 7 Deactivation 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.	Short to Power ≤ 0.5 Ω impedance between output and controller power	Diagnostic Status Powertrain Relay Voltage Engine RPM	Enabled ≥ 11.00 volts ≥ 400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger/ Supercharger Bypass Valve "A" default position not reached	P0039	This DTC indicates the failure "CRV Default position not reached". When the CRV is switched off, the valve position should move to the default position within a reasonable time. In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	Absolute Value of : Actual raw position - Safe Position(100.00 %) for at least	> 10.00 % >= 1.00 s	Diagnostic enabled ********** Powertrain relay voltage ********** No active DTCs: ********** Valve State is 'OFF' for at least ********** Engine does not crank Diagnostic system not disabled	True ********** >= 11.0 Volts ********** CRAR_b_PstnSnsrFA ********** >= 1.00 s **********	10 failures out of 14 samples 6.25ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.	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 Ω impedance between output and controller ground.	Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controllers P0051 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank2 Sensor1	P0051	Controller specific output driver circuit diagnoses the heater output low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	≤ 0.5 Ω impedance between output and controller ground.	Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controllers P0050 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank2 Sensor1	P0052	Controller specific output driver circuit diagnoses the heater output low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	≤ 0.5 Ω impedance between output and controller power.	Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
HO2S Heater Resistance Bank 1 Sensor 2) (For Dual Bank Exhaust Only	P0054	Detects an oxygen sensor heater having an incorrect or out of range resistance value. This test calculates the heater's resistance (using voltage and current) at engine start after a soak condition and compares it to the expected values for the released sensor. This fault is set if the heater resistance is outside the expected range.	Heater Resistance outside of the expected range of	4.0 < ohms < 9.3	No Active DTC's Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P262B IAT_SensorFA < 8.0 ºC > 28,800 seconds ≥ -30.0 ºC < 32.0 volts < 0.04 seconds	Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.	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 Ω impedance between output and controller ground.	Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controllers P0057 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.	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 Ω impedance between output and controller ground.	Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controllers P0056 may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.	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 Ω impedance between output and controller power.	Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
HO2S Heater Resistance Bank 2 Sensor 1	P0059	Detects an oxygen sensor heater having an incorrect or out of range resistance value.. This test calculates the heater's resistance (using voltage and current) at engine start after a soak condition and compares it to the expected values for the released sensor. This fault is set if the heater resistance is outside the expected range.	Heater Resistance outside of the expected range of	4.5 < ohms < 9.7	No Active DTC's Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P262B IAT_SensorFA < 8.0 ºC > 28,800 seconds ≥ -30.0 ºC < 32.0 volts < 0.09 seconds	Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
HO2S Heater Resistance Bank 2 Sensor 2	P0060	Detects an oxygen sensor heater having an incorrect or out of range resistance value. This test calculates the heater's resistance (using voltage and current) at engine start after a soak condition and compares it to the expected values for the released sensor. This fault is set if the heater resistance is outside the expected range.	Heater Resistance outside of the expected range of	4.5 < ohms < 9.7	No Active DTC's Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P262B IAT_SensorFA < 8.0 ºC > 28,800 seconds ≥ -30.0 ºC < 32.0 volts < 0.09 seconds	Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
MAP / MAF / Throttle Position Correlation	P0068	Detect when MAP and MAF do not match estimated engine airflow as established by the TPS	Difference between MAP and estimated MAP exceeds threshold (kPa), or P0651 (5 Volt Ref), or P0107 (MAP circuit low), or P0108 (MAP circuit high) have failed this key cycle, then MAP portion of diagnostic fails	Table, f(TPS). See supporting tables: **P0068_Delta MAP Threshold f(TPS)**	Engine Speed Run/Crank voltage	> 800 RPM > 6.41 Volts	Continuously fail MAP and MAF portions of diagnostic for 0.1875 s Continuous in MAIN processor	Type A, 1 Trips
			Absolute difference between MAF and estimated MAF exceed threshold (grams/sec), or P0102 (MAF circuit low), or P0103 (MAF circuit hi) have failed this key cycle, or maximum MAF versus RPM (Table) is greater than or equal to maximum MAF versus battery voltage, then MAF portion of diagnostic fails	Table, f(TPS). See supporting tables: **P0068_Delta MAF Threshold f(TPS)** Table, f(RPM). See supporting tables: **P0068_Maximum MAF f(RPM)** Table, f(Volts). See supporting tables: **P0068_Maximum MAF f(Volts)**			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Pressure Measurement System - Multiple Sensor Correlation (supercharged)	P00C7	Detects an inconsistency between pressure sensors in the induction system in which a particular sensor cannot be identified as the failed sensor. If the engine has been off for a sufficient amount of time, the pressure values in the induction system will have equalized. The Manifold Pressure (MAP), Supercharger Inlet Pressure (SCIAP) and Barometric Pressure (BARO) sensors values are checked to see if they are within the normal expected atmospheric pressure range. If they are, then MAP, SCIAP and BARO are compared to see if their values are similar. If two of these three sensors are similar, but the third is not, then a performance diagnostic for the specific sensor with the dissimilar value will fail. If there is no combination of two of these three sensors	ABS(Manifold Pressure - Baro Pressure) AND ABS(Supercharger Inlet Pressure - Manifold Pressure) AND ABS(Supercharger Inlet Pressure - Baro Pressure) OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Supercharger Inlet Pressure - Manifold Pressure) AND ABS(Supercharger Inlet Pressure - Baro Pressure) OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Supercharger Inlet Pressure - Manifold Pressure) AND ABS(Supercharger Inlet Pressure - Baro Pressure) OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Supercharger Inlet Pressure - Manifold	> 10.0 kPa <= 10.0 kPa <= 10.0 kPa <= 10.0 kPa > 10.0 kPa <= 10.0 kPa <= 10.0 kPa <= 10.0 kPa > 10.0 kPa > 10.0 kPa	Time between current ignition cycle and the last time the engine was running Engine is not rotating Manifold Pressure Manifold Pressure Baro Pressure Baro Pressure Supercharger Inlet Pressure Supercharger Inlet Pressure No Active DTCs: No Pending DTCs:	> 8.0 seconds >= 50.0 kPa <= 115.0 kPa >= 50.0 kPa <= 115.0 kPa >= 50.0 kPa <= 115.0 kPa EngineModeNotRunTimer Error MAP_SensorFA SCIAP_SensorFA AAP2_SnsrFA MAP_SensorCircuitFP SCIAP_SensorCircuitFP AAP2_SnsrCktFP	4 failures out of 5 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.
		that is similar, then the failed sensor cannot be uniquely identified. The Multiple Pressure Sensor Correlation Diagnostic will fail in this case.	Pressure) AND ABS(Supercharger Inlet Pressure - Baro Pressure)	> 10.0 kPa > 10.0 kPa				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow System Performance (supercharg ed)	P0101	Detects a performance failure in the Mass Air Flow (MAF) sensor, such as when a MAF value is stuck in range. This diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from other sensors. The other sensors are the Manifold Pressure (MAP) sensor, Supercharger Inlet Pressure (SCIAP) sensor and Throttle Position sensor (TPS). These modeled values are compared against the actual sensor values to see if they are similar. If they are similar, then the model passes. If they are not similar, then that model is considered to be failed. Certain combinations of model passes and model failures can be interpreted to be caused by a performance issue with the MAF sensor. In this case, the MAF Performance diagnostic	See table **P0101, P0106, P0121, P012B, P1101: Supercharger Intake Flow Rationality Diagnostic Failure Matrix** for combinations of model failures that can set this DTC. TPS model fails when Filtered Throttle Model Error MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered MAP1 model fails when ABS(Measured MAP – MAP Model 1) Filtered MAP2 model fails when ABS(Measured MAP – MAP Model 2) Filtered SCIAP1 model fails when ABS(Measured SCIAP – SCIAP Model 1) Filtered SCIAP2 model fails when ABS(Measured SCIAP – SCIAP Model 2) Filtered	> 400 kPa*(g/s) > 30.0 grams/sec > 30.0 kPa > 30.0 kPa > 30.0 kPa > 30.0 kPa	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria (Coolant Temp OR OBD Max Coolant Achieved Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables.	>= 400 RPM <= 6,200 RPM >= -9 Deg C = TRUE) <= 129 Deg C = FALSE) >= -20 Deg C <= 129 Deg C >= 0.50 Modeled Air Flow Error multiplied by **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM** and **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est** MAP Model 1 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM** and	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		will fail.				**P0101, P0106, P0121, P012B, P1101: Boost Residual Weight Factor based on % of Boost** MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** and **P0101, P0106, P0121, P012B, P1101: Boost Residual Weight Factor based on % of Boost** Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** SCIAP Model 1 Error multiplied by **P0101, P0106, P0121, P012B, P1101: SCIAP1 Residual Weight Factor based on RPM** and **P0101, P0106, P0121, P012B, P1101: Boost Residual Weight Factor based on % of Boost** SCIAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P1101: SCIAP2 Residual Weight Factor based on RPM**		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Manifold Absolute Pressure Sensor Performance (supercharg ed)	P0106	If the engine has been off for a sufficient amount of time, the pressure values in the induction system will have equalized. The MAP sensor value is checked to see if it is within the normal expected atmospheric pressure range. If it is not, then the MAP performance diagnostic will fail. If the MAP sensor value is within the normal expected atmospheric range, then MAP, Supercharger Inlet Absolute Pressure (SCIAP), and Barometric Pressure (BARO) are compared to see if their values are similar. If the SCIAP and BARO sensor values are similar, but the MAP value is not similar, then a MAP performance diagnostic will fail. The engine running portion of this diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled	**<u>Engine Running:</u>** See table **P0101, P0106, P0121, P012B, P1101: Supercharger Intake Flow Rationality Diagnostic Failure Matrix** for combinations of model failures that can set this DTC. TPS model fails when Filtered Throttle Model Error MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered MAP1 model fails when ABS(Measured MAP – MAP Model 1) Filtered MAP2 model fails when ABS(Measured MAP – MAP Model 2) Filtered SCIAP1 model fails when ABS(Measured SCIAP – SCIAP Model 1) Filtered SCIAP2 model fails when ABS(Measured SCIAP – SCIAP Model 2) Filtered	> 400 kPa*(g/s) > 30.0 grams/sec > 30.0 kPa > 30.0 kPa > 30.0 kPa > 30.0 kPa	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria (Coolant Temp OR OBD Max Coolant Achieved Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables.	>= 400 RPM <= 6,200 RPM >= -9 Deg C = TRUE) <= 129 Deg C = FALSE) >= -20 Deg C <= 129 Deg C >= 0.50 Modeled Air Flow Error multiplied by **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM** and **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est** MAP Model 1 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM** and	Continuous Calculation are performed every 12.5 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		values of sensors from other sensors. The other sensors are the Mass Air Flow (MAF) sensor, Supercharger Inlet Pressure (SCIAP) sensor and Throttle Position sensor (TPS). These modeled values are compared against the actual sensor values to see if they are similar. If they are similar, then the model passes. If they are not similar, then that model is considered to be failed. Certain combinations of model passes and model failures can be interpreted to be caused by a performance issue with the MAP sensor. In this case, the MAP Performance diagnostic will fail.				**P0101, P0106, P0121, P012B, P1101: Boost Residual Weight Factor based on % of Boost** MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** and **P0101, P0106, P0121, P012B, P1101: Boost Residual Weight Factor based on % of Boost** Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** SCIAP Model 1 Error multiplied by **P0101, P0106, P0121, P012B, P1101: SCIAP1 Residual Weight Factor based on RPM** and **P0101, P0106, P0121, P012B, P1101: Boost Residual Weight Factor based on % of Boost** SCIAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P1101: SCIAP2 Residual Weight Factor based on RPM**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						and **P0101, P0106, P0121, P012B, P1101: Boost Residual Weight Factor based on % of Boost**		
					No Active DTCs:	MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTempSensorFA SCIAP_SensorCircuitFA AmbientAirDefault CRAR_b_CRV_CktFA CRAR_b_PstnSnsrFA CRAR_b_PstnSnsrOfstFA CRAR_b_ObstructionFA		
					No Pending DTCs:	EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP MnfdTempSensorCktFP SCIAP_SensorCircuitFP		
			Engine Not Rotating:		Time between current ignition cycle and the last time the engine was running	> 8.0 seconds	4 failures out of 5 samples 1 sample every 12.5 msec	
			Manifold Pressure OR Manifold Pressure	< 50.0 kPa > 115.0 kPa	Engine is not rotating			
			OR		No Active DTCs:	EngineModeNotRunTimer Error MAP_SensorFA SCIAP_SensorFA AAP2_SnsrFA		
			ABS(Manifold Pressure - Baro Pressure) AND ABS(Supercharger Inlet Pressure - Manifold Pressure)	> 10.0 kPa > 10.0 kPa	No Pending DTCs:	MAP_SensorCircuitFP		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			AND ABS(Supercharger Inlet Pressure - Baro Pressure)	<= 10.0 kPa		SCIAP_SensorCircuitFP AAP2_SnsrCktFP		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature (ECT) Sensor Performance	P0116	This DTC detects an ECT (Engine Coolant temperature) sensor that is biased high or stuck above the thermostat monitoring diagnostic. This check is performed after a soak condition.	A failure will be reported if any of the following occur: 1) ECT at power up > IAT at power up by an IAT based table lookup value after a minimum 28,800 second soak (fast fail). 2) ECT at power up > IAT at power up by 19.3 ºC after a minimum 28,800 second soak and a block heater has not been detected. 3) ECT at power up > IAT at power up by 19.3 C after a minimum 28,800 seconds soak and the time spent cranking the engine without starting is greater than 10.0 seconds with the LowFuelConditionDiag	See **P0116_Fail if power up ECT exceeds IAT by these values** in the Supporting tables section = False	No Active DTC's Non-volatile memory initization Test complete this trip Test aborted this trip IAT LowFuelCondition Diag ========== Block Heater detection is enabled when either of the following occurs: 1) ECT at power up > IAT at power up by 2) Cranking time ========== Block Heater is detected and diagnostic is aborted when 1) or 2) occurs: 1a) Vehicle drive time 1b) Vehicle speed 1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is below 1b as follows:	VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA IgnitionOffTimeValid TimeSinceEngineRunning Valid = Not occurred = False = False ≥ -9 ºC = False ========== > 19.3 ºC < 10.0 seconds ========== > 400 seconds with > 15 MPH 0.00 times the seconds with vehicle speed below 1b	1 failure 500 msec/ sample Once per valid cold start	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					1d) IAT drops from power up IAT 2a) ECT drops from power up ECT 2b) Engine run time ========== Diagnostic is aborted when 3) or 4) occurs: 3) Engine run time with vehicle speed below 1b 4) Minimum IAT during test	≥ 3.3 ºC ≥ 1 ºC Within ≤ 30 seconds ========== > 1800 seconds ≤ -9 ºC		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Throttle Position Sensor Performance (supercharged)	P0121	Detects a performance failure in the Throttle Position sensor (TPS) sensor, such as when a TPS value is stuck in range. This diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from other sensors. The other sensors are the Manifold Pressure (MAP) sensor, Supercharger Inlet Pressure (SCIAP) sensor and Mass Air Flow (MAF) sensor. These modeled values are compared against the actual sensor values to see if they are similar. If they are similar, then the model passes. If they are not similar, then that model is considered to be failed. Certain combinations of model passes and model failures can be interpreted to be caused by a performance issue with the TPS sensor. In this case, the TPS	See table **P0101, P0106, P0121, P012B, P1101: Supercharger Intake Flow Rationality Diagnostic Failure Matrix** for combinations of model failures that can set this DTC. TPS model fails when Filtered Throttle Model Error MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered MAP1 model fails when ABS(Measured MAP – MAP Model 1) Filtered MAP2 model fails when ABS(Measured MAP – MAP Model 2) Filtered SCIAP1 model fails when ABS(Measured SCIAP – SCIAP Model 1) Filtered SCIAP2 model fails when ABS(Measured SCIAP – SCIAP Model 2) Filtered	> 400 kPa*(g/s) > 30.0 grams/sec > 30.0 kPa > 30.0 kPa > 30.0 kPa > 30.0 kPa	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria (Coolant Temp OR OBD Max Coolant Achieved Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables.	>= 400 RPM <= 6,200 RPM >= -9 Deg C = TRUE) <= 129 Deg C = FALSE) >= -20 Deg C <= 129 Deg C >= 0.50 Modeled Air Flow Error multiplied by **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM** and **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est** MAP Model 1 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM** and	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Performance diagnostic will fail.				**P0101, P0106, P0121, P012B, P1101: Boost Residual Weight Factor based on % of Boost** MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** and **P0101, P0106, P0121, P012B, P1101: Boost Residual Weight Factor based on % of Boost** Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** SCIAP Model 1 Error multiplied by **P0101, P0106, P0121, P012B, P1101: SCIAP1 Residual Weight Factor based on RPM** and **P0101, P0106, P0121, P012B, P1101: Boost Residual Weight Factor based on % of Boost** SCIAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P1101: SCIAP2 Residual Weight Factor based on RPM**		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Supercharge r Inlet Absolute Pressure (SCIAP) Sensor Performance	P012B	Detects a performance failure in the Supercharger Inlet Absolute Pressure (SCIAP) sensor, such as when a SCIAP value is stuck in range. If the engine has been off for a sufficient amount of time, the pressure values in the induction system will have equalized. The SCIAP sensor value is checked to see if it is within the normal expected atmospheric pressure range. If it is not, then the SCIAP performance diagnostic will fail. If the SCIAP sensor value is within the normal expected atmospheric range, then Manifold Pressure (MAP), SCIAP and Barometric Pressure (BARO) are compared to see if their values are similar. If the MAP and BARO sensor values are similar, but the SCIAP value is not similar, then a SCIAP performance diagnostic will fail. The engine running portion of this	<u>**Engine Running:**</u> See table **P0101, P0106, P0121, P012B, P1101: Supercharger Intake Flow Rationality Diagnostic Failure Matrix** for combinations of model failures that can set this DTC. TPS model fails when Filtered Throttle Model Error MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered MAP1 model fails when ABS(Measured MAP – MAP Model 1) Filtered MAP2 model fails when ABS(Measured MAP – MAP Model 2) Filtered SCIAP1 model fails when ABS(Measured SCIAP – SCIAP Model 1) Filtered SCIAP2 model fails when ABS(Measured SCIAP – SCIAP Model 2) Filtered	> 400 kPa*(g/s) > 30.0 grams/sec > 30.0 kPa > 30.0 kPa > 30.0 kPa > 30.0 kPa	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria (Coolant Temp OR OBD Max Coolant Achieved Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables.	>= 400 RPM <= 6,200 RPM >= -9 Deg C = TRUE) <= 129 Deg C = FALSE) >= -20 Deg C <= 129 Deg C >= 0.50 Modeled Air Flow Error multiplied by **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM** and **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est** MAP Model 1 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM** MAP Model 2 Error multiplied by	Continuous Calculation are performed every 12.5 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from other sensors. The other sensors are the Mass Air Flow (MAF) sensor, Manifold Pressure (MAP) sensor and Throttle Position sensor (TPS). These modeled values are compared against the actual sensor values to see if they are similar. If they are similar, then the model passes. If they are not similar, then that model is considered to be failed. Certain combinations of model passes and model failures can be interpreted to be caused by a performance issue with the SCIAP sensor. In this case, the SCIAP Performance diagnostic will fail.			No Active DTCs: No Pending DTCs:	**P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** MAP Model 3 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP3 Residual Weight Factor based on RPM** TIAP Model 1 Error multiplied by **P0101, P0106, P0121, P0236, P1101: TIAP Residual Weight Factor based on RPM** Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTempSensorFA SCIAP_SensorCircuitFA AmbientAirDefault CRAR_b_CRV_CktFA CRAR_b_PstnSnsrFA CRAR_b_PstnSnsrOfstFA CRAR_b_ObstructionFA EGRValve_FP		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						ECT_Sensor_Ckt_FP IAT_SensorCircuitFP MnfdTempSensorCktFP SCIAP_SensorCircuitFP		
			Engine Not Rotating: Supercharger Inlet Pressure OR Supercharger Inlet Pressure OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Supercharger Inlet Pressure - Manifold Pressure) AND ABS(Supercharger Inlet Pressure - Baro Pressure)	 < 50.0 kPa > 115.0 kPa <= 10.0 kPa > 10.0 kPa > 10.0 kPa	Time between current ignition cycle and the last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	 > 8.0 seconds EngineModeNotRunTimer Error MAP_SensorCircuitFA SCIAP_SensorCircuitFA AAP2_SnsrCktFA MAP_SensorCircuitFP SCIAP_SensorCircuitFP AAP2_SnsrCktFP	4 failures out of 5 samples 1 sample every 12.5 msec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Supercharger Inlet Absolute Pressure (SCIAP) Sensor Circuit Low (Gen III)	P012C	Detects a continuous short to ground in the Supercharger Inlet Absolute Pressure (SCIAP) signal circuit by monitoring the SCIAP sensor output voltage and failing the diagnostic when the SCIAP voltage is too low. The SCIAP sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	SCIAP Voltage	< 3.0 % of 5 Volt Range (This is equal to 6.1 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Supercharger Inlet Absolute Pressure (SCIAP) Sensor Circuit High (Gen III)	P012D	Detects a continuous short to power or open circuit in the Supercharger Inlet Absolute Pressure (SCIAP) signal circuit by monitoring the SCIAP sensor output voltage and failing the diagnostic when the SCIAP voltage is too high. The SCIAP sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	SCIAP Voltage	> 97.0 % of 5 Volt Range (This is equal to 124.0 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Low Voltage Bank 1 Sensor 2) (For Dual Bank Exhaust Only	P0137	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. 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.	Oxygen Sensor Signal	< 50 mvolts	No Active DTC's	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 AIR intrusive test = Not active Fuel intrusive test = Not active Idle intrusive test = Not active EGR intrusive test = Not active System Voltage 10.0 < Volts EGR Device Control = Not active Idle Device Control = Not active Fuel Device Control = Not active AIR Device Control = Not active Low Fuel Condition = False Only when FuelLevelDataFault = False Commanded Equivalence Ratio 0.992 ≤ ratio ≤ 1.014 Air Per Cylinder 175 ≤ mgrams ≤ 800 Fuel Control State = Closed Loop Closed Loop Active = TRUE (Please see “**Closed Loop Enable Clarification**” in Supporting Tables).	320 failures out of 400 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.
					All Fuel Injectors for active Cylinders Fuel Condition Ethanol Estimation in Progress Fuel State All of the above met for	Enabled (On) Ethanol ≤ 88 % = Not Active (Please see “**Ethanol Estimation in Progress**” in Supporting Tables). DFCO not active > 2.0 seconds		

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	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. 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.	Oxygen Sensor Signal	> 1,050 mvolts	No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Low Fuel Condition Only when FuelLevelDataFault ********** Secondary delay after above conditions are complete (cold start condition) Secondary delay after above conditions are complete (not cold start condition) Commanded Equivalence Ratio ********** All of the above met for	TPS_ThrottleAuthorityDefaulted MAF_SensorFA MAP_SensorFA EvapExcessPurgePsbl_FA FuelInjectorCircuit_FA Ethanol Composition Sensor FA AIR System FA 10.0 < Volts = All Cylinders active = Complete > 5.0 seconds > 30.0 seconds = False = False ********** > 235.0 seconds when engine soak time > 28,800 seconds > 235.0 seconds when engine soak time ≤ 28,800 seconds ≤ 1.014 EQR ********** > 2.0 seconds	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Slow Response Rich to Lean Bank 2 Sensor 2	P013C	The P013C diagnostic is the third in a sequence of six intrusive secondary O2 monitors which include DTCs P2272, P014A, P013C, P2273, P014B, & P013D. This DTC determines if the secondary O2 sensor has an slow response to an A/F change from Rich to Lean and thereby can no longer be used for secondary O2 sensor fuel control or for catalyst monitoring. This diagnostic commands fuel cut off while monitoring the sensor signal and the accumulated mass air flow. Note: The Primary method is used when the secondary O2 sensor signal transitions from above the upper threshold to below the lower threshold, otherwise the Secondary method is used. <u>Primary method</u>: The P013C diagnostic measures the secondary O2 sensor voltage response rate	Primary Method: The EWMA of the Post O2 sensor normalized integral value. The EWMA repass limit is The EWMA calculation uses a 0.30 coefficient. OR Secondary Method: The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 8.0 units ≤ 7.5 units > 70.0 grams (upper voltage threshold is 450 mvolts and lower voltage threshold is 150 mvolts)	No Active DTC's B2S2 DTC's Not Active this key cycle System Voltage Learned heater resistance Green O2S Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA O2S_Bank_ 1_TFTKO O2S_Bank_ 2_TFTKO P013D, P014A, P014B, P2272 or P2273 > 10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid, Green O2S condition is considered valid until the accumulated air flow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 in Supporting Tables tab. Airflow accumulation is only enabled when airflow	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		between an upper and lower voltage threshold. The response rate is then normalized to mass air flow rate and scaled resulting in a normalized intregral value. The normalized integral is fed into a 1st order lag filter to update the final EWMA result. DTC P013C is set when the EWMA value exceeds the EWMA threshold. Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value. Secondary method:			Low Fuel Condition Only when FuelLevelDataFault Post fuel cell Crankshaft Torque DTC's Passed ========== After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).	is above 22.0 grams/sec. = False = False = Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info. < 100.0 Nm P2272 P014A ==========		

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.
O2 Sensor Slow Response Lean to Rich Bank 2 Sensor 2	P013D	The P013D diagnostic is the sixth in a sequence of six intrusive secondary O2 monitors which include DTCs P2272, P014A, P013C, P2273, P014B, & P013D. This DTC determines if the secondary O2 sensor has an slow response to an A/F change from Lean to Rich and thereby can no longer be used for secondary O2 sensor fuel control or for catalyst monitoring. This diagnostic increases the delivered fuel while monitoring the sensor signal and the accumulated mass air flow. Note: The Primary method is used when the secondary O2 sensor signal transitions from below the lower threshold to above the upper threshold, otherwise the Secondary method is used. <u>Primary method</u>: The P013D diagnostic measures the secondary O2 sensor voltage response rate	Primary Method: The EWMA of the Post O2 sensor normalized integral value. The EWMA repass limit is The EWMA calculation uses a 0.30 coefficient. OR Secondary Method: The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 8.0 units ≤ 7.5 units > 200 grams (lower voltage threshold is 350 mvolts and upper voltage threshold is 650 mvolts)	No Active DTC's B2S2 DTC's Not Active this key cycle System Voltage Learned heater resistance Green O2S Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA O2S_Bank_ 1_TFTKO O2S_Bank_ 2_TFTKO P013C, P014A, P014B, P2272 or P2273 > 10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid, Green O2S condition is considered valid until the accumulated air flow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 in Supporting Tables tab. Airflow accumulation is only enabled when airflow	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type A, 1 Trips EWMA

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.			following must stay TRUE or the test will abort: 0.950 ≤ Base Commanded EQR ≤ 1.100			

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	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit. This test compares the measured heater current (monitored thru the low side driver) and compares it to the expected values (over the voltage range provided) for the released sensor. The diagnostic failure counter is incremented if the heater current is outside the expected range. This DTC is set based on the fail and sample counters.	Heater Current outside of the expected range of	0.3 > amps > 2.9	No Active DTC's System Voltage Heater Warm-up delay O2S Heater device control B1S1 O2S Heater Duty Cycle All of the above met for	ECT_Sensor_FA > 10.0 Volts = Complete = Not active > zero > 120 seconds	8 failures out of 10 samples Frequency: 2 tests per trip 5 seconds delay between tests and 1 second execution rate.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Delayed Response Rich to Lean Bank 2 Sensor 2	P014A	The P014A diagnostic is the second in a sequence of six intrusive secondary O2 monitors which include DTCs P2272, P014A, P013C, P2273, P014B, & P013D. This DTC determines if the secondary O2 sensor has an initial delayed response to an A/F change from Rich to Lean and thereby can no longer be used for secondary O2 sensor fuel control or for catalyst monitoring. This diagnostic commands fuel cut off while monitoring the sensor signal and the accumulated mass air flow. This fault is set if the secondary O2 sensor does not achieve the required voltage before the accumulated mass air flow threshold is reached.	Post O2 sensor voltage AND The Accumulated mass air flow monitored during the Delayed Response Test under DFCO DFCO begins after: 1) Catalyst has been rich for a minimum of AND 2) Catalyst Rich Accumulation Air Flow is	> 450 mvolts > 45 grams > 1 secs ≥ 3.0 grams	No Active DTC's B2S2 DTC's Not Active this key cycle System Voltage Learned heater resistance Green O2S Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA O2S_Bank_ 1_TFTKO O2S_Bank_ 2_TFTKO P013C, P013D, P014B, P2272 or P2273 > 10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid, Green O2S condition is considered valid until the accumulated air flow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 in Supporting Tables tab. Airflow accumulation is only enabled when airflow	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						is above 22.0 grams/sec.		
					Low Fuel Condition Only when FuelLevelDataFault	= False = False		
					Post fuel cell	= Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info.		
					Crankshaft Torque	< 100.0 Nm		
					DTC's Passed	P2272		
					Number of fueled cylinders ========== After above conditions are met: DFCO mode entered (wo driver initiated pedal input).	≤ 7 cylinders ==========		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Delayed Response Lean to Rich Bank 2 Sensor 2	P014B	The P014B diagnostic is the fifth in a sequence of six intrusive secondary O2 monitors which include DTCs P2272, P014A, P013C, P2273, P014B, & P013D. This DTC determines if the secondary O2 sensor has an initial delayed response to an A/F change from Lean to Rich and thereby can no longer be used for secondary O2 sensor fuel control or for catalyst monitoring. This diagnostic increases the delivered fuel while monitoring the sensor signal and the accumulated mass air flow. This fault is set if the secondary O2 sensor does not achieve the required voltage before the accumulated mass air flow threshold is reached.	Post O2 sensor AND The Accumulated mass air flow monitored during the Delayed Response Test	< 350 mvolts > 250 grams.	No Active DTC's B2S2 DTC's Not Active this key cycle System Voltage Learned heater resistance Green O2S Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA O2S_Bank_ 1_TFTKO O2S_Bank_ 2_TFTKO P013C, P013D, P014A, P2272 or P2273 > 10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid, Green O2S condition is considered valid until the accumulated air flow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 in Supporting Tables tab. Airflow accumulation is only enabled when airflow	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					following must stay TRUE or the test will abort: 0.950 ≤ Base Commanded EQR ≤ 1.100			

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	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. 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.	Oxygen Sensor Signal	< 40 mvolts	No Active DTC's AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Only when FuelLevelDataFault Commanded Equivalence Ratio Air Per Cylinder Fuel Control State Closed Loop Active	TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA = Not active = Not active = Not active = Not active 10.0 < Volts = Not active = Not active = Not active = Not active = False = False 0.992 ≤ ratio ≤ 1.014 175 ≤ APC ≤ 800 mgrams = Closed Loop = TRUE (Please see “**Closed Loop Enable**	285 failures out of 350 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.
						Clarification" in Supporting Tables).		
					All Fuel Injectors for active Cylinders Fuel Condition	Enabled (On) ≤ 88 % Ethanol		
					Ethanol Estimation in Progress	= Not Active (Please see "**Ethanol Estimation in Progress**" in Supporting Tables).		
					Fuel State	DFCO not active		
					All of the above met for	> 5.0 seconds		

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	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. 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.	Oxygen Sensor Signal	> 1,050 mvolts	No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Low Fuel Condition Only when FuelLevelDataFault ********** Secondary delay after above conditions are complete (cold start condition) Secondary delay after above conditions are complete (not cold start condition) Commanded Equivalence Ratio ********** All of the above met for	TPS_ThrottleAuthorityDefaulted MAF_SensorFA MAP_SensorFA EvapExcessPurgePsbl_FA FuelInjectorCircuit_FA Ethanol Composition Sensor FA AIR System FA 10.0 < Volts = All Cylinders active = Complete > 5.0 seconds > 30.0 seconds = False = False ********** > 280.0 seconds when engine soak time > 28,800 seconds > 280.0 seconds when engine soak time ≤ 28,800 seconds ≤ 1.014 EQR ********** > 2 seconds	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Performance Bank 2 Sensor 1	P0155	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit. This test compares the measured heater current (monitored thru the low side driver) and compares it to the expected values (over the voltage range provided) for the released sensor. The diagnostic failure counter is incremented if the heater current is outside the expected range. This DTC is set based on the fail and sample counters.	Heater Current outside of the expected range of	0.3 > amps > 3.1	No Active DTC's System Voltage Heater Warm-up delay O2S Heater device control B1S1 O2S Heater Duty Cycle All of the above met for	ECT_Sensor_FA > 10.0 Volts = Complete = Not active > zero > 120 seconds	8 failures out of 10 samples Frequency: 2 tests per trip 5 seconds delay between tests and 1 second execution rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Low Voltage Bank 2 Sensor 2	P0157	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. 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.	Oxygen Sensor Signal	< 50 mvolts	No Active DTC's AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Only when FuelLevelDataFault Commanded Equivalence Ratio Air Per Cylinder Fuel Control State Closed Loop Active	TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA = Not active = Not active = Not active = Not active 10.0 < Volts = Not active = Not active = Not active = Not active = False = False 0.992 ≤ ratio ≤ 1.014 175 ≤ mgrams ≤ 800 = Closed Loop = TRUE (Please see “**Closed Loop Enable Clarification**” in Supporting Tables).	320 failures out of 400 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.
					All Fuel Injectors for active Cylinders Fuel Condition Ethanol Estimation in Progress Fuel State All of the above met for	Enabled (On) ≤ 88 % Ethanol = Not Active (Please see “**Ethanol Estimation in Progress**” in Supporting Tables). DFCO not active > 2.0 seconds		

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	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. 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.	Oxygen Sensor Signal	> 1,050 mvolts	No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Low Fuel Condition Only when FuelLevelDataFault ********** Secondary delay after above conditions are complete (cold start condition) Secondary delay after above conditions are complete (not cold start condition) Commanded Equivalence Ratio ********** All of the above met for	TPS_ThrottleAuthorityDefaulted MAF_SensorFA MAP_SensorFA EvapExcessPurgePsbl_FA FuelInjectorCircuit_FA Ethanol Composition Sensor FA AIR System FA 10.0 < Volts = All Cylinders active = Complete > 5.0 seconds > 30.0 seconds = False = False ********** > 280.0 seconds when engine soak time > 28,800 seconds > 280.0 seconds when engine soak time ≤ 28,800 seconds ≤ 1.014 EQR ********** > 2 seconds	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Delayed Response Rich to Lean Bank 2 Sensor 1) (For use w/o WRAF	P015C	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 O2 monitor rich to lean tests (P014A / P013C / P2273), which commands fuel cut off. Note: The Primary method is used when the primary O2 sensor signal transitions from above to below the O2 voltage threshold, otherwise the Secondary method is used. <u>Primary method</u>: The P015C diagnostic measures the primary O2 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	Primary method: The EWMA of the Pre O2 sensor normalized R2L time delay value. The EWMA repass limit is The EWMA calculation uses a 0.25 coefficient. This method calculates the result when the Pre O2 sensor voltage is OR Secondary method: The Accumulated time monitored during the R2L Delayed Response Test. AND Pre O2 sensor voltage is above	> 0.60 EWMA (sec) ≤ 0.58 EWMA (sec) < 550 mvolts ≥ 2.5 Seconds > 100 mvolts	No Active DTC's System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Only when FuelLevelDataFault Green O2S Condition	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA P0151, P0152, P013C, P013D, P014A, P014B, P2272, P2273 > 10.0 Volts = Not active = Not active = Not active = Not active = False = False = Not Valid, Green O2S condition is	Frequency: Once per trip Note: if NaESPD_b_FastInitRespIsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponseIsActive = TRUE, multiple tests per trip are allowed	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		value. The normalized delay is fed into a 1st order lag filter to update the final EWMA result. DTC P015C is set when the EWMA value exceeds the EWMA threshold. Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value. Secondary method: This fault is set if the primary O2 sensor does not achieve the required lower voltage threshold before a delay time threshold is reached.			O2 Heater (pre sensor) on for Learned Htr resistance Engine Coolant (Or OBD Coolant Enable Criteria IAT Engine run Accum Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled) Engine Airflow Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled)	considered valid until the accumulated air flow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S1, B2S1 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 22.0 grams/sec. ≥ 40 seconds = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") > 50 ºC = TRUE) > -40 ºC > 30 seconds 800 ≤ RPM ≤ 2,550 750 ≤ RPM ≤ 2,600 2.0 ≤ gps ≤ 20.0 44.7 ≤ MPH ≤ 82.0 37.3 ≤ MPH ≤ 87.0		

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	0.74 ≤ C/L Int ≤ 1.08 = TRUE (Please see "**Closed Loop Enable Clarification**" in Supporting Tables). not in control of purge = Not Active (Please see "**Ethanol Estimation in Progress**" in Supporting Tables). > 70 kpa = enabled = not active = not active ≥ 60.0 sec 500 ≤ ºC ≤ 1,000 = DFCO possible ========== ========== ≥ 790 mvolts = 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.
O2 Sensor Delayed Response Lean to Rich Bank 2 Sensor 1) (For use w/o WRAF	P015D	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 O2 monitor lean to rich tests (P014B / P013D), which commands fuel enrichment. Note: The Primary method is used when the primary O2 sensor signal transitions from lean condition to above the O2 voltage threshold, otherwise the Secondary method is used. Primary method: The P015D diagnostic measures the primary O2 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	Primary method: The EWMA of the Pre O2 sensor normalized L2R time delay value. The EWMA repass limit is The EWMA calculation uses a 0.25 coefficient. OR Secondary method: The Accumulated time monitored during the L2R Delayed Response Test. AND Pre O2 sensor voltage is below OR At end of Cat Rich stage the Pre O2 sensor output is	> 0.60 EWMA (sec) ≤ 0.58 EWMA (sec) ≥ 2.0 Seconds < 350 mvolts < 790 mvolts	No Active DTC's P015C test is complete and System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Only when FuelLevelDataFault	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA P0151, P0152, P013C, P013D, P014A, P014B, P015C, P2272, P2273 = Passed > 10.0 Volts = Not active = Not active = Not active = Not active = False = False	Frequency: Once per trip Note: if NaESPD_b_FastInitRespIsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponseIsActive = TRUE, multiple tests per trip are allowed	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		order lag filter to update the final EWMA result. DTC P015D is set when the EWMA value exceeds the EWMA threshold. Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value. <u>Secondary method</u>: This fault is set if the primary O2 sensor does not achieve the required higher voltage threshold before a delay time threshold is reached.			Green O2S Condition O2 Heater (pre sensor) on for Learned Htr resistance Engine Coolant (Or OBD Coolant Enable Criteria IAT Engine run Accum Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled) Engine Airflow Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled)	= 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: B1S1, B2S1 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 22.0 grams/sec. ≥ 40 seconds = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") > 50 ºC = TRUE) > -40 ºC > 30 seconds 800 ≤ RPM ≤ 2,550 750 ≤ RPM ≤ 2,600 2.0 ≤ gps ≤ 20.0 44.7 ≤ MPH ≤ 82.0 37.3 ≤ MPH ≤ 87.0		

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	0.74 ≤ C/L Int ≤ 1.08 = TRUE (Please see "**Closed Loop Enable Clarification**" in Supporting Tables).		
					Evap	not in control of purge		
					Ethanol Estimation in Progress	= Not Active (Please see "**Ethanol Estimation in Progress**" in Supporting Tables).		
					Baro Post fuel cell EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on Time	> 70 kpa = enabled = not active = not active ≥ 60.0 sec		
					Predicted Catalyst temp Fuel State Number of fueled cylinders	500 ≤ ºC ≤ 1,000 = DFCO inhibit ≥ 1 cylinders		
					========== When above conditions are met: Fuel Enrich mode is entered. ========== During this test: Engine Airflow must stay between: and the delta Engine Airflow over 12.5msec must be :	========== ========== 3 ≤ gps ≤ 20 ≤ 100.0 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	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit. This test compares the measured heater current (monitored thru the low side driver) and compares it to the expected values (over the voltage range provided) for the released sensor. The diagnostic failure counter is incremented if the heater current is outside the expected range. This DTC is set based on the fail and sample counters.	Heater Current outside of the expected range of	0.3 > amps > 2.9	No Active DTC's System Voltage Heater Warm-up delay O2S Heater device control B1S1 O2S Heater Duty Cycle All of the above met for	ECT_Sensor_FA > 10.0 Volts = Complete = Not active > zero > 120 seconds	8 failures out of 10 samples Frequency: 2 tests per trip 5 seconds delay between tests and 1 second execution rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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)	>= 1.295 >= 0.100 If a fault has been detected the long-term fuel trim metric must be < 1.295 and the short-term fuel trim metric must be < 2.000 to repass the diagnostic.	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 Closed Loop Long Term FT	375 <rpm< 7,000 > 70 kPa > -20 °C (or OBD Coolant Enable Criteria = TRUE) < 150 °C 10 <kPa< 255 -20 <°C< 150 1 <g/s< 510 > 10 % or if fuel sender is faulty the diagnostic will bypass the fuel level criteria. > 30.0 seconds of data must accumulate on each trip, with at least 20.0 seconds of data in the current fuel trim cell before a pass or fail decision can be made. (Please see **P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage** in Supporting Tables for a list of cells utilized for diagnosis) Enabled Enabled (Please see "**Closed Loop Enable Clarification**" and "**Long Term FT Enable Criteria**" in Supporting Tables.)	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.
					EGR Diag. Catalyst Diag. Post O2 Diag. Device Control EVAP Diag. No active DTC:	Intrusive Test Not Active Intrusive Test Not Active Intrusive Test Not Active Not Active Large Leak Diagnostic (P0455) Not Active IAC_SystemRPM_FA MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR System FA EvapExcessPurgePsbl_FA Ethanol Composition Sensor FA FuelInjectorCircuit_FA EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit_FA MAP_EngineVacuumStatus AmbPresDfltdStatus TC_BoostPresSnsrFA O2S_Bank_2_Sensor_1_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel System Too Rich Bank 2	P0175	Determines if the fuel control system is in a rich condition, based on the filtered long-term fuel trim metric.A normally operating system operates centered around long-term fuel trim metric of 1.0. For rich conditions less fuel trim is required therefor values < 1.0 indicate a rich condition. There are two methods to determine a Rich fault. They are Passive and Intrusive. A Passive Test decision can be made up until the time that purge is first enabled. From that point forward, rich faults can only be detected by turning purge off intrusively. If during this period of time the filtered long-term fuel trim metric exceeds the threshold a fault will be set. In addition to the long-term fuel trim limit, the short-term fuel trim metric can be monitored and the fault sets once both threshold values are exceeded. The short-	**Passive Test:** The filtered Non-Purge Long Term Fuel Trim metric AND The filtered Short Term Fuel Trim metric (Note: any value above 1.05 effectively nullifies the short-term fuel trim criteria) ********** **Intrusive Test:** For 3 out of 5 intrusive segments, the filtered Purge Long Term Fuel Trim metric AND The filtered Non-Purge Long Term Fuel Trim metric AND The filtered Short Term Fuel Trim metric (Note: any value above1.05 effectively nullifies the short-term fuel trim criteria)	<= 0.705 <= 2.000 **********	**********	Secondary Parameters and Enable Conditions are identical to those for P0174, with the exception that fuel level is not considered. ********** <= 100.00 % Intrusive Test is inhibited when Purge Vapor percentage is greater than this threshold. (Note: values greater than 50% indicate the Purge Vapor Fuel requirement is not being used) A minimum number of accumlated Fuel Trim Data samples are required to adequately learn a correct Purge Vapor Fuel value. See the table **Minimum Non-Purge Samples for Purge (Vapor Fuel)** for the Purge Off cells used to validate the Purge Vapor Fuel parameter. If the accumulated purge volume is > 0.0 grams,	Frequency: 100 ms Continuous Loop ********** **Segment Definition:** Segments can last up to 30 seconds and are separated by the lesser of 20.0 seconds of purge-on time or enough time to purge 16 grams of vapor. A maximum of 5 completed segments or 20 attempts are allowed for each intrusive test. After an intrusive test report is completed, another intrusive test cannot occur for 300 seconds to allow sufficient time to	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		term fuel trim metric is only monitored on programs that have acceptable emissions when the long-term fuel metric reaches its full authority. Once purge is enabled if the filtered Purge Long Term Fuel Trim metric > 0.710 , 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. Performing intrusive tests too frequently may also affect EVAP and EPAIII emissions, and the execution frequency of other diagnostics. This is why the intrusive test is operated over several		0.705 and the short-term fuel trim metric must be > 0.000 to repass the diagnostic. The intrusive test will be enabled at long-term fuel metric values < 0.71 until the diagnostic repasses after a failure.		the intrusive test will not be inhibited even if Purge Vapor Fuel is > 100.0 %. (Note: values greater than 50% indicate the Purge Vapor Fuel requirement is not being used)	purge excess vapors from the canister. During this period, fuel trim will pass if the filtered Purge Long Term Fuel Trim metric > 0.710 for at least 200.0 seconds, indicating that the canister has been purged.	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	For this application the "type" cal (KeTHMG_b_TMS_ElecThstEquipped) = 0 If the type cal is equal to one, the application has an electrically heated t-stat, if equal to zero the the application has an non heated t-stat. See appropiate section below. ********** Type cal above = 0 (non - heated t-stat) == == == ==		No Active DTC's	ECT_Sensor_Ckt_FA VehicleSpeedSensor_FA OAT_PtEstFiltFA THMR_AWP_AuxPumpFA THMR_AHV_FA THMR_SWP_Control_FA EngineTorqueEstInaccurate ECT_Sensor_Perf_FA THMR_SWP_NoFlow_FA THMR_SWP_FlowStuckOn_FA	30 failures out of 60 samples 1 sample / second Continuous	Type B, 2 Trips
					Engine Runtime	≥ 30.0 seconds		
			Engine coolant temperature	≤ 65.0 Deg C	Distance traveled this key cycle	≥ 1.2 km		
			**********		Ambient air pressure	≥ 55.0 kPa		
			Type cal above = 1 (Electrically heated t-stat) == == == ==		Ambient air temperature	≥ -9.0 Deg C		
					**********			
			Engine coolant temperature	≤ 78.5 Deg C	Engine coolant temperature At least once during the key cycle			
					Type 0 (non-heated t-stat)	≥ 66 Deg C		
					Type 1 (Electrically heated T-stat)	≥ 79.5 to 94.5 Deg C		
					**********			
					Heat to coolant	≥ 1.5 kW		
					DFCO time	≤ 23.0 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Thermostat duty cycle RPM Active Fuel Management is not in	≤ 20.0 % ≤ 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 5 Open Circuit - (SIDI)	P0205	Controller specific output driver circuit diagnoses Injector 5 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. Or Controller specific output driver circuit diagnoses Injector 5 high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. Or Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground >= 200 KOhms impedance between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Sec P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 6 Open Circuit - (SIDI)	P0206	Controller specific output driver circuit diagnoses Injector 6 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. Or Controller specific output driver circuit diagnoses Injector 6 high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. Or Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground >= 200 KOhms impedance between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 7 Open Circuit - (SIDI)	P0207	Controller specific output driver circuit diagnoses Injector 7 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. Or Controller specific output driver circuit diagnoses Injector 7 high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. Or Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground >= 200 KOhms impedance between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 8 Open Circuit - (SIDI)	P0208	Controller specific output driver circuit diagnoses Injector 7 low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds. Or Controller specific output driver circuit diagnoses Injector 7 high sided driver for an open circuit failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit. Or Voltage measurement outside of controller specific acceptable range during driver on state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground >= 200 KOhms impedance between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbo/Super Charger Intercooler Coolant Pump Control Circuit If Intercooler pump are present	P023A	Controller specific output driver circuit diagnostic, diagnosing the 'charge air cooler pump' low sided driver for an open circuit failure, when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	≥ 200 K Ω impedance between output and controller ground	Diagnostic enabled ********** Powertrain relay voltage Ignition run crank voltage ********** Engine does not crank Diagnostic system not disabled	True ********** >= 11.0 Volts > 5.00 Volts **********	50 failures out of 63 samples 100ms / sample	Type A, 1 Trips Note: In certain controllers P023B may also set turbo/ super charger intercooler coolant pump control circuit low

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbo/Super Charger Intercooler Coolant Pump Control Circuit Low If Intercooler pump are present	P023B	Controller specific output driver circuit diagnostic, diagnosing the 'charge air cooler pump' low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground. In certain controllers this diagnosis runs only when the HWIO-output is driven by the application S/W.	≤ 0.5 Ω impedance between output and controller ground	Diagnostic enabled ********** Powertrain relay voltage Ignition run crank voltage ********** Engine does not crank Diagnostic system not disabled	True ********** >= 11.0 Volts > 5.00 Volts **********	50 failures out of 63 samples 100ms / sample	Type A, 1 Trips Note: In certain controllers P023A may also set turbo/ super charger intercooler coolant pump control circuit

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbo/Super Charger Intercooler Coolant Pump Control Circuit High If Intercooler pump are present	P023C	Controller specific output driver circuit diagnostic, diagnosing the 'charge air cooler pump' low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power. In certain controllers this diagnosis runs only when the HWIO-output is driven by the application S/W.	≤ 0.5 Ω impedance between output and controller power	Diagnostic enabled ********** Powertrain relay voltage Ignition run crank voltage ********** Engine does not crank Diagnostic system not disabled	True ********** >= 11.0 Volts > 5.00 Volts **********	50 failures out of 63 samples 100ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 5 Low side circuit shorted to ground (SIDI)	P0273	Controller specific output driver circuit diagnoses Injector 5 low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	 <= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 5 Low side circuit shorted to power (SIDI)	P0274	Controller specific output driver circuit diagnoses Injector 5 low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 6 Low side circuit shorted to ground (SIDI)	P0276	Controller specific output driver circuit diagnoses Injector 6 low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	 <= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 6 Low side circuit shorted to power (SIDI)	P0277	Controller specific output driver circuit diagnoses Injector 6 low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 7 Low side circuit shorted to ground (SIDI)	P0279	Controller specific output driver circuit diagnoses Injector 7 low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	 <= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 7 Low side circuit shorted to power (SIDI)	P0280	Controller specific output driver circuit diagnoses Injector 7 low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 8 Low side circuit shorted to ground (SIDI)	P0282	Controller specific output driver circuit diagnoses Injector 8 low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	 <= 1 volt between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 8 Low side circuit shorted to power (SIDI)	P0283	Controller specific output driver circuit diagnoses Injector 8 low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Random Misfire Detected	P0300	These DTC's will determine if a random or a cylinder specific misfire is occurring by monitoring various terms derived from crankshaft velocity. The rate of misfire over an interval is compared to both emissions and catalyst damaging thresholds. The pattern of crankshaft acceleration after the misfire is checked to differentiate between real misfire and other sources of crank shaft noise. Emissions Neutral Default Action: If consumed Emissions Neutral Default DTCs from other subsystems are set: Ignore Rough Road, Traction, Stability, and Antilock brake signals. If default action not activated, Misfire Monitor could complete less frequently or inaccurately. Default Action Latched for duration of Trip Default Action: If Misfire P030x sets on some hybrid applications, the isolation damper	Crankshaft Deceleration Value(s) vs. Engine Speed and Engine load The equation used to calculate deceleration value is tailored to specific vehicle operating conditions. The selection of the equation used is based on the 1st single cylinder continuous misfire threshold tables encountered that are not max of range. If all tables are max of range at a given speed/load, that speed load region is an ***Undetectable region*** see Algorithm Description Document for additional details. SINGLE CYLINDER CONTINUOUS MISFIRE((Medres_Decel Medres_Jerk OR (Medres_Decel Medres_Jerk OR (Lores_Decel Lores_Jerk OR (Lores_Decel Lores_Jerk OR RevBalanceTime)	- see details of thresholds on Supporting Tables Tab > **RufSCD_Decel** AND > **RufSCD_Jerk)** > **SCD_Decel** AND > **SCD_Jerk)** > **RufCyl_Decel** AND > **RufCyl_Jerk)** > **CylModeDecel** AND > **CylModeJerk)** >**RevMode_Decel**	Engine Run Time Engine Coolant Temp Or If ECT at startup Then System Voltage + Throttle delta - Throttle delta Early Termination option: (used on plug ins that may not have enough engine run time at end of trip for normal interval to complete.)	> 2 crankshaft revolution "ECT" If OBD Max Coolant Achieved = FALSE -9 ºC < ECT Or if OBD Max Coolant Achieved = TRUE -9 ºC < ECT < 130 ºC < -9 ºC If OBD Max Coolant Achieved = FALSE 21 ºC < ECT If OBD Max Coolant Achieved = TRUE 21 ºC < ECT < 130 ºC 9.00 < volts < 32.00 < 40.00 % per 25 ms < 40.00 % per 25 ms Not Enabled	Emission Exceedence = any (5) failed 200 rev blocks out of (16) 200 rev block tests Failure reported for (1) Exceedence in 1st (16) 200 rev block tests, or (4) Exceedences thereafter. OR when Early Termination Reporting = Enabled and engine rev > 1,000 revs and < 3,200 revs at end of trip	Type B, 2 Trips (Mil Flashes with Catalyst damage level of Misfire)
Cylinder 1 Misfire Detected	P0301							
Cylinder 2 Misfire Detected	P0302							
Cylinder 3 Misfire Detected	P0303							
Cylinder 4 Misfire Detected	P0304							
Cylinder 5 Misfire Detected	P0305							
Cylinder 6 Misfire Detected	P0306							
Cylinder 7 Misfire Detected	P0307							
Cylinder 8 Misfire Detected	P0308							

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.	********** **This Feature not used on Gasoline engines** Combustion Modes that force selection of Idle Tables ********** Other patterns of misfire use adjustments to the single cylinder continuous misfire threshold tables: RANDOM MISFIRE Use random misfire thresholds If no misfire for (Medres_Decel AND Medres_Jerk) OR (Medres_Decel AND Medres_Jerk) OR (Lores_Decel AND Lores_Jerk)	********** **This Feature not used on Gasoline engines** **CombustModeIdleTbl** in Supporting Tables ********** > 3 Engine Cycles > **RufSCD_Decel** * **Random_SCD_Decel** >**RufSCD_Jerk** * **Random_SCD_Jerk** > **SCD_Decel** * **Random_SCD_Decel** > **SCD_Jerk** * **Random_SCD_Jerk** > **RufCyl_Decel** * **RandomCylModDecel** > **RufCyl_Jerk** * **RandomCylModJerk**			any Catalyst Exceedence = (1) 200 rev block as data supports for catalyst damage. Catalyst Failure reported with (1 or 3) Exceedences in FTP, or (1) Exceedence outside FTP. Continuous	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			OR (Revmode Active AND (within one engine cycle: 2nd largest Lores_Decel)	> **CylModeDecel * PairCylModeDecel**				
			AND Above TRUE for))	> 50 engine cycles out of 100 engine cycles				
			BANK MISFIRE					
			Cylinders above Bank Thresholds	>= 2 cylinders				
			(Medres_Decel	> **RufSCD_Decel** * **Bank_SCD_Decel**				
			AND Medres_Jerk)	> **RufSCD_Jerk** * **Bank_SCD_Jerk**				
			OR (Medres_Decel	> **SCD_Decel** * **Bank_SCD_Decel**				
			AND Medres_Jerk)	> **SCD_Jerk** * **Bank_SCD_Jerk**				
			OR (Lores_Decel	> **RufCyl_Decel** * **BankCylModeDecel**				
			AND Lores_Jerk)	> **RufCyl_Jerk** * **BankCylModeJerk**				
			OR (Lores_Decel	> **CylModeDecel** * **BankCylModeDecel**				
			AND Lores_Jerk)	> **CylModeJerk** * **BankCylModeJerk**				

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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 CylBeforeDeacCyl_Jerk)	> **CylModeDecel * ClyAfterAFM_Decel** > **CylModeJerk * CylAfterAFM_Jerk** > **CylModeDecel * CylBeforeAFM_Decel** > **CylModeJerk * ClyBeforeAFM_Jerk** > 3 Engine Cycles > **CylModeDecel * ClyAfterAFM_Decel * RandomAFM_Decl** > **CylModeJerk * CylAfterAFM_Jerk * RandomAFM_Jerk** > **CylModeDecel * CylBeforeAFM_Decel * RandomAFM_Decl** > **CylModeJerk * ClyBeforeAFM_Jerk * RandomAFM_Jerk** - see details on Supporting Tables Tab				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Misfire Percent Emission Failure Threshold	≥ 2.21 % P0300				
			Misfire Percent Catalyst Damage	> **Catalyst_Damage_Misfire_Percentage** in Supporting Tables whenever secondary conditions are met.				
			When engine speed and load are less than the FTP cals (3) catalyst damage exceedences are allowed.	≤ 0 FTP rpm AND ≤ 0 FTP % load	(at low speed/loads, one cylinder may not cause cat damage) Engine Speed Engine Load Misfire counts	 > 1,000 rpm AND > 10 % load AND < 180 counts on one cylinder		
					Engine Speed	375 < rpm < ((Engine Over Speed Limit) - 400) OR 8,191) Engine speed limit is a function of inputs like Gear and temperature	4 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						see **EngineOverSpeedLimit** in supporting tables		
					No active DTCs:	TPS_FA EnginePowerLimited MAF_SensorTFTKO MAP_SensorTFTKO IAT_SensorTFTKO ECT_Sensor_Ckt_TFTKO 5VoltReferenceB_FA CrankSensor_TFTKO CrankSensor_FA CamLctnIntFA CamLctnExhFA CamSensorAnyLctnTFTKO AnyCamPhaser_FA AnyCamPhaser_TFTKO AmbPresDfltdStatus	4 cycle delay	
					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	7 cycle delay	
					Undetectable engine	***Undetectable region***	4 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					speed and engine load region	from Malfunction Criteria		
					Abusive Engine Over Speed	> 7,100 rpm	1,250 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	≤ 0.5 % (≤ 0.5 % in AFM) > 30 mph (> 19 mph AFM)	4 cycle delay	
					NEGATIVE TORQ AFM If deactivated cylinders appear to make power, torque is negative: DeactivatedCyl_Decel AND DeactivatedCyl_Jerk AND # of Deact Cyls Inverted	<**DeacCylInversionDecel** <**DeacCylInversionJerk** > 3 cylinders	2 cycle delay	
					EGR Intrusive test	if Active	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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Delay if PTO engaged	Enabled	4 cycle delay	
					********** **This Feature not used on Gasoline engines**	**********	**********	
					Combustion Mode	= **InfrequentRegen** value in Supporting Tables	4 cycle delay	
					Driver cranks before Wait to Start lamp extinguishes	IF TRUE	**WaitToStart** cycle delay	
					Brake Torque	> 199.99 % Max Torque	4 cycle delay	
					**********	**********	**********	
					DRIVELINE RING FILTER After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.			
					Filter Driveline ring:	> "**Ring Filter**" # of engine cycles after misfire in Supporting Tables		
					Stop filter early:	> "**Number of Normals**" # of engine cycles after misfire in Supporting Tables tab		
					ABNORMAL ENGINE SPEED OSCILLATION: (checks each "misfire" candidate in 100 engine			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 indivdual candidate deemed abnormal if number of consecutive decelerating cylinders after "misfire": (Number of decels can vary with misfire detection equation) Consecutive decels while in SCD Mode Cyl Mode Rev Mode At the end of 100 engine cycle test, the ratio of abnormal/candidate is checked to confirm if real misfire is present within the 100 engine cycles. abnormal candidates/ total candidates MISFIRE CRANKSHAFT	 > 3 % > 950 rpm > 3 mph not shifting > **Abnormal SCD Mode** > **Abnormal Cyl Mode** > **Abnormal Rev Mode** in Supporting Tables > 0.50 ratio	 discard 100 engine cycle test	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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. Typically used for checking a single misfire per engine cycle but can support some other patterns on some packages			
					Pattern Recog Enabled:	Enabled		
					Pattern Recog Enabled during Cylinder Deac	Enabled		
					Pattern Recog Enabled consecutive cyl pattrn	Enabled		
					Engine Speed Veh Speed	900 < rpm < 3,000 > 5.0 mph		
					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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					thresholds in effect at that speed and load. (CylAfter_Accel AND CylAfter_Jerk)	> Misfire_ decel ***** **1st_FireAftrMisfr_Acel** > Misfire_Jerk ***** **1st_FireAftrMisfr_Jerk** Or if AFM mode is active: > Misfire_ decel * **1stFireAftrMisAcelAFM** > Misfire_Jerk * **1stFireAfterMisJerkAFM**		
					Addtionally, the crankhaft is checked again a small calibratible number of cylinders later to see if the distrubance is still large like rough road, or has calmed down like real misfire. The size of disturbance is compared to a multiplier times the ddt_jerk value used to detect misfire at that speed and load. If there is repetitive misfire on consecutive engine cycles, the expected snap is adjusted due to the higher expected disturbance.			
					Num of Cylinders after misfire to start check of crankshaft snap	3 Cylinders		
					"misfire" recognized if: Crankshaft snap after: isolated "misfire"	< Misfire_Jerk ***** **SnapDecayAfterMisfire**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					repetative "misfire"	< Misfire_Jerk * **SnapDecayAfterMisfire * RepetSnapDecayAdjst** in Supporting Tables		
					At the end of 100 engine cycle test, the ratio of unrecog/recognized is checked to confirm if real misfire is present.			
					Ratio of Unrecog/Recog	> 0.60	discard 100 engine cycle test	
					**********	**********	**********	
					NON-CRANKSHAFT BASED ROUGH ROAD:	Enabled		
					Rough Road Source	Wheel Speed in ECM		
					**********	**********	**********	
					IF Rough Road Source = WheelSpeedInECM			
					ABS/TCS	active		
					Wheel speed noise	> **WSSRoughRoadThres**	discard 100 engine cycle test	
					VSES	active		
					AND No Emission Neutral Default Action DTCs	ABS Failed Vehicle Dynamics Control System Status Driven Wheel Rotation Status Non Driven Wheel Rotation Status		
					**********	**********	**********	
					IF Rough Road Source = "FromABS"			
					ABS/TCS	active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					RoughRoad VSES AND No Emission Neutral Default Action DTCs ********** IF Rough Road Source = "TOSS" TOSS dispersion AND No Active DTCs ********** Default Action Isolator Resonance Default Action Option ********** If Isolator Resonance Option Enabled AND Misfire P030x TFTKO	detected active ABS Failed Vehicle Dynamics Control System Status ********** >**TOSSRoughRoadThres** in supporting tables Transmission Output Shaft Angular Velocity Validity TransmissionEngagedState_FA (Auto Trans only) ClutchPstnSnsr FA (Manual Trans only) ********** Not Enabled ********** Set engine speed limits: 0 < Eng RPM < 8,000	discard 100 engine cycle test ********** discard 100 engine cycle test 4 cycle delay ********** **********	

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 (EST) output driver circuit for an Open Circuit fault. Controller specific output driver circuit diagnoses the low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	$\geq$ 30 kΩ impedance between signal and controller ground	Engine running Ignition Voltage	> 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Catalyst System Low Efficiency Bank 2	P0430	Note: The information below applies to applications that use the Decel Catalyst Monitor Algorithm Oxygen Storage. The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and O2 during lean A/F excursions to store the excess oxygen (I.e. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H2 to release this stored oxygen (I.e. Cerium Reduction). This is referred to as the Oxygen Storage Capacity, or OSC. CatMon's strategy is to "measure" the OSC of the catalyst through forced Rich (intrusive rich) and Lean (decel fuel cutoff) A/F excursions Normalized Ratio OSC Value Calculation Information and Definitions = 1. Raw OSC Calculation = (post cat O2 Resp time - pre cat O2 Resp time) 2. BestFailing OSC value from a calibration	Normalized Ratio OSC Value (EWMA filtered)	< 0.15	All enable criteria associated with P0430 can be found under P2272 - (O2 Sensor Signal Stuck Lean Bank 2 Sensor 2) Rapid Step Response (RSR) feature will initiate multiple tests: If the difference between current EWMA value and the current OSC Normalized Ratio value is and the current OSC Normalized Ratio value is Maximum number of RSR tests to detect failure when RSR is enabled. MAF Predicted catalyst temperature Front O2 Sensor or Front WRAF Rear O2 Sensor General Enable Criteria In addition to the p-codes listed under P2272, the following DTC's shall also	 > 0.48 < 0.14 12 > 2.00 g/s < 20.00 g/s < 875 ° C > 790.00 mV or > 1.25 EQR > 790.00 mV	1 test attempted per valid decel period Minimum of 1 test per trip Maximum of 2 tests per trip Frequency: Fueling Related : 12.5 ms OSC Measurements: 100 ms Temp Prediction: 12.5ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		table (based on temp and exhaust gas flow) 3. WorstPassing OSC value (based on temp and exhaust gas flow) Normalized Ratio Calculation = (1-2) / (3-2) A Normalized Ratio of 1 essentially represents a good part and a ratio of 0 essentially represents a very bad part. Refer to the **P0430_WorstPassingOSCTableB2** and **P0430_BestFailingOSCTableB2** in Supporting Tables tab for details The Catalyst Monitoring Test is completed during a decel fuel cutoff event. This fuel cutoff event occurs following a rich instrusive fueling event initiated by the O2 Sensor Signal Stuck Lean Bank 2 Sensor 2 test (P2272). Several conditions must be met in order to execute this test. Additional conditions and their related values			not be set: For switching O2 sensors: For WRAF O2 sensors:	 O2S_Bank_1_Sensor_1_FA O2S_Bank_1_Sensor_2_FA O2S_Bank_2_Sensor_1_FA O2S_Bank_2_Sensor_2_FA WRAF_Bank_1_FA WRAF_Bank_2_FA **P0430_WorstPassingOSCTableB2** **P0430_BestFailingOSCTableB2**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		are listed in the "Secondary Parameters" and "Enable Conditions" section of this document for P2272 (O2 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 IAT Sensor - with Fuel Tank Zone 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 DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 3 additional consecutive trips.	> 0.60 (EWMA Fail Threshold), ≤ 0.35 (EWMA Re-Pass Threshold)	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 at end of drive Estimate of Ambient Air Temperature Valid ***************************** Conditions for Estimate of	10 % ≤ Percent ≤ 90 % ≥ 600 seconds ≥ 5.0 miles ≥ 63 °C = TRUE) ≥ 70 kPa ≥ 10.0 miles ≤ refer to **P0442 Engine Off Time Before Vehicle Off Maximum as a Function of Estimated Ambient Temperature** in Supporting Tables. ≥ 8 hours ≥ 8 hours 0 °C≤Temperature≤ 35 °C *****************************	Once per trip, during hot soak (up to 2,400 sec.). No more than 2 unsuccessful attempts between completed tests.	Type A, 1 Trips EWMA Average run length is 8 to 12 trips under normal 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 Air Temperature to be valid: 1. Cold Start Startup delta deg C (ECT-IAT) OR 2. Short Soak and Previous EAT Valid Previous time since engine off OR 3. Less than a short soak and Previous EAT Not Valid Previous time since engine off AND Vehicle Speed AND Mass Air Flow Must expire Estimate of Ambient Temperature Valid Conditioning Time. **P0442 Estimate of Ambient Temperature Valid Conditioning Time as a Function of Ign Off Time** in Supporting Tables. OR 4. Not a Cold Start and greater than a Short Soak Previous time since	≤ 8 °C ≤ 7,200 seconds ≤ 7,200 seconds ≥ 53 mph ≥ 10 g/sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					engine off AND Vehicle Speed AND Mass Air Flow Must expire maximum value in Estimate of Ambient Temperature Valid Conditioning Time. Please see **P0442 Estimate of Ambient Temperature Valid Conditioning Time as a Function of Ign Off Time** in Supporting Tables. ********** 1. High Fuel Volatility During the volatility phase, pressure in the fuel tank is integrated vs. volatility time. If the integrated pressure is then test aborts and unsuccessful attempts is incremented. This value equates to an average integrated fuel tank pressure > 1,245 Pa. Please see **P0442 Volatility Time as a Function of Estimate of Ambient Temperature** in Supporting Tables. OR 2. Vacuum Refueling Detected	> 7,200 seconds ≥ 53 mph ≥ 10 g/sec ********** < -5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					See P0454 Fault Code for information on vacuum refueling algorithm. OR 3. Fuel Level Refueling Detected See P0464 Fault Code for information on fuel level refueling. OR 4. Vacuum Out of Range and No Refueling See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for information on fuel level refueling. OR 5. Vacuum Out of Range and Refueling Detected See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for information on fuel level refueling. OR 6. Vent Valve Override Failed Device control using an off-board tool to control the vent solenoid, cannot exceed	0.50 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					during the EONV test OR 7. Key up during EONV test No active DTCs: No Active DTC's TFTKO	 MAF_SensorFA ECT_Sensor_FA IAT_SensorFA VehicleSpeedSensor_FA IgnitionOffTimeValid AmbientAirDefault FuelLevelDataFault P0443 P0446 P0449 P0452 P0453 P0455 P0458 P0459 P0498 P0499 P0496 P1001 P1005 P11FF P130F U18A2		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission (EVAP) Vent System Performance (No ELCP - Conventional EVAP Diagnostic - with Fuel Tank Zone Module (FTZM))	P0446	This DTC will determine if a restriction is present in the vent solenoid, vent filler, vent hose or EVAP canister. This diagnostic runs with normal purge control and canister vent solenoid commanded open. The diagnostic fails when the FTP sensor vacuum measurement is above a vacuum threshold before it accumulates purge volume above a threshold. The diagnostic passes when it accumulates purge volume above a threshold before the FTP sensor vacuum measurement is above a vacuum threshold.	Vent Restriction Prep Test: Vented Vacuum for OR Vented Vacuum for Vent Restriction Test: Tank Vacuum for before Purge Volume After setting the DTC for the first time, 0 liters of fuel must be consumed before setting the DTC for the second time.	 < -623 Pa 60 seconds > 1,245 Pa 60 seconds > 2,989 Pa 5 seconds ≥ 6 liters	Fuel Level System Voltage Startup IAT Startup ECT BARO No active DTCs: No Active DTC's TFTKO	10 % ≤ Percent ≤ 90 % ≥ 10.0 volts 4 °C≤Temperature≤ 35 °C ≤ 35 °C ≥ 70 kPa MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454 P0458 P0459 P0498 P0499 P1001 P1005 P11FF P130F U18A2	Once per Cold Start Time is dependent on driving conditions Maximum time before test abort is 1,400 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 Ω impedence between output and controller ground	No active DTCs:	P1005 P130F U18A2	20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0498 may also set (Vent Solenoid Short to Ground)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Tank Pressure (FTP) Sensor Circuit Low Voltage (No ELCP - Conventional EVAP Diagnostic - with Fuel Tank Zone Module (FTZM))	P0452	This DTC will detect a Fuel Tank Pressure (FTP) sensor signal that is too low out of range. The FTP sensor circuit out of range diagnostic compares the raw sensor voltage to a lower voltage threshold. It is an X out of Y diagnostic that runs continuously anytime the controller is awake. If the sensor voltage is below the lower voltage threshold, the low fail counter then increments. If the low fail counter reaches its threshold then a fail is reported for P0452 DTC. A pass is reported for P0452 DTC if the low sample counter reaches its threshold.	FTP sensor signal The normal operating range of the FTP sensor is 0.5 volts (~1245 Pa) to 4.5 volts (~ -3736 Pa).	< 0.15 volts (3.0 % of Vref or ~ 1,495 Pa)	No active DTC's:	P1001 P1005 U18A2	640 failures out of 800 samples 12.5 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Tank Pressure (FTP) Sensor Circuit High Voltage (No ELCP - Conventional EVAP Diagnostic - with Fuel Tank Zone Module (FTZM))	P0453	This DTC will detect a Fuel Tank Pressure (FTP) sensor signal that is too high out of range. The FTP sensor circuit out of range diagnostic compares the raw sensor voltage to an upper voltage threshold. It is an X out of Y diagnostic that runs continuously anytime the controller is awake. If the sensor voltage is above the upper voltage threshold, the high fail counter then increments. If the high fail counter reaches its threshold then a fail is reported for P0453 DTC. A pass is reported for P0453 DTC if the high sample counter reaches its threshold.	FTP sensor signal The normal operating range of the FTP sensor is 0.5 volts (~1245 Pa) to 4.5 volts (~ -3736 Pa).	> 4.85 volts (97.0 % of Vref or ~ -3,985 Pa)	No active DTCs:	P1001 P1005 U18A2	640 failures out of 800 samples 12.5 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission (EVAP) System Large Leak Detected (No ELCP - Conventional EVAP Diagnostic - with Fuel Tank Zone Module (FTZM))	P0455	This DTC will detect a weak vacuum condition (large leak or purge blockage) in the EVAP system. This mode checks for large leaks and blockages when proper driving conditions are met. If these conditions are met, the diagnostic commands the vent valve closed and controls the purge duty cycle to allow purge flow to purge the fuel tank and canister system while monitoring the fuel tank vacuum level. The algorithm accumulates purge flow during the test to determine a displaced purge volume as the test proceeds. If the displaced purge volume reaches a threshold before the fuel tank vacuum level reaches its passing threshold, then a large leak failure is detected. On fuel systems with fuel caps If the first failure of	Purge volume while Tank vacuum After setting the DTC for the first time, 0 liters of fuel must be consumed before setting the DTC for the second time. Weak Vacuum Follow-up Test (fuel cap replacement test) Weak Vacuum Test failed. Passes if tank vacuum Note: Weak Vacuum Follow-up Test can only report a pass.	> 11 liters ≤ 2,740 Pa ≥ 2,740 Pa	Fuel Level System Voltage BARO Purge Flow No active DTCs: No Active DTC's TFTKO If ECT > IAT, Startup temperature delta (ECT-IAT): Startup IAT Startup ECT Weak Vacuum Follow-up Test This test can run following a weak vacuum failure or on a hot restart.	10 % ≤ Percent ≤ 90 % ≥ 10.0 volts ≥ 70 kPa ≥ 2.50 % MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454 P0458 P0459 P0498 P0499 P1001 P1005 P11FF P130F U18A2 ≤ 8 °C 4 °C≤Temperature≤ 35 °C ≤ 35 °C	Once per cold start Time is dependent on driving conditions Maximum time before test abort is 1,400 seconds Weak Vacuum Follow-up Test With large leak detected, the follow-up test is limited to 0 seconds. Once the MIL is on, the follow-up test runs indefinitely.	Type B, 2 Trips

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

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 dual fuel tanks and mechanical transfer pump)	P0461	This DTC will detect a primary fuel tank level sensor stuck in-range.	1) ********** Fuel Level in Primary and Secondary Tanks Remain in an Unreadable Range too Long ********** 1a) If Deadband diagnostic subtest enabled 1b) If fuel volume in primary tank is 1c) and if fuel volume in secondary tank is 1d) and if 1b and 1c indications do not change while fuel volume consumed by engine is OR 2) ********** After Refuel Event ********** 2a) If primary tank volume change from Engine Off to next Engine On condition is 2b)then secondary tank volume change must be OR 3) ********** Fuel consumed without a Primary Fuel Level Change ********** 3a) If indicated fuel	 1a) == Enabled status 1b) ≥ 27.8 liters 1c) < 3.0 liters 1d) >= 21.8 liters 2a) >= 10.00 liters 2b) >= 3.00 liters	1a) Diagnostic Enabled 1b) Engine Operational State 2) Primary tank indicated volume @ shutdown plus 3.0 liters	1a) == True 1b) == Running 2) < 27.8 liters	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.
			volume change is 3b) while fuel consumed by the engine is	< 3 liters >= 9.6 liters				

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	This DTC will determine if the purge solenoid is leaking to engine manifold vacuum. This test checks for purge valve leaks to intake manifold vacuum such that there would always be a small amount of purge flow present. It does this by sealing the EVAP system (purge and vent valve closed) and then monitors fuel tank vacuum level. The fuel tank vacuum level should not increase. If tank vacuum increases above a threshold, a malfunction is indicated. Additional Information This diagnostic test detects purge valve leaks to intake manifold vacuum. It is not intended to detect purge valve leaks to the atmosphere which are monitored by the EONV small leak diagnostic (P0442). The purge valve leak diagnostic exists to helps service replace	Tank Vacuum for Test time	> 2,491 Pa 5 seconds ≤ refer to **P0496 Purge Valve Leak Test Engine Vacuum Test Time (Cold Start) as a Function of Fuel Level** in Supporting Tables. Test time only increments when engine vacuum ≥ 10.0 kPa.	Fuel Level System Voltage BARO Startup IAT Startup ECT Engine Off Time No active DTCs: No Active DTC's TFTKO	10 % ≤ Percent ≤ 90 % ≥ 10.0 volts ≥ 70 kPa 4 °C≤Temperature≤ 35 °C ≤ 35 °C ≥ 28,800.0 seconds MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454 P0458 P0459 P0498 P0499 P1001 P1005 P11FF P130F U18A2	Once per cold start Cold start: max time is 1,400 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 Ω impedence between output and controller ground	No active DTC's:	P1005 P130F U18A2	20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0449 may also set (Vent Solenoid Open Circuit)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 Ω impedence between output and controller power	No active DTC's:	P1005 P130F U18A2	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.
Transmission Output Speed Sensor (TOSS)	P0502	The diagnostic monitor detects no activity in the TOSS circuit due to an electrical fault, wiring fault or sensor fault. The TOSS signal is rationalized against operating conditions of the vehicle. If the vehicle is in motion, accelerator pedal, engine torque, transmission in gear, and no vehicle braking, and the TOSS signal registers below a threshold, the DTC will set.	transmission output speed raw	≤ 12 RPM	service mode $04 active diagnostic monitor enable PTO active ignition voltage (controller run crank ignition in range) engine load enable occurs when: (accelerator pedal position engine torque) engine load disable occurs when: (accelerator pedal position engine torque OR accelerator pedal position engine torque) brake pedal position brake pedal position engine speed engine speed P0503 test fail this key on if clutch pedal is enabled clutch pedal position clutch pedal position P0502 test fail this key on OR P0502 fault active DTCs not fault active	= FALSE = 1 Boolean = FALSE ≥ 11.00 volts ≥ 12.0 % ≥ 140.0 Nm ≤ 6.0 % ≤ 80.0 Nm > 6.0 % ≤ 80.0 Nm ≤ 1.9 % < 80.0 % ≥ 6,500.0 RPM ≤ 1,400.0 RPM = FALSE = 1 Boolean ≥ 89.0 % > 84.0 % = FALSE = FALSE AcceleratorPedalFailure EngineTorqueEstInaccurate	fail time ≥ 0.5 seconds 100 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 Output Speed Sensor (TOSS)	P0503	The diagnostic monitor detects an unrealistic drop in the TOSS signal due to a sudden electrical fault, wiring fault or sensor fault. The TOSS signal is rationalized against operating conditions of the vehicle. If the vehicle is in motion, accelerator pedal, engine torque, transmission in gear, and no vehicle braking, and the TOSS signal drops above a delta threshold, a fail timer is enabled. When a TOSS drop occurs it is possible to enable the P0502 fail time as well as the P0503 fail time. With both P0502 and P0503 fail timers active it is a race condition to either DTC.	ABS(raw transmssion output speed current loop - raw transmssion output speed previous loop), 25 millisecond update rate	≥ delta fail threshold RPM	service mode $04 active diagnostic monitor enable PTO active ignition voltage (controller run crank ignition in range) 4WD range current loop, update 4WD range time, reset 4WD range time when 4WD range current loop raw transmission output speed OR last valid transmision output speed before delta drop, update transmission output speed active time 25 millisecond loop to loop transmision output speed positive delta, update transmission output speed stable time P0503 fault active OR P0503 test fail this key on if shift lever position is enable: (shift lever position previous loop AND shift lever position current loop) OR shift lever position current	= FALSE = 1 Boolean = FALSE ≥ 11.00 volts ≠ 4WD range previous loop ≠ 4WD range previous loop ≥ 300.0 RPM ≥ 300.0 RPM ≤ 150.0 RPM = FALSE = FALSE = 1 Boolean = NEUTRAL = IN GEAR = IN GEAR	fail time ≥ 0.300 seconds, increment fail count, fail count ≥ 5 counts, 25 millisecond update rate 4wd range time ≥ 6.00 seconds transmission output speed active time ≥ 2.00 seconds transmission output speed stable time ≤ 2.000 seconds shift lever position stablity time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					loop, update shift lever position stablity time P0503 fault pending delta fail threshold P0503 fault pending clutch pedal position select delta fail threshold where mesaured ratio = TISS/TOSS: 1st gear mesaured ratio mesaured ratio delta fail threshold, mesaured ratio mesaured ratio delta fail threshold, 2nd gear mesaured ratio mesaured ratio delta fail threshold, mesaured ratio mesaured ratio delta fail threshold, 3rd gear mesaured ratio mesaured ratio delta fail threshold, mesaured ratio mesaured ratio delta fail threshold, 4th gear mesaured ratio mesaured ratio delta fail threshold, mesaured ratio mesaured ratio delta fail threshold, 5th gear mesaured ratio	 = TRUE = 800.0 RPM = FALSE ≥ 89.00 % ≥ 2.170 ≤ 2.370 = 1,200.0 RPM ≤ 2.170 ≥ 1.690 = 1,200.0 RPM ≥ 1.530 ≤ 1.690 = 1,200.0 RPM ≤ 1.530 ≥ 1.250 = 1,200.0 RPM ≥ 1.140 ≤ 1.250 = 1,500.0 RPM ≤ 1.140 ≥ 1.050 = 1,500.0 RPM ≥ 0.940 ≤ 1.050 = 1,500.0 RPM ≤ 0.940 ≥ 0.850 = 1,500.0 RPM ≥ 0.770		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					mesaured ratio delta fail threshold, mesaured ratio mesaured ratio delta fail threshold, 6th gear mesaured ratio mesaured ratio delta fail threshold, mesaured ratio mesaured ratio delta fail threshold, 7th gear mesaured ratio mesaured ratio delta fail threshold, otherwise delta fail threshold P0503 fault pending clutch pedal position delta fail threshold	≤ 0.850 = 1,500.0 RPM ≤ 0.770 ≥ 0.700 = 1,500.0 RPM ≥ 0.630 ≤ 0.700 = 1,500.0 RPM ≤ 0.630 ≥ 0.500 = 1,500.0 RPM ≥ 0.400 ≤ 0.500 = 1,500.0 RPM = 850.0 RPM = FALSE ≤ 84.00 % = 850.0 RPM		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Shared High Side Drive #1 Control Circuit Low (STG) - (GEN III Controllers ONLY)	P0658	Controller specific output driver circuit diagnoses the shared high sided driver # 1 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 Ω impedance between output and controller ground	Shared high side drive #1 low diag enable Powertrain relay voltage Run Crank voltage Powertrain relay state	= 1.00 >= 11.00 > 5.00 = ON	20 failures out of 25 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.
Shared High Side Drive #1 Control Circuit High (STP) - (GEN III Controllers ONLY)	P0659	Controller specific output driver circuit diagnoses the shared high sided driver # 1 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 Ω impedance between output and controller power	Shared high side drive #1 diag enable Powertrain relay voltage Run Crank voltage Powertrain relay state	= 1.00 >= 11.00 > 5.00 = ON	20 failures out of 25 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.
Two Stage Oil Pump Control Circuit Performance - One Sided	P06DD	Diagnoses the two stage oil pump is stuck. This diagnostic includes an intrusive test and a passive test. Intrusive test: The oil pump control is cycled off (high pressure) and on (low pressure) Y = 15 times at calibratable intervals. If a change in oil pressure above a calibration is not detected then the oil pressure is checked to determine if it is stuck. It takes X-out-of-Y failures to fail and set the appropriate code. Passive test: After the intrusive test passes, then a passive test will begin to run. The passive test will monitor the oil pressure changes associated with oil pump control state changes. If the passive test determines that the oil pressure change was less then desired then the intrusive test is retriggered.	<u>Fail from passing state:</u> Oil Pressure delta is less than a minimum delta pressure on a state change and the measured filtered oil pressure is above a threshold	Oil Pressure delta = ABS [Filtered Oil Pressure at beginning of state change - filtered oil pressure after 1.7 seconds] Oil Pressure delta < **P06DD_P06DE_OP_StateChangeMin** AND Filtered Oil Pressure ≥ **P06DD_P06DE_MinOilPressThresh** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_OP_StateChangeMin P06DD_P06DE_MinOilPressThresh**)	<u>Common Criteria:</u> Two Stage Oil Pump is Present Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 8,000 RPM for longer than 65,000.0 seconds) No active DTC's for diagnsotic enable: Check oil pump TFTKO as a diagnostic enable when Enabled. No active DTC's for control enable: <u>Active Criteria:</u> One Sided Performance Test = Enabled	TRUE ≥ 60.0 seconds ≥ 70.0 kPa FALSE Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA CrankSensor_FA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA Enabled : OilPmpTFTKO Enabled Fault bundles for control disable : OilPmpTFTKO EngineTorqueEstInaccurate EngOilPressureSensorFA PowertrainRelayFault CrankSensor_FA EngOilTempFA Enabled	≥ 12 errors out of 15 samples. Run once per trip or activiated by the Passive Test	Type A, 1 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	> 1.7 seconds		
					Modelled Oil Temperature within range	60.0 deg C ≤ Oil Temp ≤ 110.0 deg C		
					Filtered Engine Speed within range	1,250 RPM ≤ Filtered Engine Speed ≤ 4,000 RPM		
					Engine Torque within range	**P06DD_P06DE_MinEnableTorque_OP** ≤ Indicated Requested Engine Torque ≤ **P06DD_P06DE_MaxEnableTorque_OP** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_MinEnableTorque_OP** **P06DD_P06DE_MaxEnableTorque_OP**)		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds] ≤ 250 RPM		
					Filtered Oil Pressure within range	Filtered Engine Oil Pressure > **P06DD_P06DE_MinOilPressThresh** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_MinOilPressThresh**)		

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	65.0 kPa < ABS[**P0521_P06DD_P06DE_OP_HiStatePressure** - **P0521_P06DD_P06DE_OP_LoStatePressure**] < 125.0 kPa		
					<u>Passive Criteria:</u>			
					Active Test Passed	TRUE		
					Filtered Engine Speed within range	1,000 RPM ≤ Filtered Engine Speed ≤ 6,000 RPM		
					Modelled Oil Temperature within range	60.0 deg C ≤ Oil Temp ≤ 100.0 deg C		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.70 seconds] ≤ 1,000 RPM		
					Oil Pressure Delta within a range	Oil Pressure Delta < **P06DD_P06DE_OP_StateChangeMin** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_OP_StateChangeMin**)		
			<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	of state change - filtered oil pressure after 1.7 seconds] Oil Pressure delta < **P06DD_P06DE_OP_StateChangeMin** AND Filtered Oil Pressure ≥ **P06DD_P06DE_MinOilPressThresh** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_OP_StateChangeMin** **P06DD_P06DE_MinOilPressThresh**)	Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 8,000 RPM for longer than 65,000.0 seconds) No active DTC's for diagnsotic enable: Check oil pump TFTKO as a diagnostic enable when Enabled. No active DTC's for control enable: <u>Active Criteria:</u> One Sided Performance Test = Enabled Oil Pump in Low State Modelled Oil Temperature within range	≥ 60.0 seconds ≥ 70.0 kPa FALSE Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA CrankSensor_FA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA Enabled : OilPmpTFTKO Enabled Fault bundles for control disable : OilPmpTFTKO EngineTorqueEstInaccurate EngOilPressureSensorFA PowertrainRelayFault CrankSensor_FA EngOilTempFA Enabled > 1.7 seconds 60.0 deg C ≤ Oil Temp ≤ 110.0 deg C	or activiated by the Passive Test	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Filtered Engine Speed within range	1,250 RPM ≤ Filtered Engine Speed ≤ 4,000 RPM		
					Engine Torque within range	**P06DD_P06DE_MinEnableTorque_OP** ≤ Indicated Requested Engine Torque ≤ **P06DD_P06DE_MaxEnableTorque_OP** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_MinEnableTorque_OP** **P06DD_P06DE_MaxEnableTorque_OP**)		
					Expected Oil Pressure Delta within range	65.0 kPa < ABS[**P0521_P06DD_P06DE_OP_HiStatePressure** - **P0521_P06DD_P06DE_OP_LoStatePressure**] < 125.0 kPa		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds] ≤ 250 RPM		
					Filtered Oil Pressure within range	Filtered Engine Oil Pressure > **P06DD_P06DE_MinOilPressThresh** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_MinOilPressThresh**)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Injector Control Module (FICM) Requested MIL Illumination	P06EC	Monitors the FICM MIL request message to determine when the FICM has detected a MIL illuminating fault.	Fuel Injector Control Module Emissions-Related DTC set and module is requesting MIL	Fuel Injector Control Module Emissions-Related DTC set and module is requesting MIL		Time since power-up ≥ 3 seconds	Continuous	Type A, No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	≤ 17.88 Ohms (temperature reads greater than 150 °C)	diagnostic monitor enable P0712 fault active OR P0712 test fail this key on vehicle load for non-hybrid only: Engine speed AND Engine speed AND vehicle speed crank diag enable: igntion voltage controller run crank active: ignition voltage	= 1 Boolean = FALSE = FALSE ≥ 200.0 RPM ≤ 7,500.0 RPM ≤ 512.0 KPH ≥ 5.00 volts ≥ 9.0 volts	>= 12.00 seconds for both fail thresholds 250 millisecond update rate ≥ 5.000 seconds ≥ 5.000 seconds ≥ 25 milliseconds	Type B, 2 Trips Emissions Neutral Diagnostic – When Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Fluid Temperature Sensor Circuit High Voltage	P0713	Controller specific analog circuit diagnoses the transmission fluid temperature sensor and wiring for an open circuit or short to power failure by comparing a voltage measurement to controller specific voltage thresholds, converted to a resistance value.	circuit resistance	≥ 420,000.00 Ohms (temperature reads less than -40 °C)	diagnostic monitor enable P0713 fault active OR P0713 test fail this key on vehicle load for non-hybrid only: Engine speed AND Engine speed AND vehicle speed crank diag enable: igntion voltage controller run crank active: ignition voltage vehicle speed TCC slip speed DTCs not fault active	= 1 Boolean = FALSE = FALSE ≥ 200.0 RPM ≤ 7,500.0 RPM ≤ 512.0 KPH ≥ 5.00 volts ≥ 9.0 volts ≥ 30.0 KPH ≥ -4,096.0 RPM P0502, P0503, P0722, P0723, P077D, P0716, P0717, P07BF, P07C0	>= 80.00 seconds for both fail thresholds 250 millisecond update rate ≥ 5.000 seconds ≥ 5.000 seconds ≥ 25 milliseconds ≥ 200.0 seconds ≥ 200.0 seconds	Type B, 2 Trips Emissions Neutral Diagnostic – When Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear 6 incorrect ratio (gear shift lever position sensor rationality	P0729	Detects when the N/V gear ratio indicates 6th gear but the Gear (shift lever) Position Sensor does not indicate 6th gear	Shifter Position Sensor	≠ Gear 6	diagnostic calibration enable Gear Position Sensor learn status Ignition voltage run/crank active Engine Torque Inaccurate Engine actual torque Transmission output speed Accelerator pedal position Clutch pedal displacement If four wheel drive low AND Gear box estimated gear ratio Gear box estimated gear ratio If four wheel drive low AND Gear box estimated gear ratio Gear box estimated gear ratio The above conditions are met for DTC's not fault active	= 1 Boolean = Learned ≥ 9.00 volts = TRUE = False ≥ 50.0 Nm ≥ 120 RPM ≥ 8.0 % ≤ 10.0 % = TRUE < 5.500 ≥ 5.000 = FALSE < 0.725 ≥ 0.635 ≥ 1.500 seconds TransmissionOutputRotationalStatusValidity	fail time ≥ 1.000 seconds Once fail time is achieved, increment fail count by 1 ≥ 1 fail counts loop rate 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.
						EngineTorqueEstInaccurate ClutchPstnSnsr FA ClutchPstnSnsrNotLearned P18C4 P18C5 P18C6 P18C7 P18C8 P18CA P2771 P086A P086B P086C P086D P086F P08A8 P08A9 P08AA P08AC		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear 1 incorrect ratio (gear shift lever position sensor rationality	P0731	Detects when the N/V gear ratio indicates 1st gear but the Gear (shift lever) Position Sensor does not indicate 1st gear	Shifter Position Sensor	≠ Gear 1	diagnostic calibration enable Gear Position Sensor learn status Ignition voltage run/crank active Engine Torque Inaccurate Engine actual torque Transmission output speed Accelerator pedal position Clutch pedal displacement If four wheel drive low AND Gear box estimated gear ratio Gear box estimated gear ratio If four wheel drive low AND Gear box estimated gear ratio Gear box estimated gear ratio The above conditions are met for DTC's not fault active	= 1 Boolean = Learned ≥ 9.00 volts = TRUE = False ≥ 50.0 Nm ≥ 120 RPM ≥ 8.0 % ≤ 10.0 % = TRUE < 5.500 ≥ 5.000 = FALSE < 2.409 ≥ 2.249 ≥ 1.500 seconds TransmissionOutputRotationalStatusValidity	fail time ≥ 1.000 seconds Once fail time is achieved, increment fail count by 1 ≥ 1 fail counts loop rate 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.
						EngineTorqueEstInaccurate ClutchPstnSnsr FA ClutchPstnSnsrNotLearned P18C4 P18C5 P18C6 P18C7 P18C8 P18CA P2771 P086A P086B P086C P086D P086F P08A8 P08A9 P08AA P08AC		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear 2 incorrect ratio (gear shift lever position sensor rationality	P0732	Detects when the N/V gear ratio indicates 2nd gear but the Gear (shift lever) Position Sensor does not indicate 2nd gear	Shifter Position Sensor	≠ Gear 2	diagnostic calibration enable Gear Position Sensor learn status Ignition voltage run/crank active Engine Torque Inaccurate Engine actual torque Transmission output speed Accelerator pedal position Clutch pedal displacement If four wheel drive low AND Gear box estimated gear ratio Gear box estimated gear ratio If four wheel drive low AND Gear box estimated gear ratio Gear box estimated gear ratio The above conditions are met for DTC's not fault active	= 1 Boolean = Learned ≥ 9.00 volts = TRUE = False ≥ 50.0 Nm ≥ 120 RPM ≥ 8.0 % ≤ 10.0 % = TRUE < 5.500 ≥ 5.000 = FALSE < 1.661 ≥ 1.570 ≥ 1.500 seconds TransmissionOutputRotationalStatusValidity	fail time ≥ 1.000 seconds Once fail time is achieved, increment fail count by 1 ≥ 1 fail counts loop rate 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.
						EngineTorqueEstInaccurate ClutchPstnSnsr FA ClutchPstnSnsrNotLearned P18C4 P18C5 P18C6 P18C7 P18C8 P18CA P2771 P086A P086B P086C P086D P086F P08A8 P08A9 P08AA P08AC		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear 3 incorrect ratio (gear shift lever position sensor rationality	P0733	Detects when the N/V gear ratio indicates 3rd gear but the Gear (shift lever) Position Sensor does not indicate 3rd gear	Shifter Position Sensor	≠ Gear 3	diagnostic calibration enable Gear Position Sensor learn status Ignition voltage run/crank active Engine Torque Inaccurate Engine actual torque Transmission output speed Accelerator pedal position Clutch pedal displacement If four wheel drive low AND Gear box estimated gear ratio Gear box estimated gear ratio If four wheel drive low AND Gear box estimated gear ratio Gear box estimated gear ratio The above conditions are met for DTC's not fault active	= 1 Boolean = Learned ≥ 9.00 volts = TRUE = False ≥ 50.0 Nm ≥ 120 RPM ≥ 8.0 % ≤ 10.0 % = TRUE < 5.500 ≥ 5.000 = FALSE < 1.258 ≥ 1.168 ≥ 1.500 seconds TransmissionOutputRotationalStatusValidity	fail time ≥ 1.000 seconds Once fail time is achieved, increment fail count by 1 ≥ 1 fail counts loop rate 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.
						EngineTorqueEstInaccurate ClutchPstnSnsr FA ClutchPstnSnsrNotLearned P18C4 P18C5 P18C6 P18C7 P18C8 P18CA P2771 P086A P086B P086C P086D P086F P08A8 P08A9 P08AA P08AC		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear 4 incorrect ratio (gear shift lever position sensor rationality	P0734	Detects when the N/V gear ratio indicates 4th gear but the Gear (shift lever) Position Sensor does not indicate 4th gear	Shifter Position Sensor	≠ Gear 4	diagnostic calibration enable Gear Position Sensor learn status Ignition voltage run/crank active Engine Torque Inaccurate Engine actual torque Transmission output speed Accelerator pedal position Clutch pedal displacement If four wheel drive low AND Gear box estimated gear ratio Gear box estimated gear ratio If four wheel drive low AND Gear box estimated gear ratio Gear box estimated gear ratio The above conditions are met for DTC's not fault active	= 1 Boolean = Learned ≥ 9.00 volts = TRUE = False ≥ 50.0 Nm ≥ 120 RPM ≥ 8.0 % ≤ 10.0 % = TRUE < 5.500 ≥ 5.000 = FALSE < 1.050 ≥ 0.960 ≥ 1.500 seconds TransmissionOutputRotationalStatusValidity	fail time ≥ 1.000 seconds Once fail time is achieved, increment fail count by 1 ≥ 1 fail counts loop rate 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.
						EngineTorqueEstInaccurate ClutchPstnSnsr FA ClutchPstnSnsrNotLearned P18C4 P18C5 P18C6 P18C7 P18C8 P18CA P2771 P086A P086B P086C P086D P086F P08A8 P08A9 P08AA P08AC		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear 5 incorrect ratio (gear shift lever position sensor rationality	P0735	Detects when the N/V gear ratio indicates 5th gear but the Gear (shift lever) Position Sensor does not indicate 5th gear	Shifter Position Sensor	≠ Gear 5	diagnostic calibration enable Gear Position Sensor learn status Ignition voltage run/crank active Engine Torque Inaccurate Engine actual torque Transmission output speed Accelerator pedal position Clutch pedal displacement If four wheel drive low AND Gear box estimated gear ratio Gear box estimated gear ratio If four wheel drive low AND Gear box estimated gear ratio Gear box estimated gear ratio The above conditions are met for DTC's not fault active	= 1 Boolean = Learned ≥ 9.00 volts = TRUE = False ≥ 50.0 Nm ≥ 120 RPM ≥ 8.0 % ≤ 10.0 % = TRUE < 5.500 ≥ 5.000 = FALSE < 0.868 ≥ 0.778 ≥ 1.500 seconds TransmissionOutputRotationalStatusValidity	fail time ≥ 1.000 seconds Once fail time is achieved, increment fail count by 1 ≥ 1 fail counts loop rate 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.
						EngineTorqueEstInaccurate ClutchPstnSnsr FA ClutchPstnSnsrNotLearned P18C4 P18C5 P18C6 P18C7 P18C8 P18CA P2771 P086A P086B P086C P086D P086F P08A8 P08A9 P08AA P08AC		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear 7 incorrect ratio (gear shift lever position sensor rationality	P076F	Detects when the N/V gear ratio indicates 7th gear but the Gear (shift lever) Position Sensor does not indicate 7th gear	Shifter Position Sensor	≠ Gear 7	diagnostic calibration enable Gear Position Sensor learn status Ignition voltage run/crank active Engine Torque Inaccurate Engine actual torque Transmission output speed Accelerator pedal position Clutch pedal displacement If four wheel drive low AND Gear box estimated gear ratio Gear box estimated gear ratio If four wheel drive low AND Gear box estimated gear ratio Gear box estimated gear ratio The above conditions are met for DTC's not fault active	= 1 Boolean = Learned ≥ 9.00 volts = TRUE = False ≥ 50.0 Nm ≥ 120 RPM ≥ 8.0 % ≤ 10.0 % = TRUE < 5.500 ≥ 5.000 = FALSE < 0.503 ≥ 0.414 ≥ 1.500 seconds TransmissionOutputRotationalStatusValidity	fail time ≥ 1.000 seconds Once fail time is achieved, increment fail count by 1 ≥ 1 fail counts loop rate 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.
						EngineTorqueEstInaccurate ClutchPstnSnsr FA ClutchPstnSnsrNotLearned P18C4 P18C5 P18C6 P18C7 P18C8 P18CA P2771 P086A P086B P086C P086D P086F P08A8 P08A9 P08AA P08AC		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reverse Inhibit Control Circuit Open (Manual Transmission Only)	P0801	Detects an open in the reverse inhibit control circuit. This diagnostic reports the DTC when an open circuit is present. Monitoring occurs when the engine speed is above a calibrated value.	Reverse inhibit control open circuit	Controller internal diagnostic	Reverse inhibit control open circuit diagnostic enabled Run/Crank Run/Crank Voltage Engine Speed	= 1.00 = TRUE Voltage ≥ 9 volts > 250 RPM	20 failures out of 25 samples 250 ms / sample	Type C, SVS one trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Skip Shift Solenoid Control Circuit	P0803	Controller specific skip shift solenoid control circuit diagnoses the skip shift solenoid and wiring for an open circuit fault by comparing a voltage measurement to controller specific voltage thresholds.	skip shift solenoid control circuit impedance	≥ 200 K Ω impedance between signal and controller ground	service mode $04 active diagnostic monitor enable calibration controller ignition run/ crank active igntion run/crank voltage engine speed	= FALSE = 1 Boolean = TRUE ≥ 9.00 volts > 250 RPM	fail count ≥ 20 counts out of sample count ≥ 25 counts 250 milliseconds 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.
Upshift/Skip Shift Solenoid Control Circuit Low	P080C	Controller specific skip shift solenoid control circuit diagnoses the skip shift solenoid and wiring for for a ground short circuit fault by comparing a voltage measurement to controller specific voltage thresholds.	skip shift solenoid control circuit impedance	≤ 0.5 Ω impedance between signal and controller ground	service mode $04 active diagnostic monitor enable calibration controller ignition run/ crank active igntion run/crank voltage engine speed	= FALSE = 1 Boolean = TRUE ≥ 9.00 volts > 250 RPM	fail count ≥ 20 counts out of sample count ≥ 25 counts 250 milliseconds 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.
Upshift/Skip Shift Solenoid Control Circuit High	P080D	Controller specific skip shift solenoid control circuit diagnoses the skip shift solenoid and wiring for a short to power circuit fault by comparing a voltage measurement to controller specific voltage thresholds.	skip shift solenoid control circuit impedance	≤ 0.5 Ω impedance between signal and controller voltage source	service mode $04 active diagnostic monitor enable calibration controller ignition run/ crank active igntion run/crank voltage engine speed	= FALSE = 1 Boolean = TRUE ≥ 9.00 volts > 250 RPM	fail count ≥ 5 counts out of sample count ≥ 6 counts 250 milliseconds 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.
Reverse Inhibit Control Circuit Low (Manual Transmission Only)	P088C	Detects a short to ground in the reverse inhibit control circuit. This diagnostic reports the DTC when a short to ground is present. Monitoring occurs when the engine speed is above a calibrated value.	Reverse inhibit control circuit short low	Controller internal diagnostic	Reverse inhibit control open circuit diagnostic enabled Run/Crank Run/Crank Voltage Engine Speed	= 1.00 = TRUE Voltage ≥ 9 volts > 250 RPM	20 failures out of 25 samples 250 ms / sample	Type C, SVS one trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reverse Inhibit Control Circuit High (Manual Transmissio n Only)	P088D	Detects a short to power in the reverse inhibit control circuit. This diagnostic reports the DTC when a short to power is present. Monitoring occurs when the engine speed is above a calibrated value.	Reverse inhibit control circuit short high	Controller internal diagnostic	Reverse inhibit control open circuit diagnostic enabled Run/Crank Run/Crank Voltage Engine Speed	= 1.00 = TRUE Voltage ≥ 9 volts > 250 RPM	20 failures out of 25 samples 250 ms / sample	Type C, SVS one trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Clutch Pedal Position Sensor Circuit Range / Performance	P08A8	A Clutch Pedal position sensor range fault is detected, if Clutch Pedal Position Sensor is in a range indicative of a vehicle NOT in gear, when the vehicle is determined to be in gear. Gear determination is made by verifying that the ratio of engine RPM versus Transmission Output Speed (N/TOS) represents a valid gear. When this occurs a clutch pedal position error is measured and processed by a 1st order lag filter. When this clutch pedal position error exceeds the defined threshold, this fault code is set.	Filtered Clutch Pedal Position Error when the vehicle is determined to be in gear	> 4 %	N/TOS Ratio: Transfer Case: Vehicle speed: Engine Torque: Clutch Pedal Position: OR No Active DTCs:	Must match actual gear (i.e. vehicle in gear) Not in 4WD Low range > 5.6 MPH > **P08A8 EngTorqueThreshold Table** (see Supporting Tables) < **P08A8 ResidualErrEnableLow Table** (see Supporting Tables) > **P08A8 ResidualErrEnableHigh Table** (see Supporting Tables) ClutchPstnSnsrCktHi FA ClutchPstnSnsrCktLo FA CrankSensor_FA Transmission Output Shaft Angular Velocity Validity VehicleSpeedSensor_FA	12.5 ms loop Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Clutch Pedal Position Sensor Circuit Low	P08A9	A continuous circuit Out-of-Range Low or open fault is detected by monitoring the percent voltage range of the clutch pedal position signal. This sensor by design is dead banded at both the high and low positions. If the voltage from the sensor is below the defined threshold value for the dead banded region, a fail counter increments. When the correct ratio of fail counts to samples occurs the fault code is set.	Clutch Position Sensor Circuit	< 4 % of Vref	Engine Not Cranking System Voltage	> 9.0 Volts	400 counts out of 500 samples 12.5 ms loop Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Clutch Pedal Position Sensor Circuit High	P08AA	A continuous circuit Out-of-Range High fault is detected by monitoring the percent voltage range of the clutch pedal position signal. This sensor by design is dead banded at both the high and low positions. If the voltage from the sensor is above the defined threshold value for the dead banded region, a fail counter increments. When the correct ratio of fail counts to samples occurs the fault code is set.	Clutch Position Sensor Circuit	> 96 % of Vref	Engine Not Cranking System Voltage	> 9.0 Volts	400 counts out of 500 samples 12.5 ms loop Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Clutch Pedal Position Not Learned	P08AC	During final assembly at the manufacturing facility an initial Clutch Pedal Applied Learn is established. This Learn is used to understand the variation in the clutch fully applied position vs. the clutch pedal position. This position is then adjusted over time based on a learning algorithm in the engine controller to adjust for clutch physical wear with usage. This Diagnostic is used to detect when this Applied Learn value is outside of defined range based on the thresholds set by the diagnostic. If the Applied Learn value is outside of the range of the threshold values this fault code is set. The OBD Manufacturer's enable counter is utilized to prevent the MIL from setting during the vehicle assembly before a Position lean can be completed in the manufacturing facility.	Fully Applied Learn Position OR	< 9.0 % > 36.0 %	OBD Manufacturer's Enable Counter	= 0	250 ms loop 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 Reset Signal Message Counter Incorrect	P1000	This DTC monitors for an error in communication with the Fuel Pump Driver Control Module Reset Signal	Communication of the Alive Rolling Count or Protection Value from the FPDCM over CAN bus is incorrect for out of total samples	 >= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage And Sensor Bus Relay	= Is available >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 11.00 Volts = On (if present)	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	Communication of the Alive Rolling Count or Protection Value from the EVAP System over CAN bus is incorrect for out of total samples	>= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage And Sensor Bus Relay	= Is available >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 11.00 Volts = On (if present)	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	= 1	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	Communication of the Alive Rolling Count or Protection Value from the Fuel Control System over CAN bus is incorrect for out of total samples	>= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage And Sensor Bus Relay	= Is available >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 11.00 Volts = On (if present)	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure Sensor A / C Correlation	P10BC	Detects a performance failure in the Barometric Pressure (BARO) sensor, such as when a BARO value is stuck in range. With this monitor, the BARO sensor is compared to a redundant sensor called BARO C. If the BARO sensor value is not similar to the BARO C sensor value, then the BARO Sensor A/C Correlation diagnostic will fail.	Difference between BARO A Sensor reading and BARO C Sensor reading	> 20.0 kPa	None		320 failures out of 400 samples 1 sample every 12.5 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger/ Supercharger Bypass Valve "A" Control Circuit Shorted	P10EE	Controller specific output driver circuit diagnostic, diagnosing for the 'electric compressor recirculation valve 'A' actuator' H-bridge driver load short failure. In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	Motor driver reports a shorted circuit.		Diagnostic enabled ********** Powertrain relay voltage ********** Engine does not crank Diagnostic system not disabled	True ********** >= 11.0 Volts ********** 	80 failures out of 100 samples 12.5ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	Communication of the Fuel Level Sensor 2 Signal Message Counter from the Fuel Pump Control Module (FTZM) over CAN bus is incorrect for out of total samples	>= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage Sensor Bus Relay	= Is available >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 11.00 Volts = On (if present)	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Inlet Airflow System Performance (supercharged)	P1101	Detects a performance failure in the Manifold Pressure (MAP) sensor, Supercharger Inlet Absolute Pressure (SCIAP) sensor, Throttle Position sensor (TPS) or Mass Air Flow (MAF) sensor that cannot be uniquely identified as a failure in one individual sensor. This diagnostic can set when more than one of these sensors has a performance concern. This diagnostic is performed using the Intake Flow Rationality Diagnostic (IFRD). IFRD calculates modeled values of sensors from these four sensors. These modeled values are compared against the actual sensor values to see if they are similar. If they are similar, then the model passes. If they are not similar, then that model is considered to be failed. Certain combinations of model passes and model failures can be interpreted to be caused by a	See table **P0101, P0106, P0121, P012B, P1101: Supercharger Intake Flow Rationality Diagnostic Failure Matrix** for combinations of model failures that can set this DTC. TPS model fails when Filtered Throttle Model Error MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered MAP1 model fails when ABS(Measured MAP – MAP Model 1) Filtered MAP2 model fails when ABS(Measured MAP – MAP Model 2) Filtered SCIAP1 model fails when ABS(Measured SCIAP – SCIAP Model 1) Filtered SCIAP2 model fails when ABS(Measured SCIAP – SCIAP Model 2) Filtered	> 400 kPa*(g/s) > 30.0 grams/sec > 30.0 kPa > 30.0 kPa > 30.0 kPa > 30.0 kPa	Engine Speed Engine Speed (Coolant Temp OR OBD Coolant Enable Criteria (Coolant Temp OR OBD Max Coolant Achieve Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables.	>= 400 RPM <= 6,200 RPM >= -9 Deg C = TRUE) <= 129 Deg C = FALSE) >= -20 Deg C <= 129 Deg C >= 0.50 Modeled Air Flow Error multiplied by **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM** and **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est** MAP Model 1 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM** and	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		performance issue with the system, but no single failed sensor can uniquely be identified. In this case, the Inlet Airflow System Performance diagnostic will fail.				**P0101, P0106, P0121, P012B, P1101: Boost Residual Weight Factor based on % of Boost** MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** and **P0101, P0106, P0121, P012B, P1101: Boost Residual Weight Factor based on % of Boost** Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** SCIAP Model 1 Error multiplied by **P0101, P0106, P0121, P012B, P1101: SCIAP1 Residual Weight Factor based on RPM** and **P0101, P0106, P0121, P012B, P1101: Boost Residual Weight Factor based on % of Boost** SCIAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P1101: SCIAP2 Residual Weight Factor based on RPM**		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module 5V Reference 1 Circuit	P1176	This DTC monitors for an error in the Fuel Pump Driver Control Module 5V Reference 1 Circuit	Raw Fuel Pump Driver Control Module 5V Reference 1 is or Raw Fuel Pump Driver Control Module 5V Reference 1 is or Absolute difference of the filtered Fuel Pump Driver Control Module 5V Reference 1 and Raw Fuel Pump Driver Control Module 5V Reference 1 is For a non-continuous failure of out of For a continuous failure of	> 92.25 Percent < 87.75 Percent > 0.90 Percent 40.00 counts 80.00 counts 0.20 seconds	Diagnostic is enabled Run/Crank Ignition Voltage U0076 PT Sensor Bus Relay Communication with the Fuel Tank Zone Module is not lost	1.00 (1 indicates enabled) >= 11.00 Volts Is not active Commanded on (if present)	Executes in 12.5ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit	P1178	This DTC monitors for an error in the Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit	Raw Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit is or Raw Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit is or Absolute difference of the filtered Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit and Raw Fuel Pump Driver Control Module Fuel Level Sensor 1 Internal Supply Circuit is For a non-continuous failure of out of For a continuous failure of	> 92.25 Percent < 87.75 Percent > 0.90 Percent 40.00 counts 80.00 counts 0.20 seconds	Diagnostic is enabled Run/Crank Ignition Voltage U0076 PT Sensor Bus Relay Communication with the Fuel Tank Zone Module is not lost	1.00 (1 indicates enabled) >= 11.00 Volts Is not active Commanded on (if present)	Executes in 50.0ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Fuel Level Sensor 2 Internal Supply Circuit	P1179	This DTC monitors for an error in the Fuel Pump Driver Control Module Fuel Level Sensor 2 Internal Supply Circuit	Raw Fuel Pump Driver Control Module Fuel Level Sensor 2 Internal Supply Circuit is or Raw Fuel Pump Driver Control Module Fuel Level Sensor 2 Internal Supply Circuit is or Absolute difference of the filtered Fuel Pump Driver Control Module Fuel Level Sensor 2 Internal Supply Circuit and Raw Fuel Pump Driver Control Module Fuel Level Sensor 2 Internal Supply Circuit is For a non-continuous failure of out of For a continuous failure of	> 92.25 Percent < 87.75 Percent > 0.90 Percent 40.00 counts 80.00 counts 0.20 seconds	Diagnostic is enabled Run/Crank Ignition Voltage U0076 PT Sensor Bus Relay Communication with the Fuel Tank Zone Module is not lost	1.00 (1 indicates enabled) >= 11.00 Volts Is not active Commanded on	Executes in 50.0ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Command Signal Message Counter Incorrect	P11FF	This DTC monitors for an error in communication with the Fuel Pump Command Signals	Communication of the Alive Rolling Count or Protection Value from the Fuel Control System over CAN bus is incorrect for out of total samples	 >= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage And Sensor Bus Relay	= Is available >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 11.00 Volts = On (if present)	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	Communication of the Fuel Level Sensor 1 Signal Message Counter from the Fuel Pump Control Module (FTZM) over CAN bus is incorrect for out of total samples	>= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage Sensor Bus Relay	= Is available >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 11.00 Volts = On (if present)	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 5 low side circuit shorted to high side circuit	P124C	Controller specific output driver circuit diagnoses injector 5 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold	Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 6 low side circuit shorted to high side circuit	P124D	Controller specific output driver circuit diagnoses injector 6 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold	Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 7 low side circuit shorted to high side circuit	P124E	Controller specific output driver circuit diagnoses injector 7 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold	Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 8 low side circuit shorted to high side circuit	P124F	Controller specific output driver circuit diagnoses injector 8 high sided driver for a short to low sided driver failure when the output is powered on by comparing a voltage measurement to controller specific voltage threshold	Voltage measurement outside of controller specific acceptable range during driver on state indicates high sided driver for a short to low sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for high sided driver for a short to low sided driver failure.	25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Module-System Voltage Low [FPPM applications only]	P129B	Detects low voltage condition of the fuel pump power module. This diagnostic reports the DTC when the fuel pump power module input voltage drops below a calibrated value.	Input Voltage	< 7.00 volts	a) FPPM configuration KeFRPR_e_ChassisFuel PresSysType b) Diagnostic Enabled KeFRPR_b_FPPM_ BatVoltLoDiagEnbl c] Diagnostic System Disabled d] Engine Running e] FPPM Power Alive Rolling Counter Fault f] FPPM Diagnostic Info1 Received message $0D5 g] Sensed Battery Voltage [message $D5]	a) == CeFRPR_e_ECM _FPPM_Sys b) == TRUE c] <> TRUE d] == TRUE e] <> TRUE f] == TRUE g] >= 7.00 volts	64.00 failures / 80.00 samples [12.5 miilisec / sample]	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Module-System Voltage High [FPPM applications only]	P129C	Detects high voltage condition of the fuel pump power module. This diagnostic reports the DTC when the fuel pump power module input voltage exceeds a calibrated value.	Input Voltage	> 18.00 volts	a) FPPM configuration KeFRPR_e_ChassisFuel PresSysType b) Diagnostic Enabled KeFRPR_b_FPPM_ BatVoltLoDiagEnbl c] Diagnostic System Disabled d] FPPM Power Alive Rolling Counter Fault e] FPPM Diagnostic Info1 Received message $0D5 f] Sensed Battery Voltage [message $D5]	a) == CeFRPR_e_ECM _FPPM_Sys b) == TRUE c] <> TRUE d] <> TRUE e] == TRUE f] >= 7.00 volts	64.00 failures / 80.00 samples [12.5 miilisec / sample]	Type C, No SVS

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Signal Message Counter Incorrect [FPPM applications only]	P129E	To detect if the command message received as serial data from the engine control module is valid The "rolling count check" value is created by adding an appended hexadecimal calculation to the pump duty cycle command value. In order to achieve a desired fuel pressure, a hexadecimal equivalent value representing the necessary fuel pump current pulse "On" time (duty cycle as a percent value) is transmitted to the FPPM. The corresponding "check" value is transmitted as well. At the FPPM, the received duty cycle command value is used to create an expected "rolling count" value using the same calculation method as the ECM. The expected "rolling count" value calculated at the receiving power module (smart device) is compared to the transmitted "rolling count" value. If these do not match, a fault condition is reported	FPPM Received Duty Cycle Rolling Count	<> Transmitted Duty Cycle Rolling Count (ECM) (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	a) Chassis Fuel Pres Sys Type configuration selection b) Diagnostic Enabled c) FPPM Control Rolling Count Faulted d) FPPM Diagnostic data received [$0CE] e) FPPM Diagnostic Data Validity Enabled f) Diagnostic System Disabled g) Communication Faulted h) Run_Crank Ignition Switch Position Circuit Voltage j) Run_Crank Ignition Status k) Sensor Bus Relay On	a) == FCBR ECM FPPM Sys b) == TRUE c) <> True d) == TRUE e) == TRUE f) <> True g) <> True h) > 7.00 Volts j) == TRUE k) == TRUE	64 failures / 80 samples 1 sample / 12.5 millisec	Type B, 2 Trips
			FPPM Received Duty Cycle Protection Value	<> Transmitted Duty Cycle Protection Value (ECM) (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	a) Chassis Fuel Pres Sys Type configuration selection b) Diagnostic Enabled c) FPPM Control Rolling Count Faulted d) FPPM Diagnostic data received [$0CE] e) FPPM Diagnostic Data Validity Enabled f) Diagnostic System Disabled g) Communication Faulted h) Run_Crank Ignition Switch Position Circuit	a) == FCBR ECM FPPM Sys b) == TRUE c) <> True d) == TRUE e) == TRUE f) <> True g) <> True h) > 7.00 Volts	64 failures / 80 samples 1 sample / 12.5 millisec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		forward to the ECM where X/Y diagnostic counting is performed.			Voltage j) Run_Crank Ignition Status k) Sensor Bus Relay On	 j) == TRUE k) == TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Control Status Signal Message Counter Incorrect [FPPM applications only]	P12A8	To detect if the control status message transmitted as serial data from the driver control module is valid. The "rolling count check" value is created by adding an appended hexadecimal calculation to each control command value. The corresponding "check" value is transmitted to the FPPM as well as the actual command. At the FPPM, the received command value is used to create an expected "rolling count" value using the same calculation method as the ECM. The expected "rolling count" value calculated at the receiving power module (smart device) is compared to the transmitted "rolling count" value. If these do not match, a fault condition is reported forward to the ECM where X/Y diagnostic counting is performed.	FPPM Control Status Alive Rolling Count	<> ECM Control Status Alive Rolling Count (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	a) Chassis Fuel Pres Sys Type configuration selection b) Diagnostic Enabled c) FPPM Diagnostic serial data received d) Run_Crank Ignition Switch Position Circuit Voltage	a) == FCBR ECM FPPM Sys b) == TRUE c) == TRUE d) > 0.00 Volts	64 failures / 80 samples 1 sample / 12.5 millisec	Type B, 2 Trips
			FPPM Power Consumption Alive Rolling Count	<> ECM Power Consumption Alive Rolling Count (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	a) Chassis Fuel Pres Sys Type configuration selection b) Diagnostic Enabled c) FPPM Diagnostic serial data received d) Run_Crank Ignition Switch Position Circuit Voltage	a) == FCBR ECM FPPM Sys b) == TRUE c) == TRUE d) > 0.00 Volts	64 failures / 80 samples 1 sample / 12.5 millisec	
			FPPM Driver Status Alive Rolling Count	<> ECM Driver Status Alive Rolling Count (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	a) Chassis Fuel Pres Sys Type configuration selection b) Diagnostic Enabled c) FPPM Diagnostic serial data received d) Run_Crank Ignition Switch Position Circuit Voltage	a) == FCBR ECM FPPM Sys b) == TRUE c) == TRUE d) > 0.00 Volts	64 failures / 80 samples 1 sample / 12.5 millisec	
			FPPM Hardware Status Alive Rolling Count	<> ECM Hardware Status Alive Rolling Count (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	a) Chassis Fuel Pres Sys Type configuration selection b) Diagnostic Enabled c) FPPM Diagnostic serial data received d) Run_Crank Ignition Switch Position Circuit Voltage	a) == FCBR ECM FPPM Sys b) == TRUE c) == TRUE d) > 0.00 Volts	64 failures / 80 samples 1 sample / 12.5 millisec	

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	Communication of the Alive Rolling Count or Protection Value from the Fuel Pump Control Module (FTZM) over CAN bus is incorrect for out of total samples	 >= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage Sensor Bus Relay	= Is available >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 11.00 Volts = On (if present)	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.
Secondary Fuel Disable control circuit open (ECM)	P13BA	Controller specific output driver circuit diagnoses Secondary Fuel Disable control circuit for an open circuit failure when the device is disabled by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground	Run/Crank active and present for a duration and Engine Cranking	== TRUE >= 2.50 seconds == FALSE	4 failures out of 5 samples 12.5 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.
Secondary Fuel Disable control circuit shorted to power (ECM)	P13BB	Controller specific output driver circuit diagnoses Secondary Fuel Disable control circuit for a short to power failure when the device is enabled 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 Ohms impedance between signal and Run/Crank voltage	Run/Crank active and present for a duration and Engine Cranking	== TRUE >= 2.50 seconds == FALSE	4 failures out of 5 samples 12.5 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.
Secondary Fuel Disable control circuit shorted to ground (ECM)	P13BC	Controller specific output driver circuit diagnoses Secondary Fuel Disable control circuit for a short to ground failure when the device is disabled 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 Ohms impedance between signal and ground	Run/Crank active and present for a duration and Engine Cranking	== TRUE >= 2.50 seconds == FALSE	4 failures out of 5 samples 12.5 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 Level Sensor A Reference Feedback Range/ Performance	P1434	This DTC monitors for an error with the FTZM Fuel Level Sensor A Reference Feedback Range/Performance Circuit	The difference between the actual and commanded FTZM reference voltage period or The difference between the actual and commanded FTZM reference voltage pulse width error	> 25.00 ms > 1.50 ms	Diagnostic is enabled Message $2D7 is being received Reference Voltage Pulse Width Signal has been available for Reference Voltage Period Signal has been available for System Diagnostics Disabled Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	1.00 (1 indicates enabled) True >= 1.25 seconds >= 0.75 seconds False = Run >= 11.00 Volts >= 11.00 Volts	16 failed samples within 20 total samples Executes in 250ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor B Reference Feedback Range/ Performance	P143E	This DTC monitors for an error with the FTZM Fuel Level Sensor B Reference Feedback Range/Performance Circuit	The difference between the actual and commanded FTZM reference voltage period or The difference between the actual and commanded FTZM reference voltage pulse width error	> 25.00 ms > 1.50 ms	Diagnostic is enabled Message $2D7 is being received Reference Voltage Pulse Width Signal has been available for Reference Voltage Period Signal has been available for System Diagnostics Disabled Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	1.00 (1 indicates enabled) True >= 1.25 seconds >= 0.75 seconds False = Run >= 11.00 Volts >= 11.00 Volts	16 failed samples within 20 total samples Executes in 250ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Sensor Bus Relay Feedback Circuit High Voltage	P157A	This DTC checks that the Sensor Bus Relay output is not stuck high	The Sensor Bus Relay ouput is stuck high	>= KeSBRR_Cnt_SB_RlyStkHiFailThrsh within KeSBRR_Cnt_SB_RlyStkHiSmplThrsh samples	The Sensor Bus Relay output has been inactive	>= KeSBRR_t_SB_RelayCommandedOff		Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Analog Mode Switch Circuit Low	P159F	This DTC will detect an analog driver mode switch input that is too low out of range.	For button type Normal_Button Analog Mode Switch low voltage threshold % of 5V range For button type Enhanced_Button Analog Mode Switch low voltage threshold % of 5V range For button type Mulitple_Button Analog Mode Switch low voltage threshold % of 5V range	< 29.00 % < 24.30 % < 21.20 %	Vehicle mode analog switch button type	= CeDMDG_e_Enhanced_ Button	200 failures out of 250 samples 25 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Analog Mode Switch Circuit High	P15A0	This DTC will detect an analog driver mode switch input that is too high out of range.	For button type Normal_Button Analog Mode Switch high voltage threshold % of 5V range For button type Enhanced_Button Analog Mode Switch high voltage threshold % of 5V range For button type Mulitple_Button Analog Mode Switch high voltage threshold % of 5V range	 >= 94.10 % >= 94.10 % >= 95.30 %	Vehicle mode analog switch button type	= CeDMDG_e_Enhanced_ Button	200 failures out of 250 samples 25 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Analog Mode Switch Performance	P15A1	This DTC will detect an analog driver mode switch input that is in an indeterminate range.	For button type Normal_Button Analog Mode Switch indeterminate region % of 5V range For button type Enhanced_Button Analog Mode Switch indeterminate regions % of 5V range For button type Mulitple_Button Analog Mode Switch indeterminate regions % of 5V range	66.80 % ≤ % of 5 volts < 72.80 % 63.50 % ≤ % of 5 volts < 65.50 % 83.50 % ≤ % of 5 volts < 85.50 % 52.90 % ≤ % of 5 volts < 54.10 % 74.10 % ≤ % of 5 volts < 75.30 % 87.50 % ≤ % of 5 volts < 88.60 %	Vehicle mode analog switch button type	= CeDMDG_e_Enhanced_ Button	200 failures out of 250 samples 25 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Sensor Reference Voltage Status Message Counter Incorrect	P165C	This DTC monitors for an error in communication with the Sensor Reference Voltage Status Signals	Communication of the Alive Rolling Count or Protection Value from the Fuel Control System over CAN bus is incorrect for out of total samples	>= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage And Sensor Bus Relay	= Is available >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 11.00 Volts = On (if present)	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Voltage Signal Message Counter Incorrect	P167F	This DTC monitors for an error in the FTZM Battery Voltage Signal Message Counter	Communication of the Alive Rolling Count or Protection Value from the Fuel Pump Control Module (FTZM) over CAN bus is incorrect for out of total samples	 >= 8 counts >= 10 counts	Message frame All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage Sensor Bus Relay	= Is available >= 3,000.00 milliseconds = Run >= 11.00 Volts >= 11.00 Volts = On (if present)	Executes in 10ms loop.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Voltage Correlation #3	P16BC	Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage & the Powertrain Relay Ignition Voltage #2	|Run/Crank – PT Relay Ignition| >	3.00 Volts	Powertrain commanded on AND (Run/Crank voltage > Table, f(IAT). See supporting tables: **P1682_PT Relay Pull-in Run/Crank Voltage f(IAT)** OR PT Relay Ignition voltage) AND Run/Crank voltage	 > 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 3 Low Voltage - (Diesel Controllers ONLY)	P16BD	Detects low voltage in the engine controls ignition relay feedback circuit 3. This diagnostic reports the DTC when low voltage is present. Monitoring occurs when run crank voltage is above a calibrated value.	Engine controls ignition relay feedback circuit 3 low voltage	Relay voltage <= 5.00	Powertrain relay low diag enable Powertrain relay voltage Run Crank voltage Powertrain relay state	= 1.00 >= 11.00 > 9.00 = ON	5 failures out of 6 samples 1000 ms / sample	Type C, No SVS

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Sensor Bus Relay Control Circuit Open	P16D7	Detects an open circuit in the sensor bus relay circuit. This diagnostic reports the DTC when an open circuit is present. A decision is made by comparing a voltage measurement to a controller specific voltage threshold.	Voltage measurement outside of controller specific acceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	Open Circuit: ≥ 200 K Ω ohms impedance between output and controller ground	Run/Crank Voltage	Voltage ≥ 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P16D8 may also set (Sensor Bus Relay Control Circuit Low).

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Sensor Bus Relay Control Circuit Low	P16D8	This DTC checks that the Sensor Bus Relay output circuit is not shorted to ground	The Sensor Bus Relay output circuit is shorted to ground	>= KeSBRD_Cnt_RlyGshtFail within KeSBRD_Cnt_RlyGshtSmpl samples	The Sensor Bus Relay Commanded Output state	= Off		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 High	P16D9	This DTC checks that the Sensor Bus Relay output is not shorted to power	The Sensor Bus Relay output circuit is shorted to power	>= KeSBRD_Cnt_RlyPsht Fail within KeSBRD_Cnt_RlyPsht Smpl samples	The Sensor Bus Relay Commanded Output state	= On		Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Excessive Clutch Slippage - Manual Transmission	P17A2	This monitor is meant to detect the actual slipping of the mechanical clutch system. This is done through 3 types of monitor strategies, where if any one strategy shows a failure the DTC sets. The 3 monitors are as follows: **Static Slip:** If the monitor determines the drivetrain is coupled and the vehicle is moving, the monitor compares the ratio of engine speed vs. vehicle speed (N/V ratio) to determine if it matches the expected N/V ratio for a gear. If it is not in an expected N/V ratio for a gear, then a static slip fail counter tracks this event and will set this DTC when the fail counter exceeds its threshold for a given drive distance. **Slip After Shift:** In some cases (usually this can happen directly after shifting), a valid N/V Ratio is never reached due to slipping at the clutch. This strategy monitors if the clutch pedal is not at the Top of Travel (ToT)	**Static Slip:** Static Slip Detection Counter --- **Slip After Shift:** Slip After Shift Detection Counter --- **Slip in Gear:**	 > 5 --- > 4 --- 	Vehicle Speed: Drive Train Coupled* Current Gear Engine Speed / Vehicle Speed ratio --- The following for: Clutch Pedal Position Engine Torque Engine Speed / Vehicle Speed And: Vehicle Speed Engine Coolant --- Engine Speed / Vehicle	> 20.0 KPH = True Not Equal to previous Gear **P17A2 Slip Detection** > **Ratio Offset** * **P17A2 Trans Gear Static Ratio** --- > 1.2 sec Not Equal: Top of Travel > 500.0 N-m > Maximum of **P17A2 Slip Detection** (**Ratio Offset** * **P17A2 Trans Gear Static Ratio**) > 15.0 KPH > 0.0 Deg C (or OBD Coolant Enable Criteria = True) --- > 0 ratio	Slip Counters reset every 10.0 kilometers 12.5 ms loop Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		and if the vehicle is moving, the engine is providing a high level of torque, and the N/V ratio is higher than the largest N/V ratio of any gear, then the clutch is deemed to be slipping and slip after shift failing counter tracks this event and will set this DTC when the fail counter exceeds its threshold for a given drive distance. **Slip in Gear:** It is possible that a calculated N/V ratio during clutch slippage could match a given gear ratio that is not the correct ratio for the actual gear the vehicle is in. To evaluate this condition, if the vehicle is moving, the engine speed is above a threshold, and the engine is producing a high level of Torque for a calibrated amount of time, if the calculated N/V ratio moves from one gear ratio to another then slippage is detected. This will then increment the Slip in gear failing counter tracks this event and will set this DTC when the fail counter exceeds its threshold	Slip in Gear Detection Counter	> 4	Speed Drive Train Coupled* Clutch Pedal Position Engine Torque Engine Speed Vehicle Speed Current Gear ---------- **Drive Train Coupled:** Engine Coolant: Engine Estimated Torque: Engine Speed: Clutch Pedal Position If Neutral Gear info available: Neutral Gear Position: Else: Estimated Trans Gear: and Estimated Trans Gear ----------	 = True Not Equal: Top of Travel >= 500.0 N-m >= 1,200 RPM >= 15 KPH Not Equal to previous Gear ---------- > 0.0 Deg C (or OBD Coolant Enable Criteria = True) > 120.0 N-m > 1,200 RPM Not Equal to Top of Travel = False = 1 - Max Gear or Reverse (aka Not Neutral) = Not Defaulted ----------		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		for a given drive distance.			No Active DTCS:	EngineTorqueEstInaccurate ECT_Sensor_FA CrankSensor_FA VehicleSpeedSensor_FA TransActualGearValidity ClutchTopOfTravelAchievedValid		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear Position Sensor Circuit A Low	P18C4	The gear position sensor is a single component containing an X-axis and a Y-axis sensor. The gear position sensor determines the manual transmission shift lever positon based on the PWM output of the X-axis and Y-axis sensors. Controller specific Gear Position Sensor Circuit A Low diagnoses Gear Position Sensor Circuit A and wiring for an out of range low circuit fault by comparing a PWM measurement to controller specific PWM thresholds.	gear position sensor A (X-axis)raw signal AND fail enable calibration	≤ 7.0007 % duty cycle = 1 Boolean	sensor type calibration is NOT no sensor service mode $04 active transmission calibration type is manual (0 = manual, 1 = automatic) diagnostic monitor enable igntion run/crank voltage for time ignition run/crank voltage	= CeSPMR_e_GearAbsolutePositionSensor = FALSE = 0 Boolean = 1 Boolean ≥ 5.00 volts ≥ 25 milliseconds ≥ 9.00 volts	≥ 240 fail counts out of ≥ 400 sample counts 12.5 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.
Gear Position Sensor Circuit A High	P18C5	The gear position sensor is a single component containing an X-axis and a Y-axis sensor. The gear position sensor determines the manual transmission shift lever positon based on the PWM output of the X-axis and Y-axis sensors. Controller specific Gear Position Sensor Circuit A High diagnoses Gear Position Sensor Circuit A and wiring for an out of range high circuit fault by comparing a PWM measurement to controller specific PWM thresholds.	gear position sensor A (X-axis) raw signal AND fail enable calibration	≥ 91.0004 % duty cycle = 1 Boolean	sensor type calibration is NOT no sensor service mode $04 active transmission calibration type is manual (0 = manual, 1 = automatic) diagnostic monitor enable igntion run/crank voltage for time ignition run/crank voltage	= CeSPMR_e_GearAbsolutePositionSensor = FALSE = 0 Boolean = 1 Boolean ≥ 5.00 volts ≥ 25 milliseconds ≥ 9.00 volts	≥ 240 fail counts out of ≥ 400 sample counts 12.5 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.
Gear Position Sensor Circuit B Low	P18C6	The gear position sensor is a single component containing an X-axis and a Y-axis sensor. The gear position sensor determines the manual transmission shift lever positon based on the PWM output of the X-axis and Y-axis sensors. Controller specific Gear Position Sensor Circuit B Low diagnoses Gear Position Sensor Circuit B and wiring for an out of range low circuit fault by comparing a PWM measurement to controller specific PWM thresholds.	gear position sensor B (Y-axis) raw signal AND fail enable calibration	≤ 7.0007 % duty cycle = 1 Boolean	sensor type calibration is NOT no sensor service mode $04 active transmission calibration type is manual (0 = manual, 1 = automatic) diagnostic monitor enable igntion run/crank voltage for time ignition run/crank voltage	= CeSPMR_e_GearAbsolutePositionSensor = FALSE = 0 Boolean = 1 Boolean ≥ 5.00 volts ≥ 25 milliseconds ≥ 9.00 volts	≥ 240 fail counts out of ≥ 400 sample counts 12.5 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.
Gear Position Sensor Circuit B High	P18C7	The gear position sensor is a single component containing an X-axis and a Y-axis sensor. The gear position sensor determines the manual transmission shift lever positon based on the PWM output of the X-axis and Y-axis sensors. Controller specific Gear Position Sensor Circuit B High diagnoses Gear Position Sensor Circuit B and wiring for an out of range high circuit fault by comparing a PWM measurement to controller specific PWM thresholds.	gear position sensor B (Y-axis) raw signal AND fail enable calibration	≥ 91.0004 % duty cycle = 1 Boolean	sensor type calibration is NOT no sensor service mode $04 active transmission calibration type is manual (0 = manual, 1 = automatic) diagnostic monitor enable igntion run/crank voltage for time ignition run/crank voltage	= CeSPMR_e_GearAbsolutePositionSensor = FALSE = 0 Boolean = 1 Boolean ≥ 5.00 volts ≥ 25 milliseconds ≥ 9.00 volts	≥ 240 fail counts out of ≥ 400 sample counts 12.5 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.
Gear Position Sensor Range/ Performance (gear shift lever position sensor rationality	P18C8	The gear position sensor is a single component containing an X-axis and a Y-axis sensor. The gear position sensor determines the manual transmission shift lever positon based on the PWM output of the X-axis and Y-axis sensors. Detects when the Gear Position Sensor A (X-axis) and B (Y-axis), values indicate a location between shifter gates that the shifter cannot physically (mechanically) achieve.	Gear position sensor X axis PWM % duty cycle Gear position sensor Y axis PWM % duty cycle Gear position sensor X axis PWM % duty cycle Gear position sensor Y axis PWM % duty cycle Gear position sensor X axis PWM % duty cycle	≥ **P18C8 Gear position sensor range/ performance (sensor A min area A)** AND ≤ **P18C8 Gear position sensor range/ performance (sensor A max area A)** AND ≤ 30.9998 PWM % duty cycle OR ≥ **P18C8 Gear position sensor range/ performance (sensor A min area B)** AND ≤ **P18C8 Gear position sensor range/ performance (sensor A max area B)** AND ≤ 30.9998 PWM % duty cycle OR ≥ **P18C8 Gear position sensor range/ performance (sensor A min area C)** AND ≤	sensor type calibration is Gear Absolute Position Sensor service mode $04 active diagnostic monitor enable igntion run/crank voltage for time ignition run/crank voltage	= CeSPMR_e_GearAbsolutePositionSensor = FALSE = 0 Boolean ≥ 5.00 volts ≥ 25 milliseconds ≥ 9.00 volts	≥ 480 fail counts out of ≥ 800 sample counts 12.5 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.
				P18C8 Gear position sensor range/ performance (sensor A max area C) AND				
			Gear position sensor Y axis PWM % duty cycle	≤ 30.9998 PWM % duty cycle				
				OR				
			Gear position sensor X axis PWM % duty cycle	≥ **P18C8 Gear position sensor range/ performance (sensor A min area D)** AND ≤ **P18C8 Gear position sensor range/ performance (sensor A max area D)** AND				
			Gear position sensor Y axis PWM % duty cycle	≤ 63.9999 PWM % duty cycle				
				OR				
			Gear position sensor X axis PWM % duty cycle	≥ **P18C8 Gear position sensor range/ performance (sensor A min area E)** AND ≤ **P18C8 Gear position sensor range/ performance (sensor A max area E)** AND				
			Gear position sensor Y axis PWM % duty cycle	≤ 63.9999 PWM % duty cycle				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				OR ≥ **P18C8 Gear position sensor range/ performance (sensor A min area F)** AND ≤ **P18C8 Gear position sensor range/ performance (sensor A max area F)**				
			Gear position sensor X axis PWM % duty cycle					
			Gear position sensor Y axis PWM % duty cycle	≤ 63.9999 PWM % duty cycle Refer to "Transmission Supporting Tables" for details				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear Position Sensor Not Learned	P18CA	The gear position sensor is a single component containing an X-axis and a Y-axis sensor. The gear position sensor determines the manual transmission shift lever positon based on the PWM output of the X-axis and Y-axis sensors. Detects when the gear position sensor position not learned. Any offset due to hardware variation is captured when the gear position sensor X-axis and Y-axis PWM duty cycle offset is not learned during vehicle assembly or service, with the transmission shift lever in neutral position and the transmission mechanically in neutral. A non-volatile memory status bit is set when the controller service procedure has been executed to successfully learn the gear position variation. The learn values are saved in the controller non-volatile memory with the associated status bit. The status bit is reset every time a controller is	Gear Position Sensor Learn status	= FALSE set to FALSE on a controller NVM initialization after battery connect, set to TRUE when service learn procedure complete	diagnostic monitor enable manufactures enable counter sensor source calibration is NOT neutral gear sensor	= 1 Boolean = 0 Counts = CeSPMR_e_GearAbsolutePositionSensor	immediate in 12.5 millisecond loop rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		disconnected from the controller battery voltage source. After a controller battery disconnect and reconnect, with the status bit then indicating the learn values have not been learned, the DTC will set fault active.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 2 Performance (For use on vehicles with dual fuel tanks and mechanical transfer pump)	P2066	This DTC will detect a secondary fuel tank level sensor stuck in-range.	1) If Deadband diagnostic subtest Enabled AND 2a) If fuel volume in primary tank is and 2b) if fuel volume in secondary tank is and 2c) and if 2a and 2b indications do not change while fuel volume consumed by engine is	1) == Enabled status 2a) ≥ 27.8 liters 2b) < 3.0 liters 2c) >= 21.8 liters	1a) Diagnostic Enabled 1b) Engine Operational Status	1a) == True 1b) == Running	250 ms / sample	Type B, 2 Trips
			1) If Secondary sensor rationality diagnostic subtest enabled AND 2a) Volume in primary tank is 2b) and volume in secondary tank is 2c) and remains in this condition for	1) == Enabled status 2a) < 28 liters 2b) > 3 liters 2c) >= 1,800 seconds	1a) Diagnostic Enabled 1b) Engine Operational StatusEngine Running	1a) == True 1b) == Running	250 ms / sample	
			a) If indicated fuel volume change is b) while fuel consumed by the engine is	a) <= 3.00 liters b) >= 13 liters	1a) Diagnostic Enabled 1b) Engine Operational StatusEngine Running 2) Secondary tank volume [Not Empty] is	1a) == True 1b) == Running 2) ≥ 3.0 liters	250 ms / sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 2 Circuit Low Voltage (For use on vehicles with dual fuel tanks)	P2067	This DTC will detect a fuel sender stuck out-of-range low in the secondary fuel tank.	Fuel level Sender % of 5V range	< 10 % or 31.56 liters	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	100 failures out of 125 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.
Fuel Level Sensor 2 Circuit High Voltage (For use on vehicles with dual fuel tanks)	P2068	This DTC will detect a fuel level sensor stuck out-of-range high in the secondary fuel tank.	Fuel level Sender % of 5V range	> 60 % or 3.19 liters	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	100 failures out of 125 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.
Post Catalyst Fuel Trim System Too Lean Bank 2	P2098	Determines if the post catalyst O2 sensor based fuel control system is indicating a lean exhaust gas condition. If the lean condition is such that the control system utilizes all or most of its available high limit authority (high limit = 100% authority), then P2098 will set. The monitor can be calibrated to fail based on the Average Integral Offset % Authority, the Average Total Offset % Authority or both combined. The Average Total Offset metric consists of the average of the Integral Offset+ Proportional Offset. Note: When the post catalyst O2 voltage is too lean, the post catalyst O2 integral and proportional offset control is increased (positive % authority). This applies a rich bias to fuel control in an attempt to counteract the lean condition. A perfectly balanced control system (no rich or lean bias required) is represented by integral	The Average Integral Offset % Authority AND The Average Total Offset % Authority (Note: any value greater than or equal to +100% effectively nullifies the Average Total Offset % Authority criteria) High Vapor Feature: The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions are present. This HV condition is indicated when the purge valve is open AND percent vapor is >= 22 % for >= 5.0 seconds AND the % Authority metric is approaching the failure threshold. Diagnosis resumes if the purge valve is closed OR the percent vapor is <= 18 % for >= 5.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary.	>= 97.5 % >= 95.0 % If the P2098 is actively failing then the Average Integral Offset must be < 97.5 % and the Average Total Offset must be < 95.0 % for the diagnostic to report a pass.	The diagnostic is enabled during: Deceleration Idle Cruise Light Acceleration Heavy Acceleration Ambient Air Pressure Engine AirFlow Intake Manifold Pressure Induction Air Temperature Start-up Coolant Temp. PTO Intrusive diag. fuel control Ethanol Estimation in Progress O2 Heater Learned Resistance Long Term Secondary Fuel Trim Enabled for (see "Long Term Secondary Fuel Trim Enable Criteria" in Supporting Tables) High Vapor Conditions Green Cat System Condition	 No No Yes No No >= 70 kPa >= 0.0 g/s <= 10,000.0 >= 0 kPa <= 256 >= -20 deg. C <= 200 >= -20 deg. C (or OBD Coolant Enable Criteria = TRUE) Not Active Not Active Not Active = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") >= 0.1 seconds Not Present = Not Valid, Green Cat System condition is considered valid until the	Frequency: Continuous Monitoring in 100ms loop. The Integral and Total Offset % Authority metrics are sampled every 100ms and an average is calculated every 40.0 seconds (400 samples) before comparing to their respective failure thresholds.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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).			No Fault Active for: AmbientAirDefault AIR System FA Ethanol Composition Sensor FA ECT_Sensor_FA EGRValveCircuit_FA EGRValvePerformance_FA IAT_SensorFA CamSensorAnyLocationFA EvapEmissionSystem_FA EvapFlowDuringNonPurge_FA FuelTankPressureSnsrCkt_FA EvapPurgeSolenoidCircuit_FA EvapSmallLeak_FA EvapVentSolenoidCircuit_FA FuelInjectorCircuit_FA MAF_SensorFA MAF_SensorTFTKO MAP_SensorFA MAP_EngineVacuumStatus EngineMisfireDetected_FA A/F Imbalance Bank2 O2S_Bank_2_Sensor_1_FA	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.		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 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).	O2S_Bank_2_Sensor_2_FA 100 100 100 100 100		

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	Determines if the post catalyst O2 sensor based fuel control system is indicating a rich exhaust gas condition. If the rich condition is such that the control system utilizes all or most of its available low limit authority (low limit = -100% authority), then P2099 will set. The monitor can be calibrated to fail based on the Average Integral Offset % Authority, the Average Total Offset % Authority or both combined. The Average Total Offset metric consists of the average of the Integral Offset+ Proportional Offset. Note: When the post catalyst O2 voltage is too rich, the post catalyst O2 integral and proportional offset control is decreased (negative % authority). This applies a lean bias to fuel control in an attempt to counteract the rich condition. A perfectly balanced control system (no rich or lean bias required) is represented by integral	The Average Integral Offset % Authority AND The Average Total Offset % Authority (Note: any value less than or equal to -100% effectively nullifies the Average Total Offset % Authority criteria) High Vapor Feature: The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions are present. This HV condition is indicated when the purge valve is open AND percent vapor is >= 22 % for >= 5.0 seconds. Diagnosis resumes if the purge valve is closed OR the percent vapor is <= 18 % for >= 5.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary.	>= -97.5 % . >= -95.0 % If the P2099 is actively failing then the Average Integral Offset must be < -97.5 % and the Average Total Offset must be < -95.0 % for the diagnostic to report a pass.	Same as P2098	Same as P2098	Frequency: Continuous Monitoring in 100ms loop. The Integral and Total Offset % Authority metrics are sampled every 100ms and an average is calculated every 40.0 seconds (400 samples) before comparing to their respective failure thresholds.	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 5 high side circuit shorted to ground	P216B	Controller specific output driver circuit diagnoses Injector 5 high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 5 high side circuit shorted to power	P216C	Controller specific output driver circuit diagnoses Injector 5 high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 1 volt between signal and controller power	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 6 high side circuit shorted to ground	P216E	Controller specific output driver circuit diagnoses Injector 6 high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 6 high side circuit shorted to power	P216F	Controller specific output driver circuit diagnoses Injector 6 high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 1 volt between signal and controller power	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 7 high side circuit shorted to ground	P217B	Controller specific output driver circuit diagnoses Injector 7 high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 7 high side circuit shorted to power	P217C	Controller specific output driver circuit diagnoses Injector 7 high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 1 volt between signal and controller power	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 8 high side circuit shorted to ground	P217E	Controller specific output driver circuit diagnoses Injector 8 high sided driver for a short to ground failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 8 high side circuit shorted to power	P217F	Controller specific output driver circuit diagnoses Injector 7 high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 1 volt between signal and controller power	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10.00 failures out of 20.00 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Bank 2 Air-Fuel Ratio Imbalance	P219B	This monitor determines if there is an Air Fuel Imbalance in the fueling system for a cylinder on a Bank 2. Detection is based on a the pre catalyst oxygen sensor voltage. The pre catalyst 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). The observed Variance is dependant on engine speed and load and is normalized by comparing it to a known "good system" result for that speed and load, and generating a Ratio metric. The Ratio metric is calculated by selecting the appropriate threshold calibration from a 17x17 table (see Supporting Table	Filtered Ratio > The Ratio metric is calculated by selecting the appropriate threshold calibration from a 17x17 table (see Supporting Table **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.	0.75 If the diagnostic has reported a failure on the prior trip, the Filtered Ratio must fall below 0.44 in order to report a pass. This feature prevents the diagnostic from toggling between failing and passing when the Filtered Ratio remains near the initial failure threshold of 0.75 .	System Voltage Fuel Level Engine Coolant Temperature Cumulative engine run time Diagnostic enabled at Idle (regardless of other operating conditions) Engine speed range Engine speed delta during a short term sample period Mass Airflow (MAF) range Cumulative delta MAF during a short term sample period Filtered MAF delta between samples Note: first order lag filter coefficient applied to MAF = 0.050 Air Per Cylinder (APC) APC delta during short term sample period	no lower than 11.0 Volts for more than 0.2 seconds > 10.0 percent AND no fuel level sensor fault > -20 deg. C (or OBD Coolant Enable Criteria = TRUE) > 0.0 seconds No 800 to 3,750 RPM < 120 RPM 5 to 1,000 g/s < 10 g/s < 0.20 g/s 100 to 720 mg/cylinder < 75 mg/cylinder	Minimum of 1 test per trip, up to 4 tests per trip during RSR or FIR. 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, 19.92 seconds of data is required at 1000 rpm while double this time is required at 500 rpm and half this time is required at 2000 rpm. This data is collected only when enable conditions are met, and as such significantly more operating time is required than is indicated above. Generally, a report will be made within 5	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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. 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			Filtered APC delta between samples Note: first order lag filter coefficient applied to APC = 0.050 Spark Advance Throttle Area (percent of max) Intake Cam Phaser Angle Exhaust Cam Phaser Angle 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	< 5.00 percent 5 to 55 degrees 0 to 200 percent 0 to 30 degrees 0 to 30 degrees >= 0.99 >= 1.2 seconds (Please see "Closed Loop Enable Clarification" and "Long Term FT Enable Criteria" in Supporting Tables) Not active Not on	minutes of operation. For RSR or FIR, 8 tests must complete before the diagnostic can report.See P219A info	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Ratio. The range of the Filtered Ratio metric is application specific since both the emissions sensitivity and relationship between imbalance and the Variance metric are application specific. Some applications may need to command a unique cam phaser value before performing the above calculations since cam phasing has been shown to have an impact on overall signal quality. This application Does Not Use this feature.			CASE learn EGR EVAP Engine Over Speed Protection Idle speed control PTO Injector base pulse width O2 learned htr resistance Rapid Step Response (RSR): RSR will trigger if the Ratio result from the last test is AND it exceeds the last Filtered ratio by Once triggered, the filtered ratio is reset to: Fast Initial Response (FIR): FIR will trigger when an NVM reset or code clear occurs. Once triggered, the filtered ratio is reset to: No Fault Active for:	Not active Not intrusive Not intrusive Not Active Normal Not Active Above min pulse limit = Valid (the O2 heater resistance has learned since NVM reset) >= 0.51 >= 0.40 0.00 0.00 EngineMisfireDetected_FA MAP_SensorFA MAF_SensorFA ECT_Sensor_FA TPS_ThrottleAuthorityDefaulted FuelInjectorCircuit_FA AIR System FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						EvapExcessPurgePsbl_FA CamSensorAnyLocationFA FuelTrimSystemB2_FA O2S_Bank_2_Sensor_1_FA O2S_Bank_2_Sensor_2_FA WRAF_Bank_2_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Signal Stuck Lean Bank 2 Sensor 2	P2272	The P2272 diagnostic is the first in a sequence of six intrusive secondary O2 monitors which include DTCs P2272, P014A, P013C, P2273, P014B, & P013D. This DTC determines if the secondary O2 sensor is stuck in a normal lean voltage range and thereby can no longer be used for secondary O2 sensor fuel control or for catalyst monitoring. This diagnostic increases the delivered fuel while monitoring the sensor signal and the accumulated mass air flow. This fault is set if the secondary O2 sensor does not achieve the required rich voltage before the accumulated mass air flow threshold is reached.	Post O2 sensor signal AND The Accumulated mass air flow monitored during the Stuck Lean Voltage Test	< 790 mvolts > 105 grams.	No Active DTC's B2S2 DTC's Not Active this key cycle System Voltage Learned heater resistance Green O2S Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA O2S_Bank_ 1_TFTKO O2S_Bank_ 2_TFTKO P013C, P013D, P014A, P014B, P2272 or P2273 > 10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid, Green O2S condition is considered valid until the accumulated air flow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 in Supporting Tables tab. Airflow accumulation is only enabled when airflow	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						is above 22.0 grams/sec.		
					Low Fuel Condition	= False		
					Only when FuelLevelDataFault	= False		
					Pedal position	≤ 100.0 %		
					Engine Airflow	2.0 ≤ gps ≤ 20.0		
					Closed loop integral	0.74 ≤ C/L Int ≤ 1.08		
					Closed Loop Active	= TRUE (Please see "**Closed Loop Enable Clarification**" in Supporting Tables).		
					Evap	not in control of purge		
					Ethanol Estimation in Progress	= Not Active (Please see "**Ethanol Estimation in Progress**" in Supporting Tables).		
					Post fuel cell	= Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info.		
					Crankshaft Torque	< 100.0 Nm		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater (post sensor) on Time	>= 60.0 sec		
					Transmission Temp	≥ -255.0 ºC		
					Predicted Catalyst temp	500 ≤ ºC ≤ 1,000		
					Fuel State	= DFCO possible		

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 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	========== 800 ≤ RPM ≤ 2,550 750 ≤ RPM ≤ 2,600 44.7 ≤ MPH ≤ 82.0 37.3 ≤ MPH ≤ 87.0 0.95 ≤ EQR ≤ 1.10 < 110.0 Nm		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Signal Stuck Rich Bank 2 Sensor 2	P2273	The P2273 diagnostic is the fourth in a sequence of six intrusive secondary O2 monitors which include DTCs P2272, P014A, P013C, P2273, P014B, & P013D. This DTC determines if the secondary O2 sensor is stuck in a normal rich voltage range and thereby can no longer be used for secondary O2 sensor fuel control or for catalyst monitoring. This diagnostic commands fuel cut off while monitoring the sensor signal and the accumulated mass air flow. This fault is set if the secondary O2 sensor does not achieve the required lean voltage before the accumulated mass air flow threshold is reached.	Post O2 sensor signal AND The Accumulated mass air flow monitored during the Stuck Rich Voltage Test	> 100 mvolts > 20.0 grams.	No Active DTC's B2S2 DTC's Not Active this key cycle System Voltage Learned heater resistance Green O2S Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA O2S_Bank_ 1_TFTKO O2S_Bank_ 2_TFTKO P013C, P013D, P014A, P014B or P2272 > 10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid, Green O2S condition is considered valid until the accumulated air flow is greater than **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 in Supporting Tables tab. Airflow accumulation is only enabled when airflow	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure Sensor C Circuit Low (Gen III)	P227C	Detects a continuous short to ground in the Barometric Pressure (BARO) C signal circuit by monitoring the BARO C sensor output voltage and failing the diagnostic when the BARO C voltage is too low. The BARO C sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	BARO C Voltage	< 40.0 % of 5 Volt Range (This is equal to 50.9 kPa)			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.
Barometric Pressure Sensor C Circuit High (Gen III)	P227D	Detects a continuous short to power or open circuit in the Barometric Pressure (BARO) C signal circuit by monitoring the BARO C sensor output voltage and failing the diagnostic when the BARO C voltage is too high. The BARO C sensor is a pressure transducer which outputs a voltage proportional to the absolute pressure.	BARO C Voltage	> 90.0 % of 5 Volt Range (This is equal to 115.0 kPa)			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.
Barometric Pressure Sensor C Circuit Intermittent/ Erratic	P227E	Detects a noisy or erratic signal in the barometric pressure (BARO) C circuit by monitoring the BARO C sensor and failing the diagnostic when the BARO C signal has a noisier output than is expected. When the value of BARO C in kilopascals (kPa) is determined, a delta is calculated between the current reading and the previous reading. The absolute value of these deltas is summed over a number of BARO C readings. The result of this summation is called a “string length”. Since the BARO C signal is anticipated to be relatively smooth, a string length of a particular magnitude indicates a noisy or erratic BARO C signal. The diagnostic will fail if the string length is too high.	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current BARO C reading - BARO C reading from 12.5 milliseconds previous)	> 150 kPa 80 consecutive BARO C readings			4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #5 CIRCUIT Low	P2312	Diagnoses Cylinder #5 Ignition Control (EST) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	$\leq$ 100 Ω 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 (EST) output driver circuit for a Short to Power fault	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	≤ 100 Ω 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 Low	P2315	Diagnoses Cylinder #6 Ignition Control (EST) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	$\leq$ 100 Ω 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 (EST) output driver circuit for a Short to Power fault	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	≤ 100 Ω 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 Low	P2318	Diagnoses Cylinder #7 Ignition Control (EST) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	$\leq$ 100 Ω 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 (EST) output driver circuit for a Short to Power fault	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	≤ 100 Ω 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 Low	P2321	Diagnoses Cylinder #8 Ignition Control (EST) output driver circuit for a Short to Ground fault. Controller specific output driver circuit diagnoses the low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	$\leq$ 100 Ω 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 (EST) output driver circuit for a Short to Power fault	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	≤ 100 Ω 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.
Turbocharger/ Supercharger Bypass Valve "A" Position Sensor Performance	P23AA	This DTC indicates a position performance failure and is set, when the position error is too high for a certain time. In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	Absolut Valve Position Error for at least	> 25.00 % >= 1.00 s	Diagnostic enabled ********** No active DTCs: ********** Valve speed for at least ********** Engine does not crank Diagnostic system not disabled Valve operation not in 'Anti Sticking' Valve Sate is 'Opening' or 'Closing'	True ********** CRAR_b_PstnSnsrFA ********** >= -10.00 Pct/s <= 10.00 Pct/s >= 1.00 s **********	10 failures out of 14 samples 6.25ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Performance Traction Torque & Speed Request Circuit	P2548	Determines if torque and/or speed request from the EBTCM is valid	Protection error - Serial Communication message ($1C8/$237) 2's complement not equal Torque Request Speed Request OR Rolling count error - Serial Communication message ($1C8/$237) rolling count index value	 Message <> two's complement of message Message <> two's complement of message Message <> previous message rolling count value + one	Diagnostic Status Run/Crank Active Ignition Voltage No Serial communication loss to EBTCM (U0121)	Enabled > 0.50 seconds > 6.41 volts No loss of communication	Fail Threshold: >= 10 failures out of 20 samples Pass Threshold: >= 10 samples during key cycle. OR Fail Threshold >= 6 Rolling count errors out of 10 samples Performed on every received message	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Camshaft Position Signal Output Circuit Low	P2615	Controller specific output driver circuit diagnoses the camshaft output low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.	Short to ground: <= 0.5 Ohms impedance between signal and controller ground Open Circuit: >= 200 K Ohms impedance between signal and controller ground	Powertrain Relay Voltage Engine is not cranking Camshaft Position Output is commanded high	>= 11.0 Volts	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips Note: In certain controllers P2614 may also set (Camshaft Position Signal Output Circuit / Open)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Camshaft Position Signal Output Circuit High	P2616	Controller specific output driver circuit diagnoses the camshaft position output low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.	Short to power: <= 0.5 Ohms impedance between signal and controller power	Powertrain Relay Voltage Engine is not cranking Camshaft Position Output is commanded low	>= 11.0 Volts	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.
Crankshaft Position Signal Output Circuit Low	P2618	Controller specific output driver circuit diagnoses the crankshaft position output low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure.	Short to ground: <= 0.5 Ohms impedance between signal and controller ground Open Circuit: >= 200 K Ohms impedance between signal and controller ground	Powertrain Relay Voltage Engine is not cranking Crankshaft Position Output is commanded high	>= 11.0 Volts	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips Note: In certain controllers P2617 may also set (Crankshaft Position Signal Output Circuit / Open)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position Signal Output Circuit High	P2619	Controller specific output driver circuit diagnoses the crankshaft position output low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure.	Short to power: <= 0.5 Ohms impedance between signal and controller power	Powertrain Relay Voltage Engine is not cranking Crankshaft Position Output is commanded low	>= 11.0 Volts	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.
Fuel Pump 2 Flow Insufficient (For use on vehicles with dual fuel tanks and mechanical transfer pump)	P2636	This DTC detects if there is insufficient fuel flow from the secondary tank to the primary tank.	a) If primary tank volume indication is b) and if secondary tank volume indication is c) and if fuel level volume zone indication change is d) while accumulated time with transfer pump On is	a) < 28 liters b) > 3 liters c) <> True d) >= 1,800 seconds	a) Diagnostic Enabled b) Secondary Tank Transfer Pump Commanded On c) Device Control Active d) Fuel volume in secondary tank e) Communication Faults Active f) Fuel Level Data Available	a) == True b) == True c) <> True d) < 10 liters e) <> True f) == True	1,800.00 seconds	Type C, No SVS Not "Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Shared High Side Drive #2 Control Circuit Low (STG) - (GEN III Controllers ONLY)	P2670	Controller specific output driver circuit diagnoses the shared high sided driver # 2 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 Ω impedance between output and controller ground	Shared high side drive #2 low diag enable Powertrain relay voltage Run Crank voltage Powertrain relay state	= 1.00 >= 11.00 > 5.00 = ON	20 failures out of 25 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.
Shared High Side Drive #2 Control Circuit High (STP) - (GEN III Controllers ONLY)	P2671	Controller specific output driver circuit diagnoses the shared high sided driver # 2 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 Ω impedance between output and controller power	Shared high side drive #2 diag enable Powertrain relay voltage Run Crank voltage Powertrain relay state	= 1.00 >= 11.00 > 5.00 = ON	20 failures out of 25 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.
Chassis Control Module 1 Requested MIL Illumination	P26C8	Monitors the Chassis Contol Module 1 MIL request message to determine when the Chassis Control Module 1 has detected a MIL illuminating fault.	Chassis Control Module 1 Emissions-Related DTC set and module is requesting MIL	Chassis Control Module 1 Emissions-Related DTC set and module is requesting MIL		Time since power-up ≥ 3 seconds	Continuous	Type A, No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger/ Supercharger Bypass Valve "A" Position Sensor Circuit Low	P2BBC	This DTC indicates a continuous or intermittent short low or open in CRV position circuit by monitoring the CRV position sensor percent Vref and failing the diagnostic when the CRV percent Vref is too low. In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	Raw position value	< 10.0 %	Diagnostic enabled ********** Powertrain relay voltage ********** Engine does not crank Diagnostic system not disabled	True ********** >= 11.0 Volts **********	10 failures out of 14 samples 100ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger/ Supercharger Bypass Valve "A" Position Sensor Circuit High	P2BBD	This DTC indicates a continuous or intermittent short high possition circuit by monitoring the CRV position sensor percent Vref and failing the diagnostic when the CRV percent Vref is too high. In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	Raw position value	> 95.0 %	Diagnostic enabled ********** Powertrain relay voltage ********** Engine does not crank Diagnostic system not disabled	True ********** >= 11.0 Volts **********	10 failures out of 14 samples 100ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger/ Supercharger Bypass Valve "A" Position Exceeded Learning Limit	P2BBE	This diagnostic detects a position learn failure. The diagnostic supports two paths: 1. Close position learning, triggered at engine shut down. The fault is set as soon as the learned close position is not in the expected range. 2. Open position learning, triggered at engine shut down, but after close position learning. The fault is set as soon as the learned open position is not in the expected range. In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	Learned Close Position ********** Close position learn complete.	> 95.00 % OR < 85.00 % **********	Diagnostic enabled ********** eCRV close position learning ********** No active DTCs: ********** Diagnostic system not disabled End of trip in progress	True ********** Enabled ********** CRAR_b_PstnSnsrFA CRAR_b_CRV_CktFA **********	during shut down	Type A, 1 Trips
			Learned Open Position ********** Open position learn complete.	> 20.00 % OR < 10.00 % **********	Diagnostic enabled ********** eCRV open position learning ********** No active DTCs: ********** Diagnostic system not disabled End of trip in progress	True ********** Enabled ********** CRAR_b_PstnSnsrFA CRAR_b_CRV_CktFA **********	during shut down	

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Secondary Fuel System Command Feedback Signal Performance (ECM)	P316A	Diagnostic to determine if the secodary fuel injector/system commands from the ECM are being processed correctly by the FICM. The ECM compares its fuel injector and system commands to values processed and transmitted by the FICM to determine if a fault condition is present.	The ECM compares its fuel injection commands, fuel system commands, and a data refresh counter to feedback values transmitted by the FICM When feedback data failures exceed (X of Y) thresholds, a fault condition is reported.	ECM fuel injection command value (INJCMD) <> FICM fuel inection feedback value (INJFDBK) or ECM fuel system command value (SYSCMD) <> FICM fuel system feedback value (SYSFDBK) or ECM calculated data refresh roll-over counter (ECMCNT) <> FICM data refresh roll-over counter (FICMCNT)	Engine Cranking and Run/Crank active for a duration and (INJCMD to INJFDBK) check 1 and (SYSCMD to SYSFDBK) check 1 and (ECMCNT to FICMCNT) check 1	== FALSE == TRUE >= 0.50 (sec) == 1 == 1 == 1	64 failures out of 80 samples Performed once every 25ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Secondary Fuel System Requests Signal Message Counter Incorrect (ECM)	P316B	Diagnostic to determine if the secondary fuel system requests recieved by the ECM are valid. Data integrity parameters in the $18A serial data message are used to determine if a fault condition is present.	When Alive Rolling Count (ARC) or Checksum (CHKSUM) failures exceed an (X of Y) threshold, a fault condition is reported	embedded CHKSUM <> calculation or embedded ARC <> calculation	Run/Crank voltage active for a duration	== TRUE >= 0.50 (sec)	20 failures out of 25 samples Performed on every received message: 12.5ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication Powertrain Sensor CAN Bus Off	U0076	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Bus status	=off	Controller On Ignition	= True for 3,000 msec = Run/Crank OR = Accessory	1.0 second	DTC Type B, Two Trips.

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Fuel Injector Control Module	U0105	This DTC monitors for a loss of communication with the fuel injector control module	Message is not received from controller for Message $1EA Message $3B5 Message $3B7	 ≥ 10,000.00 milliseconds ≥ 10,000.00 milliseconds ≥ 10,000.00 milliseconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A The following criteria have been enabled for Transition from accessory mode to off is pending Battery Voltage Ignition Voltage Criteria: Power Mode Run/Crank Voltage Off Cycle Enable Criteria: KeCMGD_b_OffKeyCycle DiagEnbl KeDFIR_e_OBD_ControllerType is an OBD Controller Controller shutdown impending Power Mode U0105 Fuel Injector Control Module	 Not Active on Current Key Cycle Enabled >= 3,000.00 milliseconds = False > 11.00 Volts = Run >= 11.00 Volts 1.00 (1 indicates enabled) OBD Controller = False = Not Run/Crank Not Active on Current Key Cycle is present on the bus	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Fuel Pump Control Module	U0109	This DTC monitors for a loss of communication with the fuel pump control module	Message is not received from controller for Message $1EB Message $4D9	 ≥ 10,000.00 milliseconds ≥ 10,000.00 milliseconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A The following criteria have been enabled for Transition from accessory mode to off is pending Battery Voltage Ignition Voltage Criteria: Power Mode Run/Crank Voltage Off Cycle Enable Criteria: KeCMGD_b_OffKeyCycle DiagEnbl KeDFIR_e_OBD_ControllerType is an OBD Controller Controller shutdown impending Power Mode U0109 Fuel Pump Control Module	 Not Active on Current Key Cycle Enabled >= 3,000.00 milliseconds = False > 11.00 Volts = Run >= 11.00 Volts 1.00 (1 indicates enabled) OBD Controller = False = Not Run/Crank Not Active on Current Key Cycle is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Anti-Lock Brake System (ABS) Control Module	U0121	This DTC monitors for a loss of communication with the Anti-Lock Brake System (ABS) Control Module (Non-OBD Module ID 243).	Message is not received from controller for Message $0C1 Message $0C5 Message $1C7 Message $1E9 Message $2F1 Message $2F9	≥ 500.00 milliseconds ≥ 500.00 milliseconds ≥ 500.00 milliseconds ≥ 500.00 milliseconds ≥ 10,000.00 milliseconds ≥ 500.00 milliseconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A The following criteria have been enabled for Transition from accessory mode to off is pending Battery Voltage Ignition Voltage Criteria: Power Mode Run/Crank Voltage Off Cycle Enable Criteria: KeCMGD_b_OffKeyCycle DiagEnbl KeDFIR_e_OBD_ControllerType is an OBD Controller Controller shutdown impending Power Mode U0121 Anti-Lock Brake System Control Module	 Not Active on Current Key Cycle Enabled >= 3,000.00 milliseconds = False > 11.00 Volts = Run >= 11.00 Volts 1.00 (1 indicates enabled) OBD Controller = False = Not Run/Crank Not Active on Current Key Cycle is present on the bus	Diagnostic runs in 12.5 ms loop	Type C, No SVS "Emissions Neutral Diagnostics – Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Chassis Control Module A	U012A	This DTC monitors for a loss of communication with the Chassis Control Module A.	Message is not received from controller for Message $4DB	 ≥ 10,000.00 milliseconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A The following criteria have been enabled for Transition from accessory mode to off is pending Battery Voltage Ignition Voltage Criteria: Power Mode Run/Crank Voltage Off Cycle Enable Criteria: KeCMGD_b_OffKeyCycleDiagEnbl KeDFIR_e_OBD_ControllerType is an OBD Controller Controller shutdown impending Power Mode U012A CHCM A	 Not Active on Current Key Cycle Enabled >= 3,000.00 milliseconds = False > 11.00 Volts = Run >= 11.00 Volts 1.00 (1 indicates enabled) OBD Controller = False = Not Run/Crank Not Active on Current Key Cycle is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Turbocharger/ Supercharger Bypass Valve "A" Position Sensor	U0657	This DTC indicates a continuous communication fault on the electric CRV SENT interface. The diagnostic monitors the SENT message in respect to message pulses and timing validity. In series applications, turbocharger 'A' is the first turbocharger in the direction of exhaust flow. In parallel applications, turbocharger 'A' is associated with engine bank 1.	SENT Mesage Faults SENT Mesage age	> 0 cnt > 6.250 ms	Diagnostic enabled ********** Powertrain relay voltage ********** Engine does not crank Diagnostic system not disabled	True ********** >= 11.0 Volts ********** 	10 failures out of 14 samples 100ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Fuel Injector Control Module on Powertrain Expansion CAN Bus	U18A5	This DTC monitors for a loss of communication with the Fuel Injector Control Module on Bus B	Message is not received from controller for Message $18A Message $4A1	 ≥ 10,000.00 milliseconds ≥ 10,000.00 milliseconds	General Enable Criteria: U0074 Normal CAN transmission on Bus B The following criteria have been enabled for Transition from accessory mode to off is pending Battery Voltage Ignition Voltage Criteria: Power Mode Run/Crank Voltage Off Cycle Enable Criteria: KeCMGD_b_OffKeyCycle DiagEnbl KeDFIR_e_OBD_ControllerType is an OBD Controller Controller shutdown impending Power Mode U18A5 Fuel Injector Control Module	 Not Active on Current Key Cycle Enabled >= 3,000.00 milliseconds = False > 11.00 Volts = Run >= 11.00 Volts 1.00 (1 indicates enabled) OBD Controller = False = Not Run/Crank Not Active on Current Key Cycle is present on the bus	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Comm with Fuel Level Sensing Module	U18D4	This DTC monitors for a loss of communication with the Fuel Level Sensing Module.	Messages are not received from controller for		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type A, 1 Trips
					U0076	Not Active on Current Key Cycle		
			Message $0C3	≥ 10,000.00 milliseconds	Normal CAN transmission on Bus S	Enabled		
			Message $0C4	≥ 10,000.00 milliseconds	The following criteria have been enabled for	>= 3,000.00 milliseconds		
			Message $0CB	≥ 10,000.00 milliseconds	Transition from accessory mode to off is pending	= False		
			Message $0CC	≥ 10,000.00 milliseconds	Battery Voltage	> 11.00 Volts		
			Message $1E6	≥ 10,000.00 milliseconds	Ignition Voltage Criteria:			
					Power Mode	= Run		
			Message $2C1	≥ 10,000.00 milliseconds	Run/Crank Voltage	>= 11.00 Volts		
			Message $2D7	≥ 10,000.00 milliseconds	Off Cycle Enable Criteria:			
			Message $2D9	≥ 10,000.00 milliseconds	KeCMGD_b_OffKeyCycle DiagEnbl	1.00 (1 indicates enabled)		
			Message $3EC	≥ 10,000.00 milliseconds	KeDFIR_e_OBD_ControllerType is an OBD Controller	OBD Controller		
			Message $3EE	≥ 10,000.00 milliseconds	Controller shutdown impending	= False		
					Power Mode	= Not Run/Crank		
					U18D4	Not Active on Current Key Cycle		
					Fuel Level Sensing Module	is present on the bus		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Heater Coolant Pump Control Circuit Open	B269A	Controller specific output driver circuit diagnoses the Heater Coolant Pump Control Circuit low sided driver for an open circuit failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	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 Ω impedance between signal and controller ground.	Run Crank Ignition in Range Engine not cranking == Above is true and == Last Open Circuit Test	= True = True ========== not Indeterminate	5 failures out of 6 samples 1 sec/ sample Continuous	Type B, 2 Trips Note: In certian controllers B269C may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Heater Coolant Pump Control Circuit Low	B269C	Controller specific output driver circuit diagnoses the Heater Coolant Pump Control Circuit low sided driver for a short to ground failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to ground failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to ground.	≤ 0.5 Ω impedance between signal and controller ground	Run Crank Ignition in Range Engine not cranking == Above is true and == Last Open Circuit Test	 = True = True ========== not Indeterminate	5 failures out of 6 samples 1 sec/ sample Continuous	Type B, 2 Trips Note: In certian controllers B269A may also set

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Heater Coolant Pump Control Circuit High	B269D	Controller specific output driver circuit diagnoses the Heater Coolant Pump Control Circuit low sided driver for a short to power failure when the output is powered on by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range during driver on state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	≤ 0.5 Ω impedance between signal and controller power.	Run Crank Ignition in Range Engine not cranking == Above is true and == Last Open Circuit Test	= True = True ========== not Indeterminate	5 failures out of 6 samples 1 sec/ 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.
O2S Circuit Low Voltage Bank 1 Sensor 1 (For use with WRAF - E80	P0131	This DTC determines if the WRAF O2 sensor signal circuit is shorted low. This DTC will detect a short to ground fault to the Pump Current, Reference Cell Voltage and Reference Ground circuits. When enabled, the diagnostic monitors the three different failure counters it receives from the WRAF Application-Specific Integrated Circuit (ASIC). The individual diagnostic failure counters are incremented based on the message received from the ASIC. The DTC is set based on any of the three individual fail and sample counters.	B1S1 WRAF ASIC indicates a ground short to any of the following WRAF signals: A) Pump Current - short to ground fail counts are accumulated to determine fault status. B) Reference Cell Voltage - short to ground fail counts are accumulated to determine fault status. C) Reference Ground - short to ground fail counts are accumulated to determine fault status. <u>Note</u>: This ASIC is referred to as C2WRAF (Delphi). <u>Note</u>: A ground short on the Pump Current or Reference Voltage signal may also set a P223C DTC.	The ASIC provides a fault indication when the pump current pin is between -150 mV and +175 mV. The ASIC provides a fault indication when the Refernce Cell Voltage pin < 225 mV. The ASIC provides a fault indication when during the intrusive test the Reference Cell impedance change is ≤ 90 ohms. <u>Note</u>: Signal A & B faults must exist for 24 ASIC clock cycles to qualify for a fail flag. The three fault signals have individual X out of Y calibrations. When the X out of Y is reached in any region this DTC is set.	B1S1 DTC's Not active this key cycle Measure Valid status (ASIC) Controller status (ASIC) Engine Run or Auto stop WRAF Ref cell temperature ********** Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) **********	P0135, P0030, P0031 or P0032 = Valid = Ready = True ≥ 628 Deg C = Complete ≥ 20.0 seconds	Signal A: 128 failures out of 160 samples OR Signal B: 128 failures out of 160 samples OR Signal C: 3 failures out of 1 samples Frequency for Signal A & B: Continuous in 25 milli - second loop Frequency for Signal C: Tested during an intrusive event performed every 60 seconds. During each event the impedance is measured 3 times once every 12.5 msec. Note: If the fail count value is greater than the sample count value that individual	Type B, 2 Trips

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

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 (For use with WRAF - E80	P0132	This DTC determines if the WRAF O2 sensor signal circuit is shorted high. This DTC will detect a short to power fault to the Pump Current (and Trim circuit), Reference Cell Voltage and Reference Ground circuit. When enabled, the diagnostic monitors the three different failure counters it receives from the WRAF Application-Specific Integrated Circuit (ASIC). The individual diagnostic failure counters are incremented based on the message received from the ASIC. The DTC is set based on any of the three individual fail and sample counters.	B1S1 WRAF ASIC indicates a short to power on any of the following WRAF signals: A) Pump Current - short to power fail counts are accumulated to determine fault status. B) Reference Cell Voltage - short to power fail counts are accumulated to determine fault status. C) Reference Ground - short to power fail counts are accumulated to determine fault status. <u>Note</u>: This ASIC is referred to as C2WRAF (Delphi).	The ASIC provides a fault indication when the pump current pin > 2.8 V. The ASIC provides a fault indication when the Reference Cell Voltage pin > 3.3 V. The ASIC provides a fault indication when the Reference Ground pin > 225 mV. <u>Note</u>: The above faults must exist for 21 ASIC clock cycles to qualify for a fail flag. The three fault signals have individual X out of Y calibrations. When the X out of Y is reached in any region this DTC is set.	B1S1 DTC's Not active this key cycle Measure Valid Status (ASIC) Controller status (ASIC) Engine Run or Auto stop WRAF Ref cell temperature ********** Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) **********	P0135, P0030, P0031 or P0032 = Valid = Ready = True ≥ 628 Deg C = Complete ≥ 20.0 seconds	Signal A: 128 failures out of 160 samples OR Signal B: 128 failures out of 160 samples OR Signal C: 128 failures out of 160 samples Frequency: Continuous in 25 milli - second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Delayed Response Rich to Lean Bank 1 Sensor 1) (For use with WRAF	P015A	DTC P015A detects that the primary WRAF oxygen sensor for Bank 1 has delayed response when the air fuel ratio transitions from rich to lean condition. This diagnostic runs simultaneously with the intrusive secondary O2 monitor rich to lean tests (P013E / P013A / P2271), which commands fuel cut off. Note: The Primary method is used when the primary WRAF O2 sensor signal transitions from above to below the O2 measured EQR threshold, otherwise the Secondary method is used. <u>Primary method</u>: The P015A diagnostic measures the primary WRAF O2 sensor response time between a rich condition above a starting measured EQR threshold and a lower measured EQR threshold. The response time is then scaled and normalized to mass air flow rate, engine speed, Baro,	Primary method: The EWMA of the Pre O2 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 WRAF O2 sensor measured EQR is OR Secondary Method: The Accumulated time monitored during the R2L Delayed Response Test. AND Pre WRAF O2 sensor measured EQR is	> 0.50 EWMA (sec) ≤ 0.41 EWMA (sec) < 0.800 EQR ≥ 3.6 Seconds > 0.300 EQR	No Active DTC's System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Only when FuelLevelDataFault Green O2S Condition	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA WRAF_Bank_1_FA P0131, P0132, P013A, P013B, P013E, P013F, P2270, P2271 > 10.0 Volts = Not active = Not active = Not active = Not active = False = False = Not Valid,	Frequency: Once per trip Note: if NaESPD_b_FastInitRespIsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponseIsActive = TRUE, multiple tests per trip are allowed	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		and intake air temperature resulting in a normalized delay value. The normalized delay is fed into a 1st order lag filter to update the final EWMA result. DTC P015A is set when the EWMA value exceeds the EWMA threshold. Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value. <u>Secondary method</u>: This fault is set if the primary WRAF O2 sensor does not achieve the required lower measured EQR			O2 Heater (pre sensor) on for Engine Coolant (Or OBD Coolant Enable Criteria IAT Engine run Accum Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled) Engine Airflow Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled) Closed loop integral Closed Loop Active	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: B1S1, B2S1 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 22.0 grams/sec. ≥ 20 seconds > 62 ºC = TRUE) > -40 ºC > 30 seconds 950 ≤ RPM ≤ 2,950 900 ≤ RPM ≤ 3,050 2.0 ≤ gps ≤ 15.0 40.4 ≤ MPH ≤ 77.7 35.4 ≤ MPH ≤ 82.0 0.80 ≤ C/L Int ≤ 1.07 = TRUE (Please see "**Closed Loop Enable Clarification**" in Supporting Tables).		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		threshold before a delay time threshold is reached.			Evap Ethanol Estimation in Progress Baro Post fuel cell EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on Time Predicted Catalyst temp Fuel State ========== All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested. ========== Pre O2S EQR B1S1 at end of Cat Rich stage Fuel State Number of fueled cylinders ========== After above conditions are met: DFCO Mode is entered (wo driver initiated pedal input).	not in control of purge = Not Active (Please see “**Ethanol Estimation in Progress**” in Supporting Tables). > 70 kpa = enabled = not active = not active ≥ 80.0 sec 500 ≤ ºC ≤ 900 = DFCO possible ========== ========== ≥ 1.080 EQR = DFCO active ≤ 3 cylinders ==========		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Delayed Response Lean to Rich Bank 1 Sensor 1) (For use with WRAF	P015B	DTC P015B detects that the primary WRAF oxygen sensor for Bank 1 has delayed response when the air fuel ratio transitions from lean to rich condition. This diagnostic runs simultaneously with the intrusive secondary O2 monitor lean to rich tests (P013F / P013B), which commands fuel enrichment. Note: The Primary method is used when the primary WRAF O2 sensor signal transitions from lean condition to above the O2 measured EQR threshold, otherwise the Secondary method is used. <u>Primary method</u>: The P015B diagnostic measures the primary WRAF O2 sensor response time between a lean condition and a higher measured EQR threshold. The response time is then scaled and normalized to mass air flow rate, engine speed, Baro, and intake air temperature resulting in	Primary method: The EWMA of the Pre O2 sensor normalized L2R time delay value. The EWMA repass limit is The EWMA calculation uses a 0.20 coefficient. OR Secondary method: The Accumulated time monitored during the L2R Delayed Response Test. AND Pre WRAF O2 sensor measured EQR is OR At end of Cat Rich stage the Pre WRAF O2 sensor measured EQR is	> 0.50 EWMA (sec) ≤ 0.47 EWMA (sec) ≥ 3.8 Seconds < 1.000 EQR < 1.080 EQR	No Active DTC's P015A test is complete and System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Only when FuelLevelDataFault	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA WRAF_Bank_1_FA P0131, P0132, P013A, P013B, P013E, P013F, P015A, P2270, P2271 = Passed > 10.0 Volts = Not active = Not active = Not active = Not active = False = False	Frequency: Once per trip Note: if NaESPD_b_FastInitRespIsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponseIsActive = TRUE, multiple tests per trip are allowed	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		a normalized delay value. The normalized delay is fed into a 1st order lag filter to update the final EWMA result. DTC P015B is set when the EWMA value exceeds the EWMA threshold. Note: This EWMA diagnostic employs two features, Fast Initial Response (FIR) and Rapid Step Response (RSR). The FIR feature is used following a code clear event or any event that results in erasure of the engine controller's non-volatile memory. The RSR feature is used when a step change in the test result is identified. Both these temporary features improve the EWMA result following a non-typical event by allowing multiple intrusive tests on a given trip until the total number of tests reach a calibration value. <u>Secondary method</u>: This fault is set if the primary WRAF O2 sensor does not achieve the required higher measured EQR threshold before a delay time threshold is			Green O2S Condition O2 Heater (pre sensor) on for Engine Coolant (Or OBD Coolant Enable Criteria IAT Engine run Accum Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled) Engine Airflow Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled) Closed loop integral Closed Loop Active	= Not Valid, Green 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: B1S1, B2S1 (if applicable) in Supporting Tables tab. Airflow accumulation is only enabled when airflow is above 22.0 grams/sec. ≥ 20 seconds > 62 ºC = TRUE) > -40 ºC > 30 seconds 950 ≤ RPM ≤ 2,950 900 ≤ RPM ≤ 3,050 2.0 ≤ gps ≤ 15.0 40.4 ≤ MPH ≤ 77.7 35.4 ≤ MPH ≤ 82.0 0.80 ≤ C/L Int ≤ 1.07 = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		reached.				(Please see "**Closed Loop Enable Clarification**" in Supporting Tables).		
					Evap	not in control of purge		
					Ethanol Estimation in Progress	= Not Active (Please see "**Ethanol Estimation in Progress**" in Supporting Tables).		
					Baro Post fuel cell EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on time	> 70 kpa = enabled = not active = not active ≥ 80.0 sec		
					Predicted Catalyst temp Fuel State Number of fueled cylinders	500 ≤ ºC ≤ 900 = DFCO inhibit ≥ 1 cylinders		
					========== When above conditions are met: Fuel Enrich mode is entered. ========== During this test: Engine Airflow must stay between: and the delta Engine Airflow over 12.5msec must be :	========== ========== 1 ≤ gps ≤ 20 ≤ 2.0 gps		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft System Cold Start Performance – Bank 1	P05CC	Detects a VVT system error during Cold Starts by comparing the desired and actual cam positions when VVT is activated. This is the same type diagnostic as P0011 except this detects excessive deviations of position while the cold start phaser positions are being commanded.	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive	Cam Position Error > 6.00 deg.	**Intake Cam Phsr Enable** System Voltage Engine Running Power Take Off (PTO) active **Catalyst Warmup Enabled** Desired cam position Desired AND Measured cam position Desired cam position variation No Active DTCs	= TRUE > 11.00 Volts = TRUE = FALSE = TRUE > 0 deg > 6.00 deg AND < 26.00 deg < 3.00 deg for (**P0011_P05CC_StablePositionTimeIc1**) seconds P0010 P2088 P2089	65 failures out of 75 samples 100 ms /sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Camshaft System Cold Start Performance – Bank 1	P05CE	Detects a VVT system error during Cold Starts by comparing the desired and actual cam positions when VVT is activated. This is the same type diagnostic as P0014 except this detects excessive deviations of position while the cold start phaser positions are being commanded.	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive	Cam Position Error > 6.00 deg.	**Exhaust Cam Phsr Enable** System Voltage Engine Running Power Take Off (PTO) active **Catalyst Warmup Enabled** Desired cam position Desired AND Measured cam position Desired cam position variation No Active DTCs	= TRUE > 11.00 volts = TRUE = FALSE = TRUE > 0 deg > 6.00 deg AND < 26.00 deg < 3.00 deg for (**P0014_P05CE_StablePositionTimeEc1**) sec P0013 P2090 P2091	65 failures out of 75 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.
Internal Control Module O2 Sensor Processor Performance Bank 1) (For use with WRAF	P064D	Diagnoses the WRAF Application-Specific Integrated Circuit (ASIC) for Controller Status and Measure Valid faults. These faults can impact closed loop fuel control. This DTC when enabled, monitors the two different failure counters it receives from the WRAF ASIC. The individual diagnostic failure counters are incremented based on the message received from the ASIC. The DTC is set based on any of the two individual fail and sample counters.	B1S1 WRAF ASIC indicates control module faults	Controller Status fail counts and Measure Valid fail counts are accumulated to determine fault status	Engine Run or Auto stop Heater Warm-up delay WRAF circuit diagnostic delay since power up	= True = Complete ≥ 20.0 sec	128 controller status fail counts out of 160 samples OR 128 measure valid fail counts out of 160 samples 25 ms / sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Adaptive Cruise Control Signal Circuit	P1553	Detects rolling count or protection value errors in Adaptive Cruise Control Axle Torque Command serial data signal	If x of y rolling count / protection value faults occur, disable adaptive cruise control for duration of fault		Adaptive Cruise Control Command Serial Data Error Diagnostic Enable	1.00	9 / 17 counts	Type C, No SVS , Emissions Neutral Diagnostics – special type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Pumping Current Performance Bank 1 (For use with WRAF - E80	P223C	This DTC determines if the WRAF O2 sensor pumping current has an incorrect or out of range value. This DTC will detect open circuit faults to the Pump current, Ref Cell voltage, Ref Ground and Trim circuits. When enabled, the diagnostic monitors the pumping current in three different fault regions during DFCO. The individual diagnostic failure counters are incremented based on the diagnostic results in each region. The DTC is set based on any of the three individual fail and sample counters.	Fault condition present when the pump current is in any of the fault regions when this test is enabled during DFCO. Note: This ASIC is referred to as C2WRAF (Delphi).	The three pump current fault regions are: A) Pump current > 4.18 ma B) Pump current ≤ 0.10 ma and ≥ - 0.10 ma C) Pump current < -0.10 ma The three fault regions have individual X out of Y calibrations. When the X out of Y is reached in any region this DTC is set. Note: A open circuit on the Pump current signal may also set a P0131 DTC. Note: A short to ground on the trim circuit can set P223C.	DTC's Not active this key cycle Measure Valid status (ASIC) Controller status (ASIC) Engine Run or Auto stop WRAF Ref cell temperature ********** Heater Warm-up delay Then WRAF circuit diagnostic delay (since heater Warm-up delay is complete) ********** Test starts when time in DFCO Test stops when time in DFCO	WRAF_Bank_1_FA P0135, P0030, P0031, P0032 = Valid = Ready = True ≥ 628 Deg C = Complete ≥ 20.0 seconds ≥ 5.0 seconds > 12.0 seconds	Region A: 224 failures out of 280 samples OR Region B: 224 failures out of 280 samples OR Region C: 224 failures out of 280 samples Sample rate is 25 msec. Test enabled during DFCO.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Reference Resistance Out Of Range Bank 1	P223E	This DTC determines if the WRAF O2 sensor reference cell has an incorrect or out of range resistance value. This test compares the element's resistance (from the WRAF sensor Application-Specific Integrated Circuit (ASIC)) to the expected values for the enabled condition. The element temperature is directly related to the element resistance based on the released sensor element specifications. The diagnostic failure counter is incremented if the element temperature is outside the expected range. This DTC is set based on the fail and sample counters.	Measured Reference cell temperature	< 700 Deg C OR > 1,000.0 Deg C	DTC's Not active this key cycle Measure Valid status (ASIC) Controller status (ASIC) Engine Run or Auto stop ********** Heater Warm-up delay Then Delay after WRAF circuit diagnostic delay **********	WRAF_Bank_1_FA P0135, P0030, P0031, P0032 = Valid = Ready = True = Complete ≥ 30.0 seconds	128 failures out of 160 samples Sample rate is 25 msec Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 Ω impedance between signal and controller ground	diagnostic monitor enable battery voltage update battery voltage timer PWM % duty cycle when voltage directly proportional OR PWM % duty cycle when voltage inversly proportional circuit sensor type	= 1 Boolean ≥ 9.00 volts ≤ 8.79 % ≥ 8.79 % 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 Ω impedance between signal and controller voltage source OR ≥ 200 K Ω impedance between signal and controller ground	diagnostic monitor enable battery voltage update battery voltage timer PWM % duty cycle when voltage directly proportional OR PWM % duty cycle when voltage inversly proportional circuit sensor type	= 1 Boolean ≥ 9.00 volts ≥ 91.21 % ≤ 91.21 % 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.
Lost Communication With Cruise Control Module	U0104	This DTC monitors for a loss of communication with the Cruise Control Module.	Message is not received from controller for Message $2CB Message $2CD	 ≥ 0.5 seconds ≥ 0.5 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts	Diagnostic runs in 12.5 ms loop	Type C, No SVS "Special Type C"

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Network Management is not active for U0104 Cruise Control Module	> 0.4000 seconds Not Active on Current Key Cycle is present on the bus		

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 - Response Cell Enable Table

Description: This table describes the Block learn cells which enable the Pre (Primary) Oxygen sensor response tests.
Note: When the table column heading matches the calibration value below it, that individual cell is enabled.

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

Multiple DTC Use - Response Cell Enable Table - 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	CeFADR_e_Cell00_PurgOnAirMode 5	CeFADR_e_Cell01_PurgOnAirMode 4	CeFADR_e_Cell02_PurgOnAirMode 3	CeFADR_e_Cell03_PurgOnAirMode 2
Multiple DTC Use - Response Cell Enable Table - Part 2				
y/x	CeFADR_e_Cell04_PurgOnAirMode 1	CeFADR_e_Cell05_PurgOnAirMode 0	CeFADR_e_Cell06_PurgOnIdle	CeFADR_e_Cell07_PurgOnDecel
1	CeFADR_e_Cell04_PurgOnAirMode 1	CeFADR_e_Cell05_PurgOnAirMode 0	CeFADR_e_Cell06_PurgOnIdle	CeFADR_e_Cell07_PurgOnDecel
Multiple DTC Use - Response Cell Enable Table - 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	CeFADR_e_Cell08_PurgOffAirMode 5	CeFADR_e_Cell09_PurgOffAirMode 4	CeFADR_e_Cell10_PurgOffAirMode 3	CeFADR_e_Cell11_PurgOffAirMode 2
Multiple DTC Use - Response Cell Enable Table - Part 4				
y/x	CeFADR_e_Cell12_PurgOffAirMode 1	CeFADR_e_Cell13_PurgOffAirMode 0	CeFADR_e_Cell14_PurgOffIdle	CeFADR_e_Cell15_PurgOffDecel
1	CeFADR_e_Cell12_PurgOffAirMode 1	CeFADR_e_Cell13_PurgOffAirMode 0	CeFADR_e_Cell14_PurgOffIdle	CeFADR_e_Cell15_PurgOffDecel

Initial Supporting table - Multiple DTC Use_Green Sensor Delay Criteria - Limit

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

Value Units: Grams
X Unit: Acculmulated Engine Airflow

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

Initial Supporting table - P0011_CamPosErrorLimIc1

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

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

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
400	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
800	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
1,200	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
1,600	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
2,000	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
2,400	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
2,800	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
3,200	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
3,600	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
4,000	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
4,400	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
4,800	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
5,200	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
5,600	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
6,000	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
6,400	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
6,800	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0

Initial Supporting table - P0011_P0021_P05CC_P05CD_EngOilPressEnblIc

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

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

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

Initial Supporting table - P0011_P0021_P05CC_P05CD_HiEngSpdHiDsbllc

Description: Minimum engine speed to disable Intake cam

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

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

Initial Supporting table - P0011_P0021_P05CC_P05CD_HiEngSpdLoEnbllc

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

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

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800

Initial Supporting table - P0011_P0021_P05CC_P05CD_LoPresHiEnbllc

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

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

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

Initial Supporting table - P0011_P0021_P05CC_P05CD_LoPresLoDsblIc

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	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150

Initial Supporting table - P0011_P0021_P05CC_P05CD_LoRpmHiEnblIc

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

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

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	1,000	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 - P0011_P0021_P05CC_P05CD_LoRpmLoDsblIc

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	950	950	950	950	950	950	950	950	950	950	950	950	950	950	950	950	950

Initial Supporting table - P0011_P0021_P05CC_P05CD_P0014_P0024_P05CE_P05CF_ColdStartEngRunning

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

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

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2

Initial Supporting table - P0011_P05CC_StablePositionTimeIc1

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

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

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
400	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
800	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
1,200	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
1,600	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
2,000	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
2,400	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
2,800	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
3,200	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
3,600	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
4,000	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
4,400	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
4,800	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
5,200	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
5,600	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
6,000	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
6,400	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
6,800	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0

Initial Supporting table - P0014_CamPosErrorLimEc1

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

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

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
400	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
800	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
1,200	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
1,600	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
2,000	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
2,400	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
2,800	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
3,200	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
3,600	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
4,000	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
4,400	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
4,800	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
5,200	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
5,600	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
6,000	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
6,400	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
6,800	21.0	21.0	21.0	10.0	8.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0

Initial Supporting table - P0014_P0024_P05CE_P05CF_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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - P0014_P0024_P05CE_P05CF_HiEngSpdHiDsblEc

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

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

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

Initial Supporting table - P0014_P0024_P05CE_P05CF_HiEngSpdLoEnblEc

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

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

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800

Initial Supporting table - P0014_P0024_P05CE_P05CF_LoPresHiEnblEc

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

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

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

Initial Supporting table - P0014_P0024_P05CE_P05CF_LoPresLoDsblEc

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

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

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150

Initial Supporting table - P0014_P0024_P05CE_P05CF_LoRpmHiEnblEc

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

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

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	1,000	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 - 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	950	950	950	950	950	950	950	950	950	950	950	950	950	950	950	950	950

Initial Supporting table - P0014_P05CE_StablePositionTimeEc1

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

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

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
400	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
800	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
1,200	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
1,600	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
2,000	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
2,400	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
2,800	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
3,200	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
3,600	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
4,000	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
4,400	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
4,800	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
5,200	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
5,600	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
6,000	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
6,400	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0
6,800	30.0	20.0	10.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	7.0	10.0

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

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

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

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	300	300	7	5	5	5	5	3	3	2	2	2	2	2	2	2	2

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

Description: OAT Performance Diagnostic counter increment for determining OAT-IAT equilibrium for engine off (for hybrid applications)

Value Units: Counter Increment Value (Unitless)
X Unit: Vehicle Speed (KPH)

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

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

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

Value Units: Counter Increment Value (Unitless)
X Unit: Vehicle Speed (KPH)
Y Units: Engine Air Flow (Grams/Second)

y/x	0.0	5.0	10.0	15.0	20.0	25.0	30.0	50.0	80.0
1.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0
5.0	-5.0	-2.0	-1.0	0.0	1.0	2.0	3.0	4.0	5.0
10.0	-4.0	-1.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0
20.0	-2.0	-1.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0
30.0	-1.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0
40.0	0.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0
50.0	0.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0
60.0	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0
70.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0

Initial Supporting table - P00C4 P2261: Compressor Surge Line

Description: Turbo compressor recirculation valve diagnosis surge area limit.

Value Units: [ratio] CRV diagnosis surge area limit.
X Unit: [g/sec[] KnBSTD_dm_AirFlowBP - Air FLow

y/x	11.94	23.08	40.02	55.08	71.72	99.66
1	1.000	1.230	1.600	1.850	2.460	3.200

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

Description: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix - This table describes combinations of individual model failures that will set P0101, P0106, P010B, P0121, P0236 and P1101 on turbocharged applications.

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

y/x	1	2	3	4	5	6	7	8	9
1	MAF Model	MAP1 Model	MAP2 Model	MAP3 Model	TIAP1 Model	TPS Model	TIAP Correlation	TIAP Correlation	DTC Set
2	Failed	Failed	Failed	Failed	Failed	Failed	Failed	Valid	
3	F	F	F	F	F	F	F	F	No DTC
4	F	F	F	F	F	F	F	T	No DTC
5	F	F	F	F	F	F	T	F	No DTC
6	F	F	F	F	F	F	T	T	No DTC
7	F	F	F	F	F	T	F	F	No DTC
8	F	F	F	F	F	T	F	T	No DTC
9	F	F	F	F	F	T	T	F	No DTC
10	F	F	F	F	F	T	T	T	No DTC
11	F	F	F	F	T	F	F	F	No DTC
12	F	F	F	F	T	F	F	T	No DTC
13	F	F	F	F	T	F	T	F	No DTC
14	F	F	F	F	T	F	T	T	No DTC
15	F	F	F	F	T	T	F	F	P1101
16	F	F	F	F	T	T	F	T	P0121
17	F	F	F	F	T	T	T	F	P1101
18	F	F	F	F	T	T	T	T	P0236
19	F	F	F	T	F	F	F	F	No DTC
20	F	F	F	T	F	F	F	T	P1101
21	F	F	F	T	F	F	T	F	P1101
22	F	F	F	T	F	F	T	T	P1101
23	F	F	F	T	F	T	F	F	P1101
24	F	F	F	T	F	T	F	T	P1101
25	F	F	F	T	F	T	T	F	P1101
26	F	F	F	T	F	T	T	T	P1101
27	F	F	F	T	T	F	F	F	P1101
28	F	F	F	T	T	F	F	T	P1101
29	F	F	F	T	T	F	T	F	P1101
30	F	F	F	T	T	F	T	T	P1101
31	F	F	F	T	T	T	F	F	P1101

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

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

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

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

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

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

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

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

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

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

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

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

Initial Supporting table - P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM

Description: P0101_P0106_P0121_P012B_P0236_P1101 MAP1 Residual Weight Factor based on RPM

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

y/x	0	400	800	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,600
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.700	0.700	0.680	0.680	0.700	1.000	1.000	1.000	1.000	1.000

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

Description: P0101_P0106_P0121_P012B_P0236_P1101 MAP2 Residual Weight Factor based on RPM

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

y/x	0	400	800	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,600
1	1.000	1.000	0.800	0.800	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: MAP3 Residual Weight Factor based on RPM

Description: P0101_P0106_P0121_P012B_P0236_P1101 MAP3 Residual Weight Factor based on RPM

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

y/x	0	400	800	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,600
1	0.600	1.000	0.800	0.800	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

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

Description: P0101_P0106_P0121_P012B_P0236_P1101 TPS Residual Weight Factor based on RPM

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

y/x	0	400	800	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,600
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

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

Description: P0101_P0106_P0121_P0236_P1101 TIAP Residual Weight Factor based on RPM

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

y/x	0	400	800	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,600
1	1.000	0.830	0.830	0.830	0.742	0.875	0.975	0.925	0.873	0.747	0.834	0.830	0.889	0.970	0.968	0.952	0.950

Initial Supporting table - P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max Air Flow

Description: P0101_P0106_P0121_P0236_P1101 TIAP-Baro Correlation Max Air Flow

Value Units: Engine Air Flow (Grams/Second)
X Unit: Engine Speed (RPM)

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	10.0	10.0	10.0	12.0	16.0	16.0	16.0	16.0	16.0

Initial Supporting table - P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max MAP

Description: P0101_P0106_P0121_P0236_P1101 TIAP-Baro Correlation Max MAP

Value Units: Manifold Pressure (kPa)
X Unit: Engine Speed (RPM)

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	95.0	80.0	60.0	50.0	40.0	35.0	30.0	30.0	30.0

Initial Supporting table - P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Offset

Description: P0101_P0106_P0121_P0236_P1101 TIAP-Baro Correlation Offset

Value Units: Pressure Difference (kPa)
X Unit: Engine Speed (RPM)

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	4.0	5.0	5.0	6.0	10.0	12.0	16.0	20.0	25.0

Initial Supporting table - P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min Air Flow

Description: P0101_P0106_P0121_P0236_P1101 TIAP-MAP Correlation Min Air Flow

Value Units: Engine Air Flow (Grams/Second)
X Unit: Engine Speed (RPM)

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	15.0	42.0	65.0	80.0	100.0	115.0	130.0	130.0	130.0

Initial Supporting table - P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min MAP

Description: P0101_P0106_P0121_P0236_P1101 TIAP-MAP Correlation Min MAP

Value Units: Manifold Pressure (kPa)
X Unit: Engine Speed (RPM)

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	115.0	150.0	170.0	175.0	180.0	180.0	180.0	180.0	180.0

Initial Supporting table - P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Offset

Description: P0101_P0106_P0121_P0236_P1101 TIAP-MAP Correlation Offset

Value Units: Pressure Difference (kPa)
X Unit: Engine Speed (RPM)

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	8.5	9.0	9.5	9.5	12.0	12.5	12.5	12.5	13.0

Initial Supporting table - P0133_KnEOSD_t_ST_LRC_LimRS1

Description: X Table Axis for P0133

Value Units: Seconds
X Unit: X Table Axis for P0133, L2R Response time breakpoints for table

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	0.000	0.011	0.021	0.032	0.043	0.053	0.063	0.074	0.085	0.096	0.106	0.117	0.128	0.138	0.148	0.159	0.170

Initial Supporting table - P0133_KnEOSD_t_ST_RLC_LimRS1

Description: Y Table Axis for P0133

Value Units: Seconds
Y Units: Y Table Axis for P0133, R2L Response time breakpoints for table

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	0.000	0.010	0.019	0.028	0.037	0.047	0.057	0.065	0.075	0.084	0.094	0.104	0.112	0.122	0.131	0.141	0.150

Initial Supporting table - P0133_O2S Slow Response Bank 1 Sensor 1 Pass/Fail Threshold table

Description: This table discribes the Pass and Fail regions based on the diagnostic test result

Value Units: If the cell contains a "0" then the fault is indicated, if it contains a "1" a fault is not indicated.
X Unit: X axis is Lean to Rich response time (in sec), Please see the table below named "KnEOSD_t_ST_LRC_LimRS1" for the 17 X axis table breakpoints.
Y Units: Y axis is Rich to Lean response time (in sec), Please see the table below named "KnEOSD_t_ST_RLC_LimRS1" for the 17 Y axis table breakpoints.

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

Initial Supporting table - P0234 P0299: Ambient pressure correction as a function of engine speed and ambient pressure

Description: Additative offset on boost pressure control deviation fail limit.

Value Units: [kPa] Control Deviation - Ambient correction.
X Unit: [kPa] KnBSTD_p_CntrlDevDiagAmbCorrBP - Ambient Air Pressure
Y Units: [rpm] KnBSTD_n_CntrlDevDiagAmbCorrBP - Engine Speed

y/x	60.00	70.00	80.00	90.00	100.00	110.00
2,000	80.00	60.00	40.00	20.00	0.00	0.00
2,500	40.00	30.00	20.00	10.00	0.00	0.00
3,000	15.00	10.00	10.00	0.00	0.00	0.00
4,000	15.00	10.00	10.00	0.00	0.00	0.00
5,000	15.00	10.00	5.00	0.00	0.00	0.00
6,000	15.00	5.00	5.00	0.00	0.00	0.00

Initial Supporting table - P0234 P0299: Boost deviation diagnostic enable delay as a function of engine speed

Description: Timer to stabilize enable conditions for over and underboost diagnosis.

Value Units: [sec] Pressure control deviation diagnosis enable delay.
X Unit: [rpm] KnBSTD_n_CntrlDevDiagEngSpdBP - Engine Speed

y/x	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	6,000
1	8.0000	6.5000	5.0000	3.0000	2.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Initial Supporting table - P0234: Overboost pressure deviation limit as a function of engine speed and desired boost pressure

Description: Negative boost pressure control deviation fail limit.

Value Units: [kPa] Negative boost pressure deviation limit.
X Unit: [kPa] KnBSTD_p_CntrlDevDiagDsrdBP - Boost pressure
Y Units: [rpm] KnBSTD_n_CntrlDevDiagEngSpdBP - Engine speed

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

Initial Supporting table - P0299: Underboost pressure deviation limit as a function of engine speed and desired boost pressure

Description: Positive boost pressure control deviation fail limit.

Value Units: [kPa] Positive boost pressure deviation limit.
X Unit: [kPa] KnBSTD_p_CntrlDevDiagDsrdBP - Boost pressure
Y Units: [rpm] KnBSTD_n_CntrlDevDiagEngSpdBP - Engine speed

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

Initial Supporting table - P050D_P1400_CatalystLightOffExtendedEngineRunTimeExit

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

y/x	0	25	50	75	100
0.000	45	45	45	45	45
0.125	45	45	45	45	45
0.250	45	45	45	45	45
0.375	45	45	45	45	45
0.500	25	25	25	25	25
0.625	25	25	25	25	25
0.750	25	25	25	25	25
0.875	25	25	25	25	25
1.000	25	25	25	25	25

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	2	2	3	10	15	20	30
1	0	0	1	1	1	1	1	1	1

Initial Supporting table - P1400_ColdStartDiagnosticDelayBasedOnEngineRunTimeCalAxis

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

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

Initial Supporting table - P1400_EngineSpeedResidual_Table

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

y/x	0	300	500	700	800	860	900	950	1,000	1,200	1,300	1,400	1,500	1,600	1,700	1,800	2,000
1	0	0	0	0	0	0	3	10	10	10	10	10	10	10	10	10	10

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. ExhEngyPerUnitMass 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	-25	-15	-9	-4	0	5	8	10	30
1	6.00	6.00	6.00	6.00	0.25	0.25	0.25	0.25	0.25

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.

y/x	20.00	25.00	30.00	35.00	40.00	45.00	50.00	55.00	100.00
1.00	9.25	20.34	27.90	255.00	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.

y/x	20.00	25.00	30.00	35.00	40.00	45.00	50.00	55.00	100.00
1.00	31.44	47.48	46.52	255.00	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.

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	14.20	28.02	71.73	92.29	124.67	140.77	143.69	141.54	139.49

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.

y/x	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00
1.00	10.00	10.00	43.00	130.00	260.00	460.00	511.99	511.99	511.99

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

Description: P0101_P0106_P010B_P0121_P012B_P0236_P1101 MAF1 Residual Weight Factor based on MAF Est

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

y/x	0	50	70	73	76	79	82	85	89	95	100	110	150	170	200	230	350
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

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

Description: P0101_P0106_P010B_P0121_P012B_P0236_P1101 MAF1 Residual Weight Factor based on RPM

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

y/x	0	400	800	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,600
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Initial Supporting table - P0128_Maximum Accumulated Energy for Start-up ECT conditions - Alternate

Description: KtECTR_E_CTR_WrmUpEnrgyLimTest1

Value Units: Cooling system energy failure threshold (kJ)
X Unit: Minimum ECT for the key cycle (°C)

y/x	-20	-5	10	30	45	60	75
1	10,274	8,614	6,954	4,741	3,081	1,421	1,421

Initial Supporting table - P0128_Maximum Accumulated Energy for Start-up ECT conditions - Primary

Description: KtECTR_E_CTR_WrmUpEnrgyLimTest0

Value Units: Cooling system energy failure threshold (kJ)
X Unit: Minimum ECT for the key cycle (°C)

y/x	-20	-5	10	30	45	60	75
1	12,486	10,730	8,973	6,631	4,875	3,118	3,118

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_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	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_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	500.000	500.000	1,000.000	8,191.875	8,191.875	8,191.875	

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

Description: Fail threshold for PSW per operating loop.

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	5	3	5	3	5	3	5

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	5	5	5	3	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_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	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	23.000	85.000	95.000	105.000	125.000
1.000	7.000	8.699	9.000	9.199	10.000

Initial Supporting table - P16F3_Delta MAP Threshold f(Desired Engine Torque)

Description: Engine Sync based and Time based delta pressure threshold above which Torque Security error is reported.

y/x	0.00	50.00	100.00	150.00	200.00	300.00
1.00	31.44	31.44	31.44	31.44	31.44	31.44

Initial Supporting table - P16F3_Speed Control External Load f(Oil Temp, RPM)

Description: Specifies the external load table for SPDR torque security as a function of engine oil temperature and engine RPM.

y/x	-40.00	-20.00	-10.00	0.00	50.00	90.00
615.00	131.92	117.05	112.72	103.98	52.37	51.45
715.00	131.92	117.05	112.72	103.98	52.37	46.72
815.00	131.12	116.82	110.62	102.38	49.92	37.83
865.00	131.42	116.88	111.72	103.23	50.96	36.26
900.00	131.92	117.05	112.72	103.98	51.31	35.02
950.00	130.64	115.74	111.94	104.46	49.74	33.68
1,000.00	128.18	113.45	109.98	104.75	48.15	32.22
1,050.00	134.50	116.36	106.90	103.36	45.81	28.53
1,100.00	134.12	116.30	106.52	102.19	44.24	31.24
1,200.00	131.81	115.16	106.62	101.28	43.00	34.74
1,500.00	112.02	102.01	95.11	93.28	40.57	41.31
2,000.00	38.92	29.92	24.63	24.32	-7.65	-7.19
2,500.00	-50.26	-50.26	-50.26	-50.26	-50.26	-50.26
3,000.00	-55.29	-55.29	-55.29	-55.29	-55.29	-55.29
4,000.00	-60.31	-60.31	-60.31	-60.31	-60.31	-60.31
5,000.00	-65.34	-65.34	-65.34	-65.34	-65.34	-65.34
6,400.00	-70.36	-70.36	-70.36	-70.36	-70.36	-70.36

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	600	800	1,000	1,200	1,400	1,400	1,800	2,200	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000
2	0.00	0.00	0.00	0.00	1.52	1.50	1.71	2.14	2.06	2.38	2.00	2.00	2.00	1.50	1.40	1.20	1.20
8	0.00	0.00	0.00	0.00	1.55	1.40	1.51	2.13	2.48	2.35	2.56	2.45	1.73	1.39	1.24	1.13	1.13
12	0.00	0.00	0.00	0.00	1.20	0.85	1.12	1.79	2.29	2.10	2.76	2.24	1.81	1.33	1.43	1.29	1.29
16	0.00	0.00	0.00	0.00	1.00	0.79	0.88	1.44	1.81	1.69	2.55	1.78	1.61	1.33	1.25	1.06	1.06
20	0.00	0.00	0.00	0.00	0.89	0.65	0.69	1.30	1.41	1.29	1.93	1.45	1.37	1.20	1.05	0.89	0.89
24	0.00	0.00	0.00	0.00	0.74	0.58	0.56	1.11	1.14	1.06	1.54	1.23	1.06	0.96	0.95	0.80	0.80
30	0.00	0.00	0.00	0.00	0.58	0.44	0.43	0.90	0.88	0.85	1.18	0.99	0.80	0.74	0.73	0.65	0.65
40	0.00	0.00	0.00	0.00	0.40	0.25	0.30	0.51	0.61	0.63	0.83	0.71	0.56	0.53	0.56	0.50	0.50
60	0.00	0.00	0.00	0.00	0.20	0.17	0.17	0.27	0.35	0.38	0.49	0.44	0.32	0.32	0.36	0.26	0.26

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	600	800	1,000	1,200	1,400	1,400	1,800	2,200	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000
2	0.00	-0.02	-0.04	-0.16	-0.22	-0.26	-0.32	-0.31	-0.30	-0.33	-0.15	-0.15	-0.15	-0.15	-0.15	-0.15	-0.15
8	0.00	-0.35	-0.41	-0.60	-0.58	-0.35	-0.70	-0.65	-0.72	-0.45	-0.67	-0.55	-0.20	-0.52	-0.38	-0.35	-0.35
12	0.00	-0.38	-0.47	-0.67	-0.65	-0.54	-0.80	-1.06	-0.90	-0.72	-0.78	-0.73	-0.52	-0.86	-0.74	-0.59	-0.59
16	0.00	-0.43	-0.61	-0.74	-0.68	-0.55	-0.70	-1.19	-0.99	-0.84	-0.85	-0.82	-0.71	-0.96	-0.83	-0.74	-0.74
20	0.00	-0.68	-0.78	-0.78	-0.71	-0.70	-0.88	-1.42	-1.31	-0.93	-0.90	-0.88	-0.80	-0.97	-0.87	-0.82	-0.82
24	0.00	0.00	0.00	-0.78	-0.80	-0.80	-1.12	-1.60	-1.40	-0.99	-0.93	-0.91	-0.87	-1.00	-0.86	-0.88	-0.88
30	0.00	0.00	0.00	-0.70	-0.82	-1.00	-1.18	-1.60	-1.42	-1.05	-0.97	-0.96	-0.92	-1.00	-0.91	-0.87	-0.87
40	0.00	0.00	0.00	-0.64	-0.74	-1.14	-1.12	-1.79	-1.40	-1.13	-1.00	-1.01	-0.99	-1.01	-0.92	-0.84	-0.84
60	0.00	0.00	0.00	0.00	0.00	-1.17	-1.23	-1.69	-1.42	-1.11	-1.03	-1.07	-1.06	-1.08	-0.93	-0.82	-0.82

Initial Supporting table - 1stFireAfterMisJerkAFM

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

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
2	3	15	15	15	15	15	15	15	15
8	2	15	15	15	15	15	15	15	15
12	2	15	15	15	15	15	15	15	15
16	2	13	15	15	15	15	15	15	15
20	2	11	15	15	15	15	15	15	15
24	2	9	15	15	15	15	15	15	15
30	2	8	12	15	15	15	15	15	15
40	2	6	9	15	15	15	15	15	15
60	2	2	4	12	15	15	15	15	15

Initial Supporting table - 1stFireAftrMisAcelAFM

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

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
2	2	15	15	15	15	15	15	15	15
8	3	15	15	15	15	15	15	15	15
12	3	15	15	15	15	15	15	15	15
16	3	15	15	15	15	15	15	15	15
20	2	15	15	15	15	15	15	15	15
24	2	15	15	15	15	15	15	15	15
30	2	15	15	15	15	15	15	15	15
40	2	15	15	15	15	15	15	15	15
60	2	8	12	15	15	15	15	15	15

Initial Supporting table - Abnormal Cyl Mode

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

Value Units: Number of consecutive number of decelerating cylinders (integer)
X Unit: thousands of RPM (rpm/1000)

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

Initial Supporting table - Abnormal Rev Mode

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

Value Units: Number of consecutive number of decelerating cylinders (integer)
X Unit: thousands of RPM (rpm/1000)

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

Initial Supporting table - Abnormal SCD Mode

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

Value Units: Number of consecutive number of decelerating cylinders (integer)
X Unit: thousands of RPM (rpm/1000)

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

Initial Supporting table - Bank_SCD_Decel

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

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	600	700	800	900	1,000	1,100	1,200	1,400	1,600
2	5.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
8	12.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
12	12.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
16	12.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
20	12.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
24	10.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
30	8.50	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
40	7.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
60	3.00	8.50	10.00	15.00	11.50	15.00	15.00	15.00	15.00

Initial Supporting table - Bank_SCD_Jerk

Description: Used for P0300 - P0308, Mulitplier to Medres SCD jerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: mulitplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	600	700	800	900	1,000	1,100	1,200	1,400	1,600
2	5.00	5.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
8	8.00	10.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
12	7.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
16	5.50	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
20	4.50	14.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
24	4.00	12.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
30	3.00	10.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
40	2.50	7.50	11.00	15.00	15.00	15.00	15.00	15.00	15.00
60	1.50	3.00	4.50	8.00	11.00	15.00	15.00	15.00	15.00

Initial Supporting table - BankCylModeDecel

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

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	600	800	1,000	1,200	1,400	1,800	2,200	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
2	2.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
8	3.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
12	3.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
16	2.50	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
20	2.20	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
24	1.75	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
30	1.50	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
40	1.50	12.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
60	1.50	5.50	8.00	11.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00

Initial Supporting table - BankCylModeJerk

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

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	600	800	1,000	1,200	1,400	1,800	2,200	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
2	3.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
8	3.50	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
12	2.00	12.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
16	2.00	10.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
20	1.50	8.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
24	1.50	4.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
30	1.50	3.50	11.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
40	1.50	4.00	7.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
60	1.50	1.50	3.00	6.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00

Initial Supporting table - Catalyst_Damage_Misfire_Percentage

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

Value Units: percent misfire over 200 revolutions (%)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000
0	22.5	22.5	22.5	22.5	20.0	16.7	12.5	5.0
10	22.5	22.5	22.5	20.0	16.7	14.3	10.0	4.6
20	22.5	22.5	20.0	16.7	14.3	10.0	5.0	4.6
30	22.5	20.0	16.7	12.5	10.0	6.3	4.6	4.6
40	20.0	16.7	11.1	9.1	6.7	4.6	4.6	4.6
50	16.7	11.1	6.3	5.0	4.6	4.6	4.6	4.6
60	11.1	6.3	4.6	4.6	4.6	4.6	4.6	4.6
70	6.3	4.6	4.6	4.6	4.6	4.6	4.6	4.6
80	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
90	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
100	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6

Initial Supporting table - ClyAfterAFM_Decel

Description: Used for P0300 - P0308, Mulitplier to Lores decel to account for different pattern of misfire after a deactivated cylider. Similar to the second cylinder of consecutive cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
2	2.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
8	3.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
12	3.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
16	2.50	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
20	2.20	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
24	1.75	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
30	1.50	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
40	1.50	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
60	1.50	8.00	12.00	15.00	15.00	15.00	15.00	15.00	15.00

Initial Supporting table - ClyBeforeAFM_Jerk

Description: Used for P0300 - P0308, Mulitplier to Lores decel to account for different pattern of misfire before a deactivated cylider, but after an active cylinder that follows an deactive cylinder on engine that supports cylinder deactivation in non even fire patterns.. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
2	2.60	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
8	1.60	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
12	1.50	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
16	1.50	12.50	15.00	15.00	15.00	15.00	15.00	15.00	15.00
20	1.50	10.91	15.00	15.00	15.00	15.00	15.00	15.00	15.00
24	1.50	9.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
30	1.50	7.56	12.00	15.00	15.00	15.00	15.00	15.00	15.00
40	1.50	5.77	9.00	15.00	15.00	15.00	15.00	15.00	15.00
60	1.50	2.45	3.80	11.50	15.00	15.00	15.00	15.00	15.00

Initial Supporting table - CombustModeIdleTbl

Description: Used for P0300 - P0308, Only used on Diesel engines. Combustion modes that will force use of Idle table. A value of CeCMBR_i_CombModesMax means not selected.

Value Units: Enumerated value of differant combustion modes (enumeration)
X Unit: Current Combustion Mode (enumeration)

CombustModeIdleTbl - Part 1						
y/x	0	1	2	3	4	5
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax

CombustModeIdleTbl - Part 2						
y/x	6	7	8	9	10	11
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax

CombustModeIdleTbl - Part 3						
y/x	12	13	14	15	16	
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	

Initial Supporting table - ConsecCylModDecel

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

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	600	800	1,000	1,200	1,400	1,800	2,200	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
2	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30
8	1.30	1.30	1.30	1.15	1.10	0.92	1.10	1.10	1.20	1.20	1.20	1.10	1.20	1.20	1.20	1.20	1.20
12	1.30	1.30	1.30	1.24	1.06	0.86	0.89	0.97	1.21	1.19	1.10	1.00	1.20	1.20	1.20	1.20	1.20
16	1.30	1.30	1.30	1.21	1.04	0.83	0.85	0.87	1.07	1.02	1.11	0.85	1.09	1.06	1.00	0.94	0.94
20	1.30	1.30	1.30	1.19	1.03	0.85	0.77	0.85	0.96	0.89	1.00	0.90	1.11	1.10	0.95	0.94	0.94
24	1.30	1.30	1.30	1.18	1.02	0.91	0.72	0.86	0.86	0.80	0.94	0.91	1.09	1.00	0.95	1.00	1.00
30	1.30	1.30	1.30	1.17	1.02	0.88	0.67	0.90	0.77	0.73	0.89	0.94	1.04	0.97	0.92	1.00	1.00
40	1.30	1.30	1.30	1.30	0.97	0.89	0.65	0.68	0.68	0.67	0.83	0.97	1.02	0.86	0.85	1.15	1.15
60	1.30	1.30	1.30	1.30	1.30	1.00	0.65	0.59	0.58	0.65	0.77	0.99	0.99	0.80	0.80	1.10	1.10

Initial Supporting table - ConsecCylModeJerk

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

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	600	800	1,000	1,200	1,400	1,800	2,200	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
2	0	0	0	-1	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	-1	-1	-1	-1	0	0	0	0	0	0	0	0	0	0
16	0	0	0	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	0	0
20	0	0	0	-1	-1	-1	-2	-2	-1	0	0	0	0	0	0	0	0
24	0	0	0	-1	-1	-1	-2	-2	-1	-1	0	0	0	0	0	0	0
30	0	0	0	-1	-1	-1	-2	-2	-1	-1	0	0	0	0	0	0	0
40	0	0	0	0	-1	-1	-2	-4	-2	-1	0	0	0	0	0	0	0
60	0	0	0	0	0	-1	-3	-3	-2	-1	0	0	0	0	0	0	0

Initial Supporting table - ConsecSCD_Decel

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

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	600	700	800	900	1,000	1,100	1,200	1,400	1,600
2	1.50	1.50	1.50	1.30	1.30	1.30	1.40	1.30	1.20
8	1.20	1.00	0.86	0.92	0.87	0.75	0.86	0.75	0.75
12	1.07	0.89	0.86	0.95	0.85	0.69	0.60	0.75	0.75
16	0.93	0.87	0.90	0.99	0.96	0.80	0.80	0.80	0.75
20	0.98	0.92	0.91	1.04	1.10	0.82	0.85	0.80	0.60
24	0.98	0.95	0.91	1.07	1.21	0.89	0.96	0.70	0.60
30	0.98	0.95	0.91	1.07	1.21	0.89	0.91	0.70	0.70
40	0.98	0.95	0.91	1.07	1.21	0.89	0.91	0.70	0.75
60	0.98	0.95	0.91	1.07	1.21	0.89	0.91	0.80	0.75

Initial Supporting table - ConsecSCD_Jerk

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

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	600	700	800	900	1,000	1,100	1,200	1,400	1,600
2	0.20	0.20	0.25	0.30	0.05	0.10	0.50	0.50	0.50
8	0.14	0.01	-0.20	-0.40	-0.50	-1.10	-1.10	-1.20	-1.50
12	0.08	-0.08	-0.06	-0.15	-0.36	-0.99	-1.70	-1.70	-1.65
16	0.05	-0.07	-0.11	-0.20	-0.50	-1.12	-1.70	-1.96	-1.63
20	0.03	-0.06	-0.12	-0.20	-0.50	-1.20	-1.40	-1.93	-1.69
24	0.01	-0.06	-0.07	-0.22	-0.50	-1.13	-1.24	-1.80	-1.50
30	0.01	-0.06	-0.07	-0.22	-0.50	-1.13	-1.07	-1.50	-1.54
40	0.01	-0.06	-0.07	-0.22	-0.50	-1.13	-1.07	-1.50	-1.39
60	0.01	-0.06	-0.07	-0.22	-0.50	-1.13	-1.07	-1.50	-1.39

Initial Supporting table - CylAfterAFM_Jerk

Description: Used for P0300 - P0308, Mulitplier to Lores Jerk to account for different pattern of misfire after a deactivated cylider. Similar to the second cylinder of consecutive cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
2	3	15	15	15	15	15	15	15	15
8	2	15	15	15	15	15	15	15	15
12	2	15	15	15	15	15	15	15	15
16	2	13	15	15	15	15	15	15	15
20	2	11	15	15	15	15	15	15	15
24	2	9	15	15	15	15	15	15	15
30	2	8	12	15	15	15	15	15	15
40	2	6	9	15	15	15	15	15	15
60	2	2	4	12	15	15	15	15	15

Initial Supporting table - CylBeforeAFM_Decel

Description: Used for P0300 - P0308, Mulitplier to Lores decel to account for different pattern of misfire before a deactivated cylider, but after an active cylinder that follows an deactive cylinder on engine that supports cylinder deactivation in non even fire patterns.. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
2	2.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
8	3.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
12	3.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
16	2.50	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
20	2.20	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
24	1.75	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
30	1.50	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
40	1.50	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
60	1.50	8.00	12.00	15.00	15.00	15.00	15.00	15.00	15.00

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	12,159	11,054	3,677	2,261	1,381	937	612	479	347	291	204	133	98
6	11,560	10,509	2,950	1,768	1,214	736	456	385	338	261	188	140	87
8	11,388	10,353	2,793	1,623	1,111	627	465	429	383	258	202	159	98
10	11,532	10,483	3,287	1,793	1,057	744	544	508	427	287	221	172	110
12	11,597	10,543	3,753	1,962	1,161	865	648	597	478	324	243	204	126
14	12,067	10,970	4,238	2,088	1,311	970	776	701	551	362	300	236	148
16	12,748	11,589	5,203	2,243	1,504	1,065	897	772	619	399	317	259	171
18	13,919	12,653	5,735	2,369	1,685	1,157	961	848	686	437	330	281	187
20	15,090	13,718	6,134	2,523	1,848	1,298	1,060	925	754	474	352	303	203
22	16,261	14,783	6,533	2,734	1,967	1,432	1,136	1,002	822	512	375	312	211
24	17,432	15,847	6,965	3,309	2,238	1,657	1,248	1,079	889	549	398	326	229
26	18,603	16,912	7,409	3,478	2,390	1,780	1,389	1,155	957	587	421	357	251
30	20,945	19,041	8,241	3,815	2,661	1,978	1,563	1,309	1,092	662	466	409	283
40	22,000	20,000	10,195	4,647	3,314	2,563	2,076	1,692	1,430	882	581	519	362
50	22,000	20,000	12,149	5,691	4,109	3,056	2,568	2,098	1,772	1,101	745	630	442
60	22,000	20,000	13,994	6,706	4,772	3,614	3,036	2,540	2,103	1,320	914	740	522
97	22,000	20,000	20,000	9,727	7,130	5,380	4,601	3,843	3,101	2,141	1,547	1,150	822

CylModeDecel - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
3	66	52	44	43	32	29	21	13	10	14	12	11	15
6	62	51	43	38	30	25	17	12	9	10	10	8	8
8	72	56	43	35	31	23	16	11	9	9	8	7	7
10	83	59	46	35	32	21	15	11	9	8	7	6	6
12	95	62	50	37	34	21	17	11	9	7	7	6	6
14	106	65	54	39	36	21	19	11	9	8	8	6	6
16	117	68	60	45	42	22	21	12	9	8	8	6	6
18	132	71	65	51	47	25	23	13	10	9	9	6	6
20	148	76	71	57	53	29	25	14	10	10	9	7	6
22	164	81	76	62	59	32	27	15	11	10	10	7	7
24	179	87	80	68	64	35	29	17	13	11	10	7	7

Initial Supporting table - CylModeDecel

26	195	92	86	74	68	38	31	19	14	12	11	8	8
30	226	103	96	85	77	45	35	23	16	13	12	9	9
40	305	163	150	114	98	61	45	32	22	17	13	12	13
50	383	224	195	142	119	77	55	41	27	21	16	16	17
60	462	286	243	171	140	93	65	50	33	25	20	18	23
97	757	518	398	278	220	161	104	85	54	41	32	28	33

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	11,424	10,386	4,511	2,575	1,553	1,090	711	578	418	268	196	107	75
6	9,966	9,060	4,500	3,275	1,946	1,351	961	587	428	296	236	162	105
8	9,900	9,000	6,000	3,811	2,319	1,763	1,201	751	555	338	257	194	135
10	20,000	10,433	7,000	4,143	2,686	2,189	1,460	1,071	689	399	280	226	150
12	20,000	11,885	8,143	4,752	2,984	2,620	1,720	1,354	734	461	303	262	180
14	20,000	13,336	9,284	5,767	3,242	2,836	1,979	1,366	859	522	326	285	218
16	20,000	14,788	10,425	6,152	3,698	3,040	2,238	1,414	898	583	349	304	248
18	20,000	16,239	11,567	6,521	4,514	3,289	2,497	1,462	976	644	380	334	257
20	20,000	17,691	12,708	6,930	5,412	3,482	2,757	1,510	1,080	705	425	368	268
22	20,000	19,143	13,849	7,163	5,824	3,905	2,917	1,604	1,172	723	464	379	280
24	20,000	20,000	14,991	7,371	6,376	4,273	3,184	1,775	1,303	751	509	386	291
26	20,000	20,000	16,132	7,989	6,939	4,981	3,624	1,935	1,476	788	548	399	303
30	20,000	20,000	18,415	9,094	7,651	5,746	4,195	2,404	1,823	909	615	416	329
40	20,000	20,000	20,000	11,791	10,243	7,781	5,716	3,457	2,689	1,346	800	572	459
50	20,000	20,000	20,000	14,007	12,573	9,637	7,237	4,541	3,550	1,655	984	732	588
60	20,000	20,000	20,000	20,000	14,988	11,493	8,758	5,625	4,357	1,965	1,160	908	717
97	20,000	20,000	20,000	20,000	19,887	18,452	13,131	8,742	7,046	3,125	1,814	1,498	1,203

CylModeJerk - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
3	59	44	32	27	26	23	21	17	15	17	15	14	13
6	74	56	46	37	35	22	19	14	13	14	12	10	10
8	85	63	53	45	39	23	19	13	12	12	10	8	7
10	98	70	61	53	44	28	20	13	11	10	9	7	7
12	113	74	64	57	49	32	23	14	11	10	9	7	7
14	129	79	69	62	54	37	25	16	13	11	9	8	7
16	144	84	75	68	58	41	28	18	14	12	10	8	7
18	155	89	77	70	63	46	30	20	16	14	11	9	9
20	162	94	82	74	68	50	33	22	18	15	11	10	10
22	166	99	86	78	73	55	36	24	20	17	12	11	11
24	178	104	91	83	77	59	38	26	21	18	12	12	12

Initial Supporting table - CylModeJerk

26	181	109	98	90	82	64	41	28	23	19	13	13	13
30	202	119	109	102	92	73	46	33	27	22	16	15	15
40	281	144	134	126	116	95	58	43	35	30	22	21	21
50	362	169	154	145	137	118	71	54	44	37	27	27	27
60	444	228	214	195	179	141	83	64	53	44	33	33	33
97	750	419	387	342	294	225	130	100	86	72	54	53	53

Initial Supporting table - DeacCylInversionDecel

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

Value Units: Delta time per cylinder (usec)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
2	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0

Initial Supporting table - DeacCylInversionJerk

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

Value Units: Change in Delta time per cylinder from last cylinder (usec)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
2	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0

Initial Supporting table - EngineOverSpeedLimit

Description: Engine OverSpeed Limit versus gear

Value Units: RPM
X Unit: Enumeration of transmission gear state (enumeration)

EngineOverSpeedLimit - Part 1

y/x	CeTGRR_e_TransGr1	CeTGRR_e_TransGr2	CeTGRR_e_TransGr3	CeTGRR_e_TransGr4	CeTGRR_e_TransGr5	CeTGRR_e_TransGr6	CeTGRR_e_TransGr9
1	6,500	6,500	6,500	6,500	6,500	6,500	6,500

EngineOverSpeedLimit - Part 2

y/x	CeTGRR_e_TransGr10	CeTGRR_e_TransGrNeut	CeTGRR_e_TransGrRvrs	CeTGRR_e_TransGrPark	CeTGRR_e_TransGr7	CeTGRR_e_TransGr8	
1	6,500	4,000	4,000	4,000	6,500	6,500	

Initial Supporting table - InfrequentRegen

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

Value Units: Enumerated value of differant combustion modes (enumeration)
X Unit: Current Combustion Mode (enumeration)

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

Initial Supporting table - Number of Normals

Description: Used for P0300-P0308. Number of Normals for the Driveline Ring Filter
After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.

Value Units: Number of Engine cycles after isolated misfire (Engine cycles)
X Unit: thousands of RPM (rpm/1000)

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

Initial Supporting table - P00C6 - High Pressure Pump Control Mode timeout

Description: High Pressure Pump Control Mode timeout

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

y/x	-40	-32	-24	-16	-12	-8	0	8	16	20	24	32	40	48	64	80	96
1	12.0	12.0	11.5	9.0	9.0	7.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0

upporting table - P00C6 - maximum acceptable counts of fuel rail pressure below KtFHPD_p_HPS_PressFallLoThrsh after High Pressure Sta

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: Ethanol Precent (%)
Y Units: Coolant Temperature (Deg C)

y/x	-40	-32	-24	-16	-12	-8	0	8	16	20	24	32	40	48	64	80	96
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: Ethanol Precent (%)
Y Units: Coolant Temperature (Deg C)

y/x	-40	-32	-24	-16	-12	-8	0	8	16	20	24	32	40	48	64	80	96
0	2.0	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
13	2.0	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
25	2.0	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
38	2.0	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
50	2.0	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
63	2.0	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
75	2.0	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
88	2.0	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
100	2.0	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6

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

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

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

y/x	-40	-32	-24	-16	-12	-8	0	8	16	20	24	32	40	48	64	80	96
0	20.0	20.0	20.0	15.0	15.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
13	20.0	20.0	20.0	15.0	15.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
25	20.0	20.0	20.0	15.0	15.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
38	20.0	20.0	20.0	15.0	15.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
50	20.0	20.0	20.0	15.0	15.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
63	20.0	20.0	20.0	15.0	15.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
75	20.0	20.0	20.0	15.0	15.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
88	20.0	20.0	20.0	15.0	15.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
100	20.0	20.0	20.0	15.0	15.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

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	0.75	0.75	0.75	0.75	0.79	0.82	0.86	0.92	0.95

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	1.63	2.04	2.46	2.87	3.29	3.71	4.12	4.54	4.95	5.37	5.79	6.20	6.62	7.03	7.45	7.87	8.28
554.00	1.16	0.86	0.71	0.63	0.57	0.53	0.51	0.49	0.47	0.46	0.45	0.44	0.43	0.42	0.42	0.41	0.41
593.00	1.21	0.89	0.74	0.65	0.59	0.55	0.52	0.50	0.48	0.47	0.46	0.45	0.44	0.43	0.43	0.42	0.42
632.00	1.26	0.93	0.76	0.67	0.61	0.57	0.54	0.51	0.50	0.48	0.47	0.46	0.45	0.45	0.44	0.43	0.43
671.00	1.31	0.96	0.79	0.69	0.63	0.58	0.55	0.53	0.51	0.50	0.48	0.47	0.46	0.46	0.45	0.45	0.44
710.00	1.36	1.00	0.82	0.72	0.65	0.60	0.57	0.55	0.53	0.51	0.50	0.49	0.48	0.47	0.46	0.46	0.45
749.00	1.42	1.04	0.85	0.74	0.67	0.62	0.59	0.56	0.54	0.53	0.51	0.50	0.49	0.48	0.48	0.47	0.47
788.00	1.47	1.08	0.88	0.77	0.69	0.64	0.61	0.58	0.56	0.54	0.53	0.52	0.51	0.50	0.49	0.48	0.48
827.00	1.54	1.12	0.91	0.79	0.72	0.67	0.63	0.60	0.58	0.56	0.54	0.53	0.52	0.51	0.50	0.50	0.49
866.00	1.60	1.16	0.94	0.82	0.74	0.69	0.65	0.62	0.60	0.58	0.56	0.55	0.54	0.53	0.52	0.51	0.51

Initial Supporting table - P0420_WorstPassingOSCTableB1

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

y/x	1.63	2.04	2.46	2.87	3.29	3.71	4.12	4.54	4.95	5.37	5.79	6.20	6.62	7.03	7.45	7.87	8.28
554.00	3.10	1.93	1.39	1.11	0.93	0.81	0.73	0.67	0.62	0.58	0.55	0.53	0.50	0.49	0.47	0.46	0.45
593.00	3.15	1.96	1.41	1.13	0.95	0.83	0.74	0.68	0.63	0.59	0.56	0.54	0.51	0.50	0.48	0.47	0.45
632.00	3.20	1.99	1.44	1.14	0.96	0.84	0.75	0.69	0.64	0.60	0.57	0.54	0.52	0.50	0.49	0.47	0.46
671.00	3.24	2.02	1.46	1.16	0.98	0.85	0.77	0.70	0.65	0.61	0.58	0.55	0.53	0.51	0.50	0.48	0.47
710.00	3.29	2.05	1.48	1.18	0.99	0.87	0.78	0.71	0.67	0.62	0.59	0.57	0.54	0.52	0.51	0.49	0.48
749.00	3.34	2.08	1.51	1.20	1.01	0.88	0.79	0.73	0.68	0.64	0.60	0.58	0.55	0.53	0.52	0.50	0.49
788.00	3.39	2.11	1.53	1.22	1.03	0.90	0.81	0.74	0.69	0.65	0.61	0.59	0.56	0.54	0.53	0.51	0.50
827.00	3.45	2.15	1.56	1.24	1.05	0.92	0.82	0.75	0.70	0.66	0.63	0.60	0.57	0.55	0.54	0.52	0.51
866.00	3.50	2.18	1.58	1.27	1.07	0.93	0.84	0.77	0.72	0.67	0.64	0.61	0.58	0.56	0.55	0.53	0.52

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	5	5	5	5	5

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

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

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

y/x	1.50	3.00	4.00	15.00	20.00	25.00	27.50	32.00	36.00
1	-3.00	-3.00	-3.00	-3.00	-4.00	-4.00	-4.00	-4.00	-4.00

Initial Supporting table - P2635 Max Fuel Flow

Description: P2635 Maximum Fuel Flow Disable Criteria
Maximum allowed fuel flow values above which the diagnostic is disabled

Value Units: grams / sec
X Unit: kPa [desired fuel pressure]
Y Units: Volts [device supply]

y/x	200.0	250.0	300.0	350.0	400.0	450.0	500.0	550.0	600.0
4.5	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
6.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
7.5	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
9.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
10.5	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
12.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
13.5	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
15.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
16.5	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
18.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
19.5	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
21.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
22.5	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
24.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
25.5	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
27.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0
28.5	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0	512.0

Initial Supporting table - P2635 Threshold High

Description: P2635 Filtered Fuel Pressure Error High Threshold [under-performing pump]
Instantaneously calculated filtered fuel pressure error

Value Units: kPa
X Unit: kPa [desired fuel pressure]
Y Units: grams / sec [fuel flow]

y/x	200.0	250.0	300.0	350.0	400.0	450.0	500.0	550.0	600.0
0.0	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0
1.5	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0
3.0	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0
4.5	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0
6.0	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0
7.5	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0
9.0	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0
10.5	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0
12.0	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0
13.5	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0
15.0	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0
16.5	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0
18.0	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0
19.5	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0
21.0	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0
22.5	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0
24.0	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0
25.5	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0
27.0	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0
28.5	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0
30.0	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0
31.5	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0
33.0	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0
34.5	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0
36.0	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0
37.5	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0
39.0	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0
40.5	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0
42.0	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0
43.5	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0
45.0	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0

Initial Supporting table - P2635 Threshold High

46.5	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0
48.0	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0

Initial Supporting table - P2635 Threshold Low

Description: P2635 Filtered Pressure Error Low Threshold [over-performing pump]
Instantaneously calculated filtered fuel pressure error

Value Units: kPa
X Unit: kPa [desired fuel pressure]
Y Units: grams / sec [fuel flow]

y/x	200.0	250.0	300.0	350.0	400.0	450.0	500.0	550.0	600.0
0.0	-260.0	-210.0	-160.0	-110.0	-60.0	-67.5	-75.0	-82.5	-90.0
1.5	-145.0	-125.0	-102.5	-81.3	-60.0	-67.5	-75.0	-82.5	-90.0
3.0	-30.0	-37.5	-45.0	-52.5	-60.0	-67.5	-75.0	-82.5	-90.0
4.5	-30.0	-37.5	-45.0	-52.5	-60.0	-67.5	-75.0	-82.5	-90.0
6.0	-30.0	-37.5	-45.0	-52.5	-60.0	-67.5	-75.0	-82.5	-90.0
7.5	-30.0	-37.5	-45.0	-52.5	-60.0	-67.5	-75.0	-82.5	-90.0
9.0	-30.0	-37.5	-45.0	-52.5	-60.0	-67.5	-75.0	-82.5	-90.0
10.5	-30.0	-37.5	-45.0	-52.5	-60.0	-67.5	-75.0	-82.5	-90.0
12.0	-30.0	-37.5	-45.0	-52.5	-60.0	-67.5	-75.0	-82.5	-90.0
13.5	-30.0	-37.5	-45.0	-52.5	-60.0	-67.5	-75.0	-82.5	-90.0
15.0	-30.0	-37.5	-45.0	-52.5	-60.0	-67.5	-75.0	-82.5	-90.0
16.5	-30.0	-37.5	-45.0	-52.5	-60.0	-67.5	-75.0	-82.5	-90.0
18.0	-30.0	-37.5	-45.0	-52.5	-60.0	-67.5	-75.0	-82.5	-90.0
19.5	-30.0	-37.5	-45.0	-52.5	-60.0	-67.5	-75.0	-82.5	-90.0
21.0	-30.0	-37.5	-45.0	-52.5	-60.0	-67.5	-75.0	-82.5	-90.0
22.5	-30.0	-37.5	-45.0	-52.5	-60.0	-67.5	-75.0	-82.5	-90.0
24.0	-30.0	-37.5	-45.0	-52.5	-60.0	-67.5	-75.0	-82.5	-90.0
25.5	-30.0	-37.5	-45.0	-52.5	-60.0	-67.5	-75.0	-82.5	-90.0
27.0	-30.0	-37.5	-45.0	-52.5	-60.0	-67.5	-75.0	-82.5	-90.0
28.5	-30.0	-37.5	-45.0	-52.5	-60.0	-67.5	-75.0	-82.5	-90.0
30.0	-30.0	-37.5	-45.0	-52.5	-60.0	-67.5	-75.0	-82.5	-90.0
31.5	-30.0	-37.5	-45.0	-52.5	-60.0	-67.5	-75.0	-82.5	-90.0
33.0	-30.0	-37.5	-45.0	-52.5	-60.0	-67.5	-75.0	-82.5	-90.0
34.5	-30.0	-37.5	-45.0	-52.5	-60.0	-67.5	-75.0	-82.5	-90.0
36.0	-30.0	-37.5	-45.0	-52.5	-60.0	-67.5	-75.0	-82.5	-90.0
37.5	-30.0	-37.5	-45.0	-52.5	-60.0	-67.5	-75.0	-82.5	-90.0
39.0	-30.0	-37.5	-45.0	-52.5	-60.0	-67.5	-75.0	-82.5	-90.0
40.5	-30.0	-37.5	-45.0	-52.5	-60.0	-67.5	-75.0	-82.5	-90.0
42.0	-30.0	-37.5	-45.0	-52.5	-60.0	-67.5	-75.0	-82.5	-90.0
43.5	-30.0	-37.5	-45.0	-52.5	-60.0	-67.5	-75.0	-82.5	-90.0
45.0	-30.0	-37.5	-45.0	-52.5	-60.0	-67.5	-75.0	-82.5	-90.0

Initial Supporting table - P2635 Threshold Low

46.5	-30.0	-37.5	-45.0	-52.5	-60.0	-67.5	-75.0	-82.5	-90.0
48.0	-30.0	-37.5	-45.0	-52.5	-60.0	-67.5	-75.0	-82.5	-90.0

- 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

Initial Supporting table - Pair_SCD_Decel

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

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	600	700	800	900	1,000	1,100	1,200	1,400	1,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	0.75	1.00	1.00	0.86	1.00	1.00	1.00	0.93	0.90
12	0.75	0.91	1.00	0.94	1.00	1.00	1.00	1.00	1.00
16	0.75	0.89	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	0.75	0.89	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	0.75	0.89	1.00	1.00	1.00	1.00	1.00	0.90	0.90
30	0.75	0.89	1.00	1.00	1.00	1.00	1.00	0.90	0.90
40	0.75	0.89	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	0.75	0.89	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - Pair_SCD_Jerk

Description: Used for P0300 - P0308, Mulitplier to P0300_SCD_Jerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	600	700	800	900	1,000	1,100	1,200	1,400	1,600
2	1.50	1.50	1.50	1.20	1.50	1.50	1.50	1.50	1.50
8	1.23	1.42	1.30	1.29	1.50	1.35	1.50	1.50	1.50
12	1.15	1.25	1.18	1.24	1.39	1.35	1.50	1.50	1.50
16	1.15	1.40	1.23	1.40	1.25	1.40	1.50	1.50	1.50
20	1.15	1.40	1.23	1.40	1.25	1.50	1.20	1.50	1.50
24	1.15	1.40	1.23	1.40	1.25	1.50	1.00	1.50	1.50
30	1.15	1.40	1.23	1.40	1.25	1.50	0.80	1.50	1.50
40	1.15	1.40	1.23	1.40	1.25	1.50	0.80	1.50	1.50
60	1.15	1.40	1.23	1.40	1.25	1.50	0.90	1.50	1.50

Initial Supporting table - PairCylModeDecel

Description: Used for P0300 - P0308, Mulitplier to Cyl Mode Deceleration to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: mulitplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	600	800	1,000	1,200	1,400	1,800	2,200	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.32	0.95	0.90	0.80	0.85	0.85	0.85	0.90	0.90	0.90	0.90	0.90	0.70	1.00	1.00
12	1.00	1.00	1.29	1.10	0.76	0.57	0.60	0.73	0.75	0.66	0.83	0.80	0.92	0.90	0.80	1.00	1.00
16	1.00	1.00	1.18	1.10	0.85	0.59	0.72	0.85	0.76	0.69	0.82	0.71	0.90	0.90	0.95	1.00	1.00
20	1.00	1.00	1.21	0.95	0.96	0.62	0.75	0.90	0.72	0.66	0.77	0.67	0.85	0.95	0.84	0.85	1.00
24	1.00	1.00	1.21	0.96	1.03	0.69	0.70	0.90	0.69	0.65	0.73	0.65	0.76	0.84	0.81	0.75	1.00
30	1.00	1.00	1.18	0.95	1.11	0.68	0.72	0.95	0.67	0.65	0.71	0.64	0.69	0.77	0.77	0.70	1.00
40	1.00	1.00	1.16	0.94	1.16	0.71	0.72	0.85	0.64	0.67	0.68	0.61	0.62	0.70	0.68	0.73	1.00
60	1.00	1.00	0.72	0.72	0.72	0.72	0.72	0.72	0.62	0.70	0.65	0.60	0.55	0.63	0.60	0.67	1.00

Initial Supporting table - PairCylModeJerk

Description: Used for P0300 - P0308, Mulitplier to P0300_CylModeJerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	600	800	1,000	1,200	1,400	1,800	2,200	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.30
8	1.00	1.00	0.80	0.85	1.00	0.90	0.90	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	0.80	0.95	0.90	0.85	0.90	1.21	0.96	0.95	1.05	1.00	1.00	1.08	1.00	1.00	1.00
16	1.00	1.00	0.80	0.90	0.96	0.90	1.03	1.32	1.04	0.98	0.83	0.82	1.06	1.00	0.92	1.11	1.11
20	1.00	1.00	1.00	1.29	0.97	0.90	1.19	1.45	1.29	1.03	0.79	0.80	0.95	0.86	0.83	1.05	1.05
24	1.00	1.00	1.00	1.31	1.10	1.00	1.33	1.54	1.35	1.07	0.76	0.79	0.88	0.86	0.81	1.08	1.08
30	1.00	1.00	1.00	1.20	1.10	1.15	1.49	1.57	1.31	1.11	0.74	0.79	0.82	0.81	0.82	0.97	0.97
40	1.00	1.00	1.00	1.10	1.10	1.15	1.46	1.65	1.33	1.15	0.72	0.80	0.76	0.77	0.76	0.81	0.81
60	1.00	1.00	1.00	1.00	1.00	1.10	1.50	1.52	1.22	1.09	0.68	0.80	0.70	0.73	0.73	0.76	0.76

Initial Supporting table - Random_SCD_Decel

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

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	600	700	800	900	1,000	1,100	1,200	1,400	1,600
2	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
8	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
12	1.05	1.05	1.05	1.05	1.00	1.00	1.00	1.00	1.00
16	1.10	1.05	1.10	1.10	1.05	1.00	1.00	1.00	1.00
20	1.30	1.30	1.30	1.30	1.20	1.00	1.00	1.00	1.15
24	1.45	1.45	1.45	1.45	1.30	1.10	1.10	1.10	1.20
30	1.60	1.60	1.60	1.60	1.45	1.20	1.20	1.20	1.30
40	1.80	1.80	1.80	1.80	1.80	1.30	1.30	1.30	1.40
60	2.00	2.00	2.00	2.00	1.80	1.40	1.40	1.40	1.50

Initial Supporting table - Random_SCD_Jerk

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

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	600	700	800	900	1,000	1,100	1,200	1,400	1,600
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RandomAFM_Decl

Description: Used for P0300 - P0308, Mulitplier to Cylinder_Decel while in Cylnder Deactivation mode to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
2	2.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
8	3.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
12	3.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
16	2.50	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
20	2.20	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
24	1.75	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
30	1.50	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
40	1.50	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
60	1.50	8.00	12.00	15.00	15.00	15.00	15.00	15.00	15.00

Initial Supporting table - RandomAFM_Jerk

Description: Used for P0300 - P0308, Mulitplier to Cylinder_Jerk while in Cylnder Deactivation mode to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
2	2.60	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
8	1.60	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
12	1.50	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
16	1.50	12.50	15.00	15.00	15.00	15.00	15.00	15.00	15.00
20	1.50	10.91	15.00	15.00	15.00	15.00	15.00	15.00	15.00
24	1.50	9.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
30	1.50	7.56	12.00	15.00	15.00	15.00	15.00	15.00	15.00
40	1.50	5.77	9.00	15.00	15.00	15.00	15.00	15.00	15.00
60	1.50	2.45	3.80	11.50	15.00	15.00	15.00	15.00	15.00

Initial Supporting table - RandomCylModDecel

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

Value Units: Multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	600	800	1,000	1,200	1,400	1,800	2,200	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.25	1.10	1.27	1.40	1.30	1.30	1.00	1.15	1.14	1.00	1.06	1.00	1.00
12	1.00	1.00	1.00	1.00	1.40	1.13	1.40	1.69	1.92	1.74	1.76	1.64	1.57	1.33	1.36	1.14	1.14
16	1.00	1.00	1.00	1.00	1.46	1.10	1.50	1.79	2.02	1.82	2.14	1.66	1.87	1.72	1.50	1.25	1.25
20	1.00	1.00	1.00	1.00	1.50	1.12	1.40	2.00	1.98	1.73	2.04	1.67	1.96	1.90	1.53	1.28	1.28
24	1.00	1.00	1.00	1.00	1.53	1.21	1.40	2.00	1.96	1.70	1.97	1.68	1.85	1.80	1.62	1.35	1.35
30	1.00	1.00	1.00	1.00	1.57	1.25	1.40	2.10	1.94	1.73	1.92	1.70	1.73	1.81	1.58	1.39	1.39
40	1.00	1.00	1.00	1.00	1.54	1.25	1.35	1.69	1.92	1.77	1.88	1.70	1.63	1.72	1.56	1.58	1.58
60	1.00	1.00	1.00	1.00	1.50	1.25	1.30	1.60	1.89	1.81	1.80	1.72	1.53	1.69	1.54	1.51	1.51

Initial Supporting table - RandomCylModJerk

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

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	600	800	1,000	1,200	1,400	1,800	2,200	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RandomRevModDecl

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

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	3,000	3,500	4,000	4,500	5,000	5,500	6,000	7,000	8,000
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RepetSnapDecayAdjst

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

Value Units: multiplier
X Unit: RPM

y/x	1,000	1,400	1,400	1,800	2,200	3,000	4,000	5,000	6,000
1	3.50	4.50	5.00	5.00	5.00	5.00	5.00	5.00	5.00

Initial Supporting table - RevMode_Decel

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

Value Units: Delta time between revolutions (usec)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
3	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
50	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - Ring Filter

Description: Used for P0300-P0308. Driveline Ring Filter
After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.

Value Units: Number of Engine cycles after isolated misfire (Engine cycles)
X Unit: thousands of RPM (rpm/1000)

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

Initial Supporting table - SCD_Decel

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

Value Units: Delta time per cylinder (usec)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,800
3	2,260	971	573	361	215	157	116	79	65	51	46	40	28
6	2,179	946	563	352	252	174	135	79	69	60	51	41	29
8	2,126	933	558	380	273	188	147	89	77	64	54	44	30
10	2,073	984	606	408	295	202	158	102	86	69	58	46	32
12	2,024	1,038	660	436	316	216	169	116	95	74	61	48	34
14	2,038	1,091	714	464	337	249	198	127	103	79	65	51	36
16	2,052	1,144	756	492	358	258	210	133	111	88	71	53	38
18	2,067	1,197	771	523	379	267	220	143	117	92	74	56	41
20	2,081	1,250	791	556	400	277	230	153	124	95	77	58	43
22	2,095	1,303	812	589	421	285	240	163	131	98	80	61	45
24	2,110	1,356	832	622	442	299	250	173	139	104	83	63	47
26	2,124	1,409	852	655	464	313	260	183	146	109	87	65	49
30	2,440	1,515	916	662	480	341	281	203	162	120	94	68	53
40	2,776	1,781	1,030	770	556	410	332	254	201	148	119	89	64
50	3,096	1,921	1,177	802	624	480	380	305	240	175	143	111	91
60	3,286	2,311	1,438	1,107	823	549	424	355	279	203	168	132	117
97	4,216	3,050	1,937	1,406	1,036	835	659	548	427	306	259	212	217

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	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,800
3	2,301	906	517	324	228	154	116	93	77	61	50	38	26
6	2,081	1,077	656	433	298	191	149	100	82	63	50	37	27
8	2,104	1,157	705	506	343	219	168	104	84	64	53	41	27
10	2,128	1,283	799	603	391	249	186	108	87	66	56	46	26
12	2,151	1,326	859	701	452	281	205	119	93	67	57	47	35
14	2,174	1,431	936	802	522	312	224	132	100	69	60	51	39
16	2,197	1,536	1,013	899	593	351	245	145	107	70	62	54	42
18	2,220	1,641	1,110	992	658	386	266	158	115	73	65	57	45
20	2,425	1,746	1,226	1,113	731	425	287	171	125	79	69	60	46
22	2,674	1,851	1,342	1,226	805	460	308	184	136	87	74	61	49
24	2,869	1,956	1,458	1,317	881	496	329	197	147	97	82	66	53
26	3,157	2,061	1,575	1,428	954	529	350	210	159	107	89	70	56
30	3,313	2,270	1,807	1,658	1,104	595	392	236	182	127	106	85	66
40	4,075	2,795	2,388	2,172	1,464	759	497	300	239	178	147	116	88
50	4,897	3,320	2,970	2,686	1,819	923	602	388	308	228	187	147	114
60	6,070	3,845	3,436	3,200	2,156	1,086	707	455	366	278	225	173	135
97	7,246	5,812	5,268	5,035	3,425	1,701	1,100	704	582	459	368	277	214

Initial Supporting table - SnapDecayAfterMisfire

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

Value Units: multiplier
X Unit: RPM
Y Units: gear ratio

y/x	1,000	1,400	1,400	1,800	2,200	3,000	4,000	5,000	6,000
1	3.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	4.00
1	3.00	5.00	4.50	4.50	4.50	4.50	4.50	4.50	3.00
1	3.50	4.50	3.75	3.75	3.75	3.75	3.75	3.75	3.00
1	3.60	4.65	4.50	4.50	4.50	4.50	4.50	4.50	4.50
2	4.42	4.42	4.23	4.23	4.23	3.80	3.56	3.56	4.00
2	3.59	3.59	3.67	3.67	3.13	3.05	3.37	3.37	3.37
3	2.93	3.47	4.04	3.82	3.88	3.88	3.88	3.87	3.86
3	3.00	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
5	3.00	3.50	3.10	3.02	3.02	3.02	2.78	2.75	1.78

Initial Supporting table - TOSSRoughRoadThres

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

Value Units: change in rpm per sec (rpm)
X Unit: Engine Speed (RPM)
Y Units: Transmission Speed (RPM)

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

Initial Supporting table - WaitToStart

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

Value Units: Number of Engine Cycles (integer)
X Unit: Engine Coolant (deg C)

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

Initial Supporting table - WSSRoughRoadThres

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

Value Units: acceleration
X Unit: Vehicle Speed (KPH)

y/x	0	12	24	36	48	60	72	85	97	109	121	133	145	157	169	181	193
1	0.30005	0.44995	0.59998	0.65002	0.69995	0.75000	0.80005	0.84998	0.90002	0.91003	0.92004	0.93005	0.93994	0.94995	0.95996	0.96997	0.97998

Initial Supporting table - ZeroTorqueAFM

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

Value Units: Percent of Maximum Brake torque (%)
X Unit: RPM
Y Units: Barometric Pressure (kPa)

ZeroTorqueAFM - Part 1

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

ZeroTorqueAFM - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
65	0.00	-0.37	-0.75	-1.12	-1.50	-0.25	1.00	2.25	3.50	4.75	6.00	7.25	8.50
75	0.00	-0.37	-0.75	-1.12	-1.50	-0.25	1.00	2.25	3.50	4.75	6.00	7.25	8.50
85	0.00	-0.37	-0.75	-1.12	-1.50	-0.25	1.00	2.25	3.50	4.75	6.00	7.25	8.50
95	0.00	-0.37	-0.75	-1.12	-1.50	-0.25	1.00	2.25	3.50	4.75	6.00	7.25	8.50
105	0.00	-0.37	-0.75	-1.12	-1.50	-0.25	1.00	2.25	3.50	4.75	6.00	7.25	8.50

Initial Supporting table - ZeroTorqueEngLoad

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

Value Units: Percent of Maximum Brake torque (%)
X Unit: RPM
Y Units: Barometric Pressure (kPa)

ZeroTorqueEngLoad - Part 1

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
65	-3.50	-3.50	-3.50	-3.50	-3.00	-3.00	-3.00	-2.50	-2.00	-1.50	-1.50	-1.50	-0.50
75	-3.50	-3.50	-3.50	-3.50	-3.00	-3.00	-3.00	-2.50	-2.00	-1.50	-1.50	-1.50	-0.50
85	-3.50	-3.50	-3.50	-3.50	-3.00	-3.00	-3.00	-2.50	-2.00	-1.50	-1.50	-1.50	-0.50
95	-3.50	-3.50	-3.50	-3.50	-3.00	-3.00	-3.00	-2.50	-2.00	-1.50	-1.50	-1.50	-0.50
105	-3.50	-3.50	-3.50	-3.50	-3.00	-3.00	-3.00	-2.50	-2.00	-1.50	-1.50	-1.50	-0.50

ZeroTorqueEngLoad - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
65	-0.50	-0.50	-0.50	0.00	0.50	2.33	4.17	6.00	7.83	9.67	11.50	13.33	15.17
75	-0.50	-0.50	-0.50	0.00	0.50	2.33	4.17	6.00	7.83	9.67	11.50	13.33	15.17
85	-0.50	-0.50	-0.50	0.00	0.50	2.33	4.17	6.00	7.83	9.67	11.50	13.33	15.17
95	-0.50	-0.50	-0.50	0.00	0.50	2.33	4.17	6.00	7.83	9.67	11.50	13.33	15.17
105	-0.50	-0.50	-0.50	0.00	0.50	2.33	4.17	6.00	7.83	9.67	11.50	13.33	15.17

Initial Supporting table - Closed Loop Enable Clarification - KaFCLP_U_SlphrIntglOfst_Thrsh

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

Value Units: millivolts
X Unit: Post Catalyst Number

y/x	CiOXYR_O2_PostCat1	CiOXYR_O2_PostCat2
CiFCLP_Decel	2,048	2,048
CiFCLP_Idle	2,048	2,048
CiFCLP_Cruise	2,048	2,048
CiFCLP_LightAccel	2,048	2,048
CiFCLP_HeavyAccel	2,048	2,048

Initial Supporting table - Closed Loop Enable Clarification - KcFCLP_Cnt_O2RdyCyclesThrsh

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

Value Units: Time (events * 12.5 milliseconds)

y/x	1
1	10

Initial Supporting table - Closed Loop Enable Clarification - KcFULC_O2_SensorReadyEvents

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

Value Units: Time (events * 12.5 milliseconds)

y/x	1
1	10

Initial Supporting table - Closed Loop Enable Clarification - KeEOSD_U_RichThrsh

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

Value Units: Volts

y/x	1
1	1,050

Initial Supporting table - Closed Loop Enable Clarification - KeFCLP_dm_IntegrationAirflowMax

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

Value Units: Grams per Second

y/x	1
1	512

Initial Supporting table - Closed Loop Enable Clarification - KeFCLP_Pct_CatAccuSlphrPostDsbl

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

Value Units: Percent

y/x	1
1	255

Initial Supporting table - Closed Loop Enable Clarification - KeFCLP_T_IntegrationCatalystMax

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

Value Units: Celcius

y/x	1
1	950

Initial Supporting table - Closed Loop Enable Clarification - KeFCLP_T_IntegrationCatalystMin

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

Value Units: Celcius

y/x	1
1	500

Initial Supporting table - Closed Loop Enable Clarification - KeFULC_T_WRAF_SensorReadyThrsh

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

Value Units: Degrees Celcius

y/x	1
1	700

Initial Supporting table - Closed Loop Enable Clarification - KeWRSC_T_HtrCntrlCL

Description: WRAF heater temperature enabling threshold 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	40

Initial Supporting table - Closed Loop Enable Clarification - KfFCLP_U_O2ReadyThrshLo

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

Value Units: millivolts

y/x	1
1	1,100

Initial Supporting table - Closed Loop Enable Clarification - KfFULC_U_O2_SensorReadyThrshLo

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

Value Units: millivolts

y/x	1
1	1,050

Initial Supporting table - Closed Loop Enable Clarification - KtFCLL_p_AdaptiveLowMAP_Limit

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

Value Units: KPa
X Unit: KPa

y/x	65	70	75	80	85	90	95	100	105
1	17.3	17.9	18.6	19.2	19.9	20.6	21.2	21.9	22.0

Initial Supporting table - Closed Loop Enable Clarification - KtFCLP_t_PostIntglDisableTime

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

Value Units: Time in seconds
X Unit: Degrees Celcius

y/x	-40	-29	-18	-6	5	16	28	39	50	61	73	84	95	106	118	129	140
1	263.0	263.0	263.0	240.0	145.0	79.0	60.0	60.0	58.0	54.0	50.0	46.0	46.0	46.0	46.0	46.0	46.0

Initial Supporting table - Closed Loop Enable Clarification - KtFCLP_t_PostIntglRampInTime

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

Value Units: Time in seconds
X Unit: Degrees Celcius

y/x	-40	-29	-18	-6	5	16	28	39	50	61	73	84	95	106	118	129	140
1	60.0	60.0	60.0	45.0	30.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0

Initial Supporting table - Closed Loop Enable Clarification - KtFSTA_t_ClosedLoopAutostart

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

Value Units: Time in seconds
X Unit: Degrees Celcius

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	320.0	320.0	280.0	200.0	90.0	55.0	45.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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
1	350.0	350.0	320.0	250.0	140.0	55.0	45.0	40.0	40.0	40.0	40.0	18.0	18.0	38.0	38.0	38.0	38.0

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

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

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

y/x	-10	-4	1	7	13	18	24	29	35	41	46	52	58	63	69	74	80
1	30	30	45	60	80	120	220	300	400	400	400	400	400	400	400	400	400

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

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

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

y/x	-10	-4	1	7	13	18	24	29	35	41	46	52	58	63	69	74	80
1	44	44	44	44	68	82	105	153	320	480	480	480	480	480	480	480	480

Initial Supporting table - P0442 EONV Pressure Threshold (Pascals)

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

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

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2
2	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2
3	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2
4	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2
5	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2
6	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2
7	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2
8	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2
9	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2
10	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2
11	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2
12	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2
13	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2
14	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2
15	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2
16	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2
17	-463.1	-463.1	-445.6	-424.5	-399.7	-371.9	-344.2	-317.2	-291.4	-268.1	-247.9	-231.6	-218.7	-208.7	-202.1	-199.2	-199.2

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

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

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

y/x	0	6	12	19	25	31	37	44	50	56	62	69	75	81	87	94	100
1	61	59	58	57	56	55	54	53	52	51	50	49	48	47	46	44	43

Initial Supporting table - P057B KtBRKI_K_CmpltTestPointWeight

Description:

y/x	0.000	0.002	0.012	0.030	0.047	0.057	0.094	0.141	1.000
1	0	0	0	0	1	1	1	1	1

Initial Supporting table - P057B KtBRKI_K_FastTestPointWeight

Description:

y/x	0.000	0.002	0.012	0.030	0.047	0.057	0.094	0.200	1.000
1	0	0	0	0	1	1	1	1	1

Initial Supporting table - DFCO_CoolEnblHi_Temp

Description:			
y/x	-40	0	25
1	10.0	10.0	10.0

Initial Supporting table - DFCO_DelayAfterStart_Time

Description:

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

Initial Supporting table - DFCO_DsblLo_Vehicle_Speed

Description:

y/x	CeTCOR_e_NonEcoMode	CeTCOR_e_EcoMode
CeTGRR_e_TransGr1	10	10
CeTGRR_e_TransGr2	10	10
CeTGRR_e_TransGr3	10	10
CeTGRR_e_TransGr4	15	15
CeTGRR_e_TransGr5	0	0
CeTGRR_e_TransGr6	0	0
CeTGRR_e_TransGr9	0	0
CeTGRR_e_TransGr10	0	0
CeTGRR_e_TransGrNeut	0	0
CeTGRR_e_TransGrRvrs	0	0
CeTGRR_e_TransGrPark	0	0
CeTGRR_e_TransGr7	0	0
CeTGRR_e_TransGr8	0	0

Initial Supporting table - DFCO_EnblHi_Vehicle_Speed

Description:

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

Initial Supporting table - CalculatedPerfMaxEc1

Description: Maximum desired camshaft position for Exhaust CAM - Bank1

Value Units: Maximum desired camshaft position (degCam)
X Unit: Engine Oil Temperature (degC)
[1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17]
[-40 -28 -16 -4 8 20 32 44 56 68 80 92 104 116 128 140 152]

Y Units: Engine Speed (rpm)
[1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17]
[400 800 1200 1600 2000 2400 2800 3200 3600 4000 4400 4800 5200 5600 6000 6400 6800]

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
2	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
3	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
4	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
5	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
6	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
7	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
8	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
9	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
10	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
11	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
12	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
13	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
14	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
15	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
16	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
17	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5

Initial Supporting table - CalculatedPerfMaxIc1

Description: Maximum desired camshaft position for Intake CAM - Bank1

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

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
2	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
3	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
4	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
5	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
6	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
7	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
8	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
9	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
10	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
11	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
12	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
13	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
14	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
15	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
16	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5
17	11.5	11.5	11.5	22.5	24.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5	26.5

Initial Supporting table - P0234: Overboost pressure limit below basic pressure as a function of engine speed and ambient pressure

Description: Overboost under basic pressure (open loop pressure control) diagnose failure limit.

Value Units: [kPa] Overboost under basic pressure fail limit.
X Unit: [kPa] KnBSTD_p_CntrlDevDiagAmbCorrBP - Ambient Air Pressure
Y Units: [rpm] KnBSTD_n_CntrlDevDiagAmbCorrBP - Engine Speed

y/x	60.00	70.00	80.00	90.00	100.00	110.00
2,000.00	90.000	90.000	80.000	70.000	60.000	60.000
2,500.00	62.000	52.000	32.000	30.000	30.000	30.000
3,000.00	42.000	25.000	10.000	10.000	10.000	10.000
4,000.00	30.000	10.000	10.000	10.000	10.000	10.000
5,000.00	30.000	10.000	10.000	10.000	10.000	10.000
6,000.00	30.000	10.000	10.000	10.000	10.000	10.000

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

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

Value Units: [kPa] Allowed positive rate limit
X Unit: [rpm] KnBSTD_n_CntrlDevDiagEngSpdBP - Engine Speed

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

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

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

Value Units: [kPa] Allowed negative rate limit.
X Unit: [rpm] KnBSTD_n_CntrlDevDiagEngSpdBP - Engine Speed

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

Initial Supporting table - P0521_P06DD_P06DE_OP_HiStatePressure

Description: Two Stage Oil Pump Oil Pressure in High State

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

y/x	0.0	20.0	40.0	60.0	80.0	90.0	100.0	110.0	120.0
1,000.0	466.0	431.0	423.0	399.0	360.0	324.0	280.0	263.0	200.0
1,250.0	472.0	444.0	431.0	417.0	390.0	372.0	339.0	303.0	252.0
1,500.0	475.0	451.0	431.0	430.0	410.0	397.0	382.0	367.0	310.0
2,000.0	492.0	457.0	442.0	445.0	430.0	420.0	408.0	391.0	327.0
2,500.0	489.0	473.0	459.0	455.0	444.0	436.0	426.0	412.0	398.0
3,000.0	501.0	469.0	463.0	469.0	458.0	452.0	442.0	427.0	413.0
3,500.0	540.0	468.0	466.0	482.0	472.0	464.0	452.0	436.0	420.0
4,000.0	540.0	466.0	463.0	485.0	477.0	470.0	460.0	443.0	426.0
4,500.0	540.0	464.0	460.0	489.0	481.0	476.0	467.0	450.0	432.0

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	0	20	40	60	80	90	100	110	120
1,000	267	248	238	227	217	211	206	198	188
1,250	272	251	240	233	225	220	215	209	197
1,500	275	255	241	237	231	227	223	217	206
2,000	284	260	248	242	238	234	229	226	223
2,500	281	263	252	247	242	239	235	233	231
3,000	291	267	251	252	247	245	240	237	235
3,500	280	265	253	254	249	247	243	241	238
4,000	280	266	254	255	252	249	245	239	234
4,500	280	268	255	257	254	251	247	238	229

Initial Supporting table - P06DD_P06DE_MaxEnableTorque_OP

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

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

y/x	1,000.0	1,250.0	1,500.0	1,750.0	2,000.0	2,250.0	2,500.0	2,750.0	3,000.0
1.0	0.0	100.0	150.0	150.0	150.0	150.0	150.0	100.0	0.0

Initial Supporting table - P06DD_P06DE_MinEnableTorque_OP

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

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

y/x	1,000.0	1,250.0	1,500.0	1,750.0	2,000.0	2,250.0	2,500.0	2,750.0	3,000.0
1.0	0.0	0.0	20.0	20.0	20.0	20.0	20.0	0.0	0.0

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

Initial Supporting table - 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	0.0	20.0	40.0	60.0	80.0	90.0	100.0	110.0	120.0
1,000.0	100.0	92.0	93.0	86.0	55.0	45.0	35.0	20.0	6.0
1,250.0	103.0	96.0	95.0	92.0	83.0	58.0	40.0	30.0	10.0
1,500.0	105.0	98.0	95.0	97.0	90.0	85.0	82.0	68.0	53.0
2,000.0	108.0	103.0	102.0	100.0	96.0	93.0	90.0	82.0	68.0
2,500.0	114.0	105.0	104.0	104.0	101.0	98.0	96.0	89.0	78.0
3,000.0	117.0	110.0	109.0	109.0	105.0	101.0	97.0	91.0	87.0
3,500.0	120.0	115.0	114.0	114.0	111.0	105.0	98.0	92.0	88.0
4,000.0	120.0	116.0	115.0	115.0	113.0	108.0	99.0	93.0	90.0
4,500.0	120.0	116.0	116.0	116.0	114.0	112.0	100.0	95.0	90.0

Initial Supporting table - Minimum Non-Purge Samples for Purge Vapor Fuel

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

Value Units: Sample Counts per loop rate of 100ms (divide by 10 to get seconds)
X Unit: Long Term Fuel Trim Cell I.D. (no units) (Only PurgeOff cells are used)

Minimum Non-Purge Samples for Purge Vapor Fuel - Part 1				
y/x	CeFADR_e_Cell00_PurgOnAirMode5	CeFADR_e_Cell01_PurgOnAirMode4	CeFADR_e_Cell02_PurgOnAirMode3	CeFADR_e_Cell03_PurgOnAirMode2
1	65,535	65,535	65,535	65,535
Minimum Non-Purge Samples for Purge Vapor Fuel - Part 2				
y/x	CeFADR_e_Cell04_PurgOnAirMode1	CeFADR_e_Cell05_PurgOnAirMode0	CeFADR_e_Cell06_PurgOnIdle	CeFADR_e_Cell07_PurgOnDecel
1	65,535	65,535	65,535	65,535
Minimum Non-Purge Samples for Purge Vapor Fuel - Part 3				
y/x	CeFADR_e_Cell08_PurgOffAirMode5	CeFADR_e_Cell09_PurgOffAirMode4	CeFADR_e_Cell10_PurgOffAirMode3	CeFADR_e_Cell11_PurgOffAirMode2
1	170	140	140	140
Minimum Non-Purge Samples for Purge Vapor Fuel - Part 4				
y/x	CeFADR_e_Cell12_PurgOffAirMode1	CeFADR_e_Cell13_PurgOffAirMode0	CeFADR_e_Cell14_PurgOffIdle	CeFADR_e_Cell15_PurgOffDecel
1	140	140	165	180

Initial Supporting table - P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage

Description: Identifies which Long Term Fuel Trim Cell I.D.s are used for diagnosis. Only cells identified as "CeFADD_e_NonSelectedCell" are not used for diagnosis.

P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage - Part 1				
y/x	CeFADR_e_Cell00_PurgOnAirMode5	CeFADR_e_Cell01_PurgOnAirMode4	CeFADR_e_Cell02_PurgOnAirMode3	CeFADR_e_Cell03_PurgOnAirMode2
1	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell
P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage - Part 2				
y/x	CeFADR_e_Cell04_PurgOnAirMode1	CeFADR_e_Cell05_PurgOnAirMode0	CeFADR_e_Cell06_PurgOnIdle	CeFADR_e_Cell07_PurgOnDecel
1	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_NonSelectedCell
P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage - Part 3				
y/x	CeFADR_e_Cell08_PurgOffAirMode5	CeFADR_e_Cell09_PurgOffAirMode4	CeFADR_e_Cell10_PurgOffAirMode3	CeFADR_e_Cell11_PurgOffAirMode2
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_PurgOffAirMode1	CeFADR_e_Cell13_PurgOffAirMode0	CeFADR_e_Cell14_PurgOffIdle	CeFADR_e_Cell15_PurgOffDecel
1	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_NonSelectedCell

Initial Supporting table - P219A Normalizer Bank1 Table

Description: Bank 1 Normalizer table used in the calculation of the Ratio for the current sample period.

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

y/x	1,000	1,220	1,440	1,655	1,875	2,095	2,315	2,530	2,750	2,970	3,190	3,400	3,625	3,845	4,060	4,280	4,500
40	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
80	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
120	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
160	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	1.00	1.00	1.00	1.50	1.50	3.00	4.25	5.50	3.25	6.00	6.00
200	9,999.00	9,999.00	9,999.00	3.75	3.75	3.00	2.25	1.00	1.50	1.75	1.50	3.00	5.25	5.50	3.25	6.00	6.00
240	25.25	25.25	6.75	4.75	3.75	3.00	3.50	1.75	2.00	1.75	3.00	7.50	7.50	12.00	13.50	12.25	12.25
280	25.25	25.25	6.75	5.50	5.00	6.50	6.25	4.25	4.25	2.75	10.50	15.50	24.00	25.50	7.50	6.25	6.25
320	43.50	43.50	38.50	26.25	23.00	20.75	24.25	14.50	21.00	19.50	8.25	10.25	13.75	9.50	5.25	5.75	6.25
360	43.50	49.25	54.75	47.25	43.00	46.00	52.50	36.25	28.00	14.75	5.50	6.50	8.00	4.00	4.50	5.25	9,999.00
400	9,999.00	70.25	70.25	63.00	64.75	62.25	50.50	39.00	31.75	16.25	8.75	17.00	7.00	6.50	6.50	9,999.00	9,999.00
440	9,999.00	70.25	90.00	109.50	86.75	80.25	56.50	36.50	37.75	30.25	19.50	15.50	9.00	10.00	10.00	9,999.00	9,999.00
480	9,999.00	9,999.00	109.50	102.25	94.75	131.50	82.25	54.00	45.75	35.25	25.00	20.25	9.00	10.00	10.00	9,999.00	9,999.00
520	9,999.00	9,999.00	9,999.00	143.50	143.50	144.00	97.75	71.00	58.50	35.25	25.00	25.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
560	9,999.00	9,999.00	9,999.00	143.50	143.50	144.00	97.75	71.00	71.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
640	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
720	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
800	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00

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

Initial Supporting table - P219A Variance Threshold Bank1 Table

Description: Bank 1 lookup table of Variance metric used to calculate the Ratio for the current sample period

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

y/x	1,000	1,220	1,440	1,655	1,875	2,095	2,315	2,530	2,750	2,970	3,190	3,400	3,625	3,845	4,060	4,280	4,500
40	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
80	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
120	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
160	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	1.50	1.50	1.50	1.50	1.50	1.75	2.25	2.50	4.00	3.50	3.50
200	9,999.00	9,999.00	9,999.00	4.00	4.00	2.50	1.50	1.50	1.50	1.50	1.50	1.75	3.00	2.50	4.00	3.50	3.50
240	5.75	5.75	6.00	4.75	4.00	2.50	1.50	1.75	1.50	1.50	2.00	3.75	5.00	5.00	6.00	5.75	5.75
280	5.75	5.75	6.00	5.75	4.25	3.75	4.00	2.75	2.50	2.50	4.25	5.25	7.00	3.75	4.25	2.25	2.25
320	8.25	8.25	8.50	6.75	7.75	8.50	7.25	6.00	9.00	5.75	3.50	4.75	4.25	2.25	1.50	1.75	2.25
360	8.25	9.50	10.50	11.00	10.50	11.50	12.50	9.75	9.25	8.00	6.00	5.25	3.50	1.50	1.50	1.50	9,999.00
400	9,999.00	14.75	14.75	11.75	13.25	17.00	16.00	14.00	10.75	11.50	12.50	5.50	3.50	4.00	4.00	9,999.00	9,999.00
440	9,999.00	14.75	14.75	14.50	15.25	20.00	17.75	23.00	15.50	13.25	12.00	9.50	7.50	6.00	6.00	9,999.00	9,999.00
480	9,999.00	9,999.00	14.50	16.75	19.00	22.00	19.50	18.25	17.50	13.50	13.00	11.25	7.50	6.00	6.00	9,999.00	9,999.00
520	9,999.00	9,999.00	9,999.00	19.00	19.00	21.00	22.00	25.00	21.25	13.50	13.00	13.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
560	9,999.00	9,999.00	9,999.00	19.00	19.00	21.00	22.00	25.00	25.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
640	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
720	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
800	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00

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	20.00	25.00	30.00	35.00	40.00	45.00	50.00	55.00	100.00
1.00	9.25	20.34	27.90	255.00	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	20.00	25.00	30.00	35.00	40.00	45.00	50.00	55.00	100.00
1.00	31.44	47.48	46.52	255.00	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	14.20	28.02	71.73	92.29	124.67	140.77	143.69	141.54	139.49

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	10.00	10.00	43.00	130.00	260.00	460.00	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	0.346	0.346	0.306	0.344	0.790	0.423	0.468	0.926	0.960	1.438	1.631	0.917	1.031	1.031	1.031	1.031	1.031

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_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	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_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	500.000	500.000	1,000.000	8,191.875	8,191.875	8,191.875	

Initial Supporting table - P0606_Program Sequence Watch Enable f(Core, Loop Time)

Description: The enabling flags for the program sequence watch as a function of processor core and operating loop time sequence.

Value Units: PSW enable flag (boolean)
X Unit: Processor Core (enum)
Y Units: Operating Loop Time Sequence (enum)

y/x	CeTSKR_e_CPU	CeTSKR_e_CPU2	CeTSKR_e_CPU3	CeTSKR_e_CPU4
CePISR_e_5msSeq	0	0	0	0
CePISR_e_6p25msSeq	1	1	0	0
CePISR_e_10msSeq	0	0	0	0
CePISR_e_12p5msSeq	1	1	0	0
CePISR_e_20msSeq	0	0	0	0
CePISR_e_25msSeq	1	1	0	0
CePISR_e_40msSeq	0	0	0	0
CePISR_e_50msSeq	1	1	0	0
CePISR_e_80msSeq	0	0	0	0
CePISR_e_100msSeq	0	0	0	0
CePISR_e_EventA_Seq	0	0	0	0
CePISR_e_EventB_Seq	0	0	0	0
CePISR_e_EventC_Seq	0	0	0	0

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_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	5	3	5	3	5	3	5

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	5	5	5	3	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_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	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 - P16F3_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	31.44	31.44	31.44	31.44	31.44	31.44

Initial Supporting table - P16F3_Speed Control External Load f(Oil Temp, RPM)

Description: Specifies the external load table for SPDR torque security as a function of engine oil temperature and engine RPM.

Value Units: External Load Table for SPDR (Nm)
X Unit: Engine Oil Temperature (deg C)
Y Units: Engine Speed (RPM)

y/x	-40.00	-20.00	-10.00	0.00	50.00	90.00
615.00	131.92	117.05	112.72	103.98	52.37	51.45
715.00	131.92	117.05	112.72	103.98	52.37	46.72
815.00	131.12	116.82	110.62	102.38	49.92	37.83
865.00	131.42	116.88	111.72	103.23	50.96	36.26
900.00	131.92	117.05	112.72	103.98	51.31	35.02
950.00	130.64	115.74	111.94	104.46	49.74	33.68
1,000.00	128.18	113.45	109.98	104.75	48.15	32.22
1,050.00	134.50	116.36	106.90	103.36	45.81	28.53
1,100.00	134.12	116.30	106.52	102.19	44.24	31.24
1,200.00	131.81	115.16	106.62	101.28	43.00	34.74
1,500.00	112.02	102.01	95.11	93.28	40.57	41.31
2,000.00	38.92	29.92	24.63	24.32	-7.65	-7.19
2,500.00	-50.26	-50.26	-50.26	-50.26	-50.26	-50.26
3,000.00	-55.29	-55.29	-55.29	-55.29	-55.29	-55.29
4,000.00	-60.31	-60.31	-60.31	-60.31	-60.31	-60.31
5,000.00	-65.34	-65.34	-65.34	-65.34	-65.34	-65.34
6,400.00	-70.36	-70.36	-70.36	-70.36	-70.36	-70.36

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	32,767	32,767	3,677	2,261	1,828	1,119	902	604	494	346	187	154	102
6	32,767	32,767	2,950	1,768	1,406	1,030	766	532	427	273	125	104	90
8	32,767	32,767	2,793	1,623	1,283	992	680	513	388	175	127	105	79
10	32,767	32,767	3,287	1,793	1,441	1,030	707	487	314	161	144	107	82
12	32,767	32,767	3,753	1,962	1,529	1,208	751	480	312	180	163	127	90
14	32,767	32,767	4,238	2,088	1,723	1,361	806	531	350	185	175	148	108
16	32,767	32,767	5,203	2,243	1,864	1,475	942	637	354	247	204	172	123
18	32,767	32,767	5,735	2,369	2,057	1,654	1,087	713	369	267	227	188	136
20	32,767	32,767	6,134	2,523	2,215	1,807	1,195	772	539	282	245	210	138
22	32,767	32,767	6,533	2,734	2,286	1,921	1,291	870	646	304	258	223	134
24	32,767	32,767	6,965	3,309	2,286	2,010	1,371	957	761	329	266	235	136
26	32,767	32,767	7,409	3,478	2,390	2,138	1,475	1,039	841	368	263	240	134
30	32,767	32,767	8,241	3,815	2,661	2,291	1,659	1,197	985	439	252	205	145
40	32,767	32,767	10,195	4,647	3,314	2,563	2,114	1,678	1,335	704	400	338	261
50	32,767	32,767	12,149	5,691	4,109	3,056	2,568	2,098	1,757	1,230	744	637	406
60	32,767	32,767	13,994	6,706	4,772	3,614	3,036	2,540	2,103	1,503	921	775	486
97	32,767	32,767	20,000	9,727	7,130	5,380	4,601	3,843	3,101	2,200	1,349	1,215	760

RufCyl_Decel - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
3	64	52	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	57	48	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	57	46	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	57	48	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	74	56	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	89	65	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	101	74	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	106	82	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	109	88	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	106	90	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	112	88	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	115	87	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	122	93	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	221	144	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
50	302	213	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	408	267	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	645	433	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	32,767	32,767	4,511	2,575	1,553	1,186	936	744	530	268	218	107	71
6	32,767	32,767	4,500	3,275	1,946	1,351	1,032	716	494	234	188	120	76
8	32,767	32,767	6,000	3,811	2,319	1,763	994	686	497	222	200	140	99
10	32,767	32,767	7,000	4,143	2,686	2,189	928	642	484	235	203	166	128
12	32,767	32,767	8,143	4,752	2,984	2,620	991	620	513	245	240	197	148
14	32,767	32,767	9,284	5,767	3,242	2,836	1,126	701	536	270	265	234	171
16	32,767	32,767	10,425	6,152	3,698	3,040	1,538	790	572	375	344	266	201
18	32,767	32,767	11,567	6,521	4,514	3,289	1,978	895	621	479	386	308	225
20	32,767	32,767	12,708	6,930	5,412	3,482	2,345	1,094	818	555	431	347	253
22	32,767	32,767	13,849	7,163	5,824	3,905	2,774	1,323	1,014	630	467	384	282
24	32,767	32,767	14,991	7,371	6,376	4,273	3,170	1,557	1,210	706	507	420	311
26	32,767	32,767	16,132	7,989	6,939	4,981	3,491	1,830	1,395	782	546	456	339
30	32,767	32,767	18,415	9,094	7,651	5,746	4,084	2,404	1,711	934	625	528	396
40	32,767	32,767	20,000	11,791	10,243	7,781	5,478	4,105	2,651	1,329	821	707	539
50	32,767	32,767	20,000	14,007	12,573	9,637	6,803	5,200	3,550	1,695	1,018	887	682
60	32,767	32,767	20,000	20,000	14,988	11,493	8,127	6,216	4,357	2,061	1,215	1,066	825
97	32,767	32,767	20,000	20,000	19,887	18,452	13,095	10,029	7,046	3,291	1,953	1,740	1,358

RufCyl_Jerk - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
3	48	37	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	63	56	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	83	67	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	101	78	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	115	89	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	133	96	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	145	98	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	159	101	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	175	114	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	193	130	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	211	142	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	228	154	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	264	178	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	352	239	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
50	441	299	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	529	359	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	861	586	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 alititude 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	1,591	1,591	1,409	1,147	995	852	507	363	282	140	81	57	32,767
6	1,211	1,211	957	805	648	517	314	258	217	93	48	29	32,767
8	1,100	1,100	881	685	555	416	270	204	165	70	27	12	32,767
10	1,029	1,029	873	671	535	379	266	150	120	59	13	20	32,767
12	1,080	1,080	934	705	555	404	281	134	96	52	24	29	32,767
14	1,164	1,164	980	765	595	454	305	160	99	46	35	38	32,767
16	1,275	1,275	1,034	859	662	498	349	227	112	50	46	46	32,767
18	1,371	1,371	1,119	960	743	574	370	274	124	64	57	55	32,767
20	1,507	1,507	1,230	1,047	842	662	460	320	160	84	68	64	32,767
22	1,607	1,607	1,348	1,134	949	732	561	367	199	105	79	72	32,767
24	1,702	1,702	1,440	1,208	1,029	814	627	438	239	132	90	81	32,767
26	1,781	1,781	1,539	1,295	1,082	889	699	513	278	161	101	90	32,767
30	1,941	1,941	1,715	1,429	1,231	1,066	838	652	357	217	124	107	32,767
40	2,301	2,301	2,068	1,791	1,610	1,438	1,241	1,002	553	318	180	151	32,767
50	2,665	2,665	2,432	2,147	1,979	1,828	1,625	1,326	733	416	243	199	32,767
60	3,029	3,029	2,809	2,563	2,339	2,170	2,021	1,645	925	504	299	248	32,767
97	4,356	4,356	4,171	3,921	3,751	3,460	3,324	2,783	1,516	837	511	431	32,767

RufSCD_Decel - Part 2

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

Initial Supporting table - RufSCD_Decel

22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
50	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - RufSCD_Jerk

Description: Used for P0300-P0308. Crankshaft jerk threshold while in SCD mode during Idle or GPF regen. SCD mode uses smaller windows 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	2,301	2,301	906	517	324	228	154	116	93	61	38	26	32,767
6	2,081	2,081	1,077	656	433	298	192	160	112	66	37	27	32,767
8	2,104	2,104	1,157	705	506	343	233	195	120	79	41	27	32,767
10	2,128	2,128	1,283	799	603	391	255	200	139	83	46	26	32,767
12	2,151	2,151	1,326	859	701	452	279	220	153	88	47	35	32,767
14	2,174	2,174	1,431	936	802	522	300	245	167	71	51	39	32,767
16	2,197	2,197	1,536	1,013	899	593	399	326	181	74	54	42	32,767
18	2,220	2,220	1,641	1,110	992	658	386	266	158	73	57	45	32,767
20	2,425	2,425	1,746	1,226	1,113	731	425	287	171	79	60	46	32,767
22	2,674	2,674	1,851	1,342	1,226	805	460	308	184	87	61	49	32,767
24	2,869	2,869	1,956	1,458	1,317	881	496	329	197	97	66	53	32,767
26	3,157	3,157	2,061	1,575	1,428	954	529	350	210	107	70	56	32,767
30	3,313	3,313	2,270	1,807	1,658	1,104	595	392	236	127	85	66	32,767
40	4,075	4,075	2,795	2,388	2,172	1,464	759	497	300	178	116	88	32,767
50	4,897	4,897	3,320	2,970	2,686	1,819	923	602	388	228	147	114	32,767
60	6,070	6,070	3,845	3,436	3,200	2,156	1,086	707	455	278	173	135	32,767
97	7,246	7,246	5,812	5,268	5,035	3,425	1,701	1,100	704	459	277	214	32,767

RufSCD_Jerk - Part 2

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

Initial Supporting table - RufSCD_Jerk

24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
50	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - P0556_BBVS_VacLowFlow

Description: The brake booster vacuum pressure below which the sensor’s output will be considered abnormally low when it is non-increasing when the brake apply is in released condition.

Value Units: KPAa
X Unit: Scaled ambient air pressure (KPAa)

y/x	60	70	80	90	100
1	50	60	70	80	90

Initial Supporting table - P0324_PerCyl_ExcessiveKnock_Threshold

Description: Fail threshold for the Knock Performance per-cylinder Excessive Knock Diagnostic

Value Units: Filtered Knock Intensity. Unit-less term scaled from 0.0 (no knock) to 5.0 (maximum/large knock)
X Unit: Engine Speed (RPM)
Y Units: N/A

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38

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	2.0723	2.0723	2.0664	2.0664	2.0605	2.0352	2.0332	2.0332	2.0332	2.0000	1.8789	1.7227	1.5996	1.4746	1.4746	1.4746	1.4746

Initial Supporting table - P0325_P0330_OpenCktThrshMax (Normal Noise)

Description: Knock Open Circuit Diagnostic Minimum Threshold when using the Normal Noise method (see "OpenMethod" description): When using the Normal Noise method (see "OpenMethod" description).

Value Units: Filtered background engine noise. Unit-less term from the Knock Detection Fast Fourier Transform (FFT) for a selected frequency range.
X Unit: Engine Speed (RPM)
Y Units: N/A

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

Initial Supporting table - P0325_P0330_OpenCktThrshMin (20 kHz)

Description: Knock Open Circuit Diagnostic Minimum Threshold when using the 20 kHz method (see "OpenMethod" description)

Value Units: Unit-less, filtered term from the Knock Detection Fast Fourier Transform (FFT) for the 20 kHz frequency range.
X Unit: Engine (RPM)
Y Units: N/A

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.7441	0.7324	0.7227	0.7188	0.7188	0.7188	0.7305	0.7305	0.7344	0.7168	0.6660	0.6152	0.5859	0.5605	0.5605	0.5605	0.5605

Initial Supporting table - P0325_P0330_OpenCktThrshMin (Normal Noise)

Description: Knock Open Circuit Diagnostic Minimum Threshold when using the Normal Noise method (see "OpenMethod" description): When using the Normal Noise method (see "OpenMethod" description).

Value Units: Filtered background engine noise. Unit-less term from the Knock Detection Fast Fourier Transform (FFT) for a selected frequency range.
X Unit: Engine Speed (RPM)
Y Units: N/A

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

Initial Supporting table - P0325_P0330_OpenMethod_2

Description: Defines which Knock Open Circuit Diagnostic method to use.

Value Units: Identifies one of two diagnostic methods (either 20 kHz or Normal Noise) used (as a function of engine speed) for Open Circuit detection
X Unit: Engine Speed Index, 500 to 8500 (RPM) by 500 rpm increments (Index 0, 1, 2.... 16 = 500, 1000, 1500.... 8500 RPM)
Y Units: N/A

P0325_P0330_OpenMethod_2 - Part 1					
y/x	0	1	2	3	4
1	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz
P0325_P0330_OpenMethod_2 - Part 2					
y/x	5	6	7	8	9
1	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz
P0325_P0330_OpenMethod_2 - Part 3					
y/x	10	11	12	13	14
1	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz
P0325_P0330_OpenMethod_2 - Part 4					
y/x	15	16			
1	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz			

Initial Supporting table - P0326_P0331_AbnormalNoise_CylsEnabled

Description: Specifies which cylinders will be used for the Abnormal Noise portion of the performance diagnostics (1 = cylinder used, 0 = cylinder not used)

Value Units: Boolean that indicates which engine cylinders are being used for the per-sensor Knock Performance diagnostic (0 = not used, 1 = used)
X Unit: Cylinder number in firing order (i.e. Cyl 0 = first cylinder in firing order, Cyl 1 = second cylinder in firing order....)
Y Units: N/A

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

Initial Supporting table - P0326_P0331_AbnormalNoise_Threshold

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

Value Units: Filtered background engine noise. Unit-less term from the Knock Detection Fast Fourier Transform (FFT) for a selected frequency range.
X Unit: Engine Speed (RPM)
Y Units: N/A

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.695	0.695	0.695	0.695	0.904	1.018	1.201	1.400	1.300	1.500	1.700	1.900	2.100	2.100	2.100	2.100	2.100

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	0.045	0.045	0.049	0.055	0.064	0.074	0.078	0.117	0.127	0.148	0.166	0.182	0.182	0.182	0.182	0.182	0.182

Initial Supporting table - P06B6_P06B7_OpenTestCktThrshMin

Description: Knock Open Circuit Minimum Threshold for Internal Circuit Diagnostic. Used only when the 20 kHz method is being used (see "OpenMethod" description). The Open Test Circuit ensures that the internal circuit used to generate the 20 kHz signal for the Open Circuit diags (P0325, P0330) is within range.

Value Units: Unit-less, filtered term from the Knock Detection Fast Fourier Transform (FFT) for the 20 kHz frequency range.
X Unit: Engine Speed (RPM).
Y Units: N/A

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.020	0.020	0.020	0.021	0.021	0.029	0.027	0.035	0.053	0.059	0.070	0.072	0.111	0.111	0.111	0.111	0.111

Initial Supporting table - P171D hydraulic pressure delay

Description: Time to delay the initial x of y counter due to hydraulic transients. Thresholds are a function of transmission fluid temperature. Horizontal axis is transmission fluid temperature (DegC) and table output is delay time (seconds).

Value Units: delay time seconds
X Unit: transmission fluid temperature DegC

y/x	-40	0	20	30	40	50	60
1	0.090	0.090	0.080	0.075	0.075	0.075	0.075

Initial Supporting table - P171D predicted turbine speed error

Description: Predicted turbine speed vs actual turbine speed error. Thresholds are a function of engine speed and transmission fliud temperature. Diagnostic is considered failing above these values. Table vertical axis is engine speed (RPM), horizontal axis is transmission fluid temperature (DegC) and table output is predicted turbine speed error (RPM).

Value Units: turbine speed RPM error
X Unit: transmission fluid temperature DegC
Y Units: engine speed RPM

y/x	-40	0	10	20	40
0	350	350	350	350	350
500	350	350	350	350	350
1,100	350	350	350	350	350
1,500	350	350	350	350	350
2,500	350	350	350	350	350

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

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

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

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	300	300	160	18	18	18	18	10	3	3	3	3	3	3	3	3	3

Unique Supporting table - P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM

Description: P0101_P0106_P0121_P012B_P0236_P1101 MAP1 Residual Weight Factor based on RPM

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

y/x	0	400	800	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,600
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

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

Description: P0101_P0106_P0121_P012B_P0236_P1101 MAP2 Residual Weight Factor based on RPM

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

y/x	0	400	800	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,600
1	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

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

Description: P0101_P0106_P0121_P012B_P0236_P1101 TPS Residual Weight Factor based on RPM

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

y/x	0	400	800	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,600
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

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

Description: P0101_P0106_P010B_P0121_P012B_P0236_P1101 MAF1 Residual Weight Factor based on MAF Est

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

y/x	0	50	70	73	76	79	82	85	89	95	100	110	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	0.900	0.900	0.900

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

Description: P0101_P0106_P010B_P0121_P012B_P0236_P1101 MAF1 Residual Weight Factor based on RPM

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

y/x	0	400	800	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,600
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Unique Supporting table - P2160 range change delay time

Description: If the transmission range state changes, the transmission range state must be stable for this amount of time as part of the P2160 enable conditions.

X Unit: transmission fluid temperature DegC
Y Units: delay time seconds

y/x	-40.00	0.00	40.00
1	5.000	5.000	5.000

Unique Supporting table - P2161 range change delay time

Description: If the transmission range state changes, the transmission range state must be stable for this amount of time as part of the P2161 enable conditions.

X Unit: transmission fluid temperature DegC
Y Units: delay time seconds

y/x	-40.00	-20.00	40.00
1	5.000	5.000	5.000

Initial Supporting table - P0196_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	79.5	79.5	79.5	60.0	60.0	39.8	39.8	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 - P0442 Volatility Time as a Function of Estimate of Ambient Temperature

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

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

y/x	-10	-4	1	7	13	18	24	29	35	41	46	52	58	63	69	74	80
1	45	150	210	210	250	320	425	550	600	600	600	600	600	600	600	600	600

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	70	70	70	70	74	82	105	153	320	480	480	480	480	480	480	480	480

Initial Supporting table - P0442 EONV Pressure Threshold (Pascals)

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

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

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6
2	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6
3	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6
4	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6
5	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6
6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6
7	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6
8	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6
9	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6
10	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6
11	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6
12	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6
13	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6
14	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6
15	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6
16	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6
17	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6

Initial Supporting table - P0442 Estimate of Ambient Temperature Valid Conditioning Time as a Function of Ign Off Time

Description: EONV estimated ambient temperature valid conditioning time as a function of ignition off time

Value Units: Estimated Ambient Temperature Valid Conditioning Time (seconds)
X Unit: Ignition Off Time (seconds)

P0442 Estimate of Ambient Temperature Valid Conditioning Time as a Function of Ign Off Time - Part 1																	
y/x	0	600	1,200	1,800	2,400	3,000	3,600	4,200	4,800	5,400	6,000	6,600	7,200	7,800	8,400	9,000	9,600
1	300	450	500	600	650	650	650	650	650	650	625	600	575	550	525	500	480

P0442 Estimate of Ambient Temperature Valid Conditioning Time as a Function of Ign Off Time - Part 2																	
y/x	10,200	10,800	11,700	12,600	13,500	14,400	15,300	16,200	17,100	18,000	19,200	20,400	21,600	22,800	24,000	25,200	
1	460	440	420	400	380	360	340	320	300	280	260	240	220	200	200	200	

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

Description: P0101_P0106_P010B_P0121_P012B_P0236_P1101 MAF1 Residual Weight Factor based on MAF Est

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

y/x	0	50	70	73	76	79	82	85	89	95	100	110	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	0.510	0.510	0.510	0.510

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	500	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,500	4,000	4,500	5,000	5,500	6,500	7,500
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 - Multiple DTC Use - Response Cell Enable Table

Description: This table describes the Block learn cells which enable the Pre (Primary) Oxygen sensor response tests.
Note: When the table column heading matches the calibration value below it, that individual cell is enabled.

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

Multiple DTC Use - Response Cell Enable Table - 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	CeFADR_e_Cell00_PurgOnAirMode 5	CeFADR_e_Cell01_PurgOnAirMode 4	CeFADR_e_Cell02_PurgOnAirMode 3	CeFADR_e_Cell03_PurgOnAirMode 2
Multiple DTC Use - Response Cell Enable Table - Part 2				
y/x	CeFADR_e_Cell04_PurgOnAirMode 1	CeFADR_e_Cell05_PurgOnAirMode 0	CeFADR_e_Cell06_PurgOnIdle	CeFADR_e_Cell07_PurgOnDecel
1	CeFADR_e_Cell04_PurgOnAirMode 1	CeFADR_e_Cell05_PurgOnAirMode 0	CeFADR_e_Cell06_PurgOnIdle	CeFADR_e_Cell07_PurgOnDecel
Multiple DTC Use - Response Cell Enable Table - 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	CeFADR_e_Cell08_PurgOffAirMode 5	CeFADR_e_Cell09_PurgOffAirMode 4	CeFADR_e_Cell10_PurgOffAirMode 3	CeFADR_e_Cell11_PurgOffAirMode 2
Multiple DTC Use - Response Cell Enable Table - Part 4				
y/x	CeFADR_e_Cell12_PurgOffAirMode 1	CeFADR_e_Cell13_PurgOffAirMode 0	CeFADR_e_Cell14_PurgOffIdle	CeFADR_e_Cell15_PurgOffDecel
1	CeFADR_e_Cell12_PurgOffAirMode 1	CeFADR_e_Cell13_PurgOffAirMode 0	CeFADR_e_Cell14_PurgOffIdle	CeFADR_e_Cell15_PurgOffDecel

Initial Supporting table - Multiple DTC Use_Green Sensor Delay Criteria - Limit

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

Value Units: Grams
X Unit: Acculmulated Engine Airflow

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

Initial Supporting table - P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM

Description: P0101_P0106_P0121_P012B_P0236_P1101 MAP1 Residual Weight Factor based on RPM

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

y/x	500	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,500	4,000	4,500	5,000	5,500	6,500	7,500
1	0.850	0.850	0.850	0.850	0.850	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	500	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,500	4,000	4,500	5,000	5,500	6,500	7,500
1	0.850	0.850	0.850	0.850	0.850	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

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

Description: P0101_P0106_P0121_P012B_P0236_P1101 MAP3 Residual Weight Factor based on RPM

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

y/x	13	263	750	1,200	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,313	7,000	7,488
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

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

Description: P0101_P0106_P0121_P012B_P0236_P1101 TPS Residual Weight Factor based on RPM

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

y/x	500	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,500	4,000	4,500	5,000	5,500	6,500	7,500
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

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

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

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

y/x	1	2	3	4	5	6	7
1	TPS Model Failure	MAF Model Failure	MAP1 Model Failure	MAP2 Model Failure	SCIAP1 Model Failure	SCIAP2 Model Failure	DTC Set
2	F	F	F	F	F	F	No DTC
3	F	F	F	F	F	T	No DTC
4	F	F	F	F	T	F	No DTC
5	F	F	F	F	T	T	P012B
6	F	F	F	T	F	F	No DTC
7	F	F	F	T	F	T	P1101
8	F	F	F	T	T	F	P1101
9	F	F	F	T	T	T	P1101
10	F	F	T	F	F	F	No DTC
11	F	F	T	F	F	T	P1101
12	F	F	T	F	T	F	P1101
13	F	F	T	F	T	T	P1101
14	F	F	T	T	F	F	P0106
15	F	F	T	T	F	T	P1101
16	F	F	T	T	T	F	P1101
17	F	F	T	T	T	T	P1101
18	F	T	F	F	F	F	No DTC
19	F	T	F	F	F	T	P0101
20	F	T	F	F	T	F	No DTC
21	F	T	F	F	T	T	P0101 & P012B
22	F	T	F	T	F	F	P1101
23	F	T	F	T	F	T	P0101
24	F	T	F	T	T	F	P1101
25	F	T	F	T	T	T	P0101 & P012B
26	F	T	T	F	F	F	P1101
27	F	T	T	F	F	T	P1101
28	F	T	T	F	T	F	P1101
29	F	T	T	F	T	T	P1101
30	F	T	T	T	F	F	P1101
31	F	T	T	T	F	T	P1101

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

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

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

Description: P0101_P0106_P0121_P0236_P1101 TIAP Residual Weight Factor based on RPM

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

y/x	13	263	750	1,200	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,313	7,000	7,488
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 - P0153_KnEOSD_t_ST_LRC_LimRS2

Description: X Table Axis for P0153

Value Units: Seconds
X Unit: X Table Axis for P0153, L2R Response time breakpoints for table

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	0.000	0.030	0.045	0.060	0.075	0.090	0.105	0.120	0.135	0.150	0.165	0.180	0.195	0.210	0.225	0.240	1.000

Initial Supporting table - P0153_KnEOSD_t_ST_RLC_LimRS2

Description: Y Table Axis for P0153

Value Units: Seconds
Y Units: Y Table Axis for P0153, R2L Response time breakpoints for table

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	0.000	0.045	0.060	0.075	0.090	0.105	0.120	0.135	0.150	0.165	0.180	0.195	0.210	0.225	0.240	0.255	1.000

Initial Supporting table - P0153_O2S Slow Response Bank 2 Sensor 1 Pass/Fail Threshold table

Description: This table discribes the Pass and Fail regions based on the diagnostic test result

Value Units: If the cell contains a "0" then the fault is indicated, if it contains a "1" a fault is not indicated.
X Unit: X axis is Lean to Rich response time (in sec), Please see the table below named "KnEOSD_t_ST_LRC_LimRS2" for the 17 X axis table breakpoints.
Y Units: Y axis is Rich to Lean response time (in sec), Please see the table below named "KnEOSD_t_ST_RLC_LimRS2" for the 17 Y axis table breakpoints.

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

Initial Supporting table - P0806 EngTorqueThreshold Table

Description: The diagnostic is inhibited if torque (NM) is less than this value. Prevents false fails in regions where false in-gear N/TOS ratios are possible due to low torque, where high torque would otherwise cause slip and prevent a valid in-gear state.

Value Units: Torque (NM)
X Unit: Percent Clutch Pedal Position (%)

y/x	0.00	6.25	12.50	18.75	25.00	31.25	37.50	43.75	50.00	56.25	62.50	68.75	75.00	81.25	87.50	93.75	100.00
1	50.0	50.0	50.0	53.0	59.0	69.0	83.0	106.0	125.0	130.0	-8,192.0	-8,192.0	-8,192.0	-8,192.0	-8,192.0	-8,192.0	-8,192.0

Initial Supporting table - P0806 ResidualErrEnableHigh Table

Description: Represents the upper threshold of a deadband where the diagnostic will be inhibited to prevent false fails due to clutch slip that can falsely indicate a valid in-gear N/TOS ratio. The lower threshold of the deadband is represented by the table "P0806 ResidualErrEnableLow Table". A lower threshold value that is greater than or equal to the upper threshold for the same gear is an indication that this portion of the diagnostic's enable critera is ignored in that gear. Conversely if the lower threshold value is at or near 0% and the upper threshold for the same gear is at or near 100%, then diagnosis is not enabled in that gear.

Value Units: Percent Clutch Pedal Position (%)
X Unit: Gear, where "0" - "6" is gear 1 - 7, respectively; "7" is reverse

y/x	CeMTCI_e_Gear1	CeMTCI_e_Gear2	CeMTCI_e_Gear3	CeMTCI_e_Gear4	CeMTCI_e_Gear5	CeMTCI_e_Gear6	CeMTCI_e_Gear7	CeMTCI_e_Reverse
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - P0806 ResidualErrEnableLow Table

Description: Represents the lower threshold of a deadband where the diagnostic will be inhibited to prevent false fails due to clutch slip that can falsely indicate a valid in-gear N/TOS ratio. The upper threshold of the deadband is represented by the table "P0806 ResidualErrEnableHigh Table". An upper threshold value that is less than or equal to the lower threshold for the same gear is an indication that this portion of the diagnostic's enable critera is ignored in that gear. Conversely if the lower threshold value is at or near 0% and the upper threshold for the same gear is at or near 100%, then diagnosis is not enabled in that gear.

Value Units: Percent Clutch Pedal Position (%)
X Unit: Gear, where "0" - "6" is gear 1 - 7, respectively; "7" is reverse

y/x	CeMTCI_e_Gear1	CeMTCI_e_Gear2	CeMTCI_e_Gear3	CeMTCI_e_Gear4	CeMTCI_e_Gear5	CeMTCI_e_Gear6	CeMTCI_e_Gear7	CeMTCI_e_Reverse
1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

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

Value Units: Grams
X Unit: Acculmulated Engine Airflow

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

Initial Supporting table - P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM

Description: P0101_P0106_P0121_P012B_P0236_P1101 MAP1 Residual Weight Factor based on RPM

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

y/x	0	650	700	1,000	1,300	1,600	1,900	2,200	2,500	2,800	3,100	3,400	3,700	4,000	4,500	5,500	6,200
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.000

Initial Supporting table - P0101, P0106, P0121, P012B, P0236, P1101: 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	650	700	1,000	1,300	1,600	1,900	2,200	2,500	2,800	3,100	3,400	3,700	4,000	4,500	5,500	6,200
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.000

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

Description: P0101_P0106_P0121_P012B_P0236_P1101 MAP3 Residual Weight Factor based on RPM

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

y/x	0	650	700	1,000	1,300	1,600	1,900	2,200	2,500	2,800	3,100	3,400	3,700	4,000	4,500	5,500	6,200
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

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

Description: P0101_P0106_P0121_P012B_P0236_P1101 TPS Residual Weight Factor based on RPM

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

y/x	0	650	700	1,000	1,300	1,600	1,900	2,200	2,500	2,800	3,100	3,400	3,700	4,000	4,500	5,500	6,200
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

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

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

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

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

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

Description: P0101_P0106_P0121_P012B_P1101 SCIAP1 Residual Weight Factor based on RPM

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

y/x	0	650	700	1,000	1,300	1,600	1,900	2,200	2,500	2,800	3,100	3,400	3,700	4,000	4,500	5,500	6,200
1	0.000	0.000	0.740	0.710	0.971	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

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

Description: P0101_P0106_P0121_P012B_P1101 SCIAP2 Residual Weight Factor based on RPM

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

y/x	0	650	700	1,000	1,300	1,600	1,900	2,200	2,500	2,800	3,100	3,400	3,700	4,000	4,500	5,500	6,200
1	0.000	0.000	0.680	0.710	0.719	0.802	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

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

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

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

y/x	1	2	3	4	5	6	7
1	TPS Model Failure	MAF Model Failure	MAP1 Model Failure	MAP2 Model Failure	SCIAP1 Model Failure	SCIAP2 Model Failure	DTC Set
2	F	F	F	F	F	F	No DTC
3	F	F	F	F	F	T	No DTC
4	F	F	F	F	T	F	No DTC
5	F	F	F	F	T	T	P012B
6	F	F	F	T	F	F	No DTC
7	F	F	F	T	F	T	P1101
8	F	F	F	T	T	F	P1101
9	F	F	F	T	T	T	P1101
10	F	F	T	F	F	F	No DTC
11	F	F	T	F	F	T	P1101
12	F	F	T	F	T	F	P1101
13	F	F	T	F	T	T	P1101
14	F	F	T	T	F	F	P0106
15	F	F	T	T	F	T	P1101
16	F	F	T	T	T	F	P1101
17	F	F	T	T	T	T	P1101
18	F	T	F	F	F	F	No DTC
19	F	T	F	F	F	T	P0101
20	F	T	F	F	T	F	No DTC
21	F	T	F	F	T	T	P0101 & P012B
22	F	T	F	T	F	F	P1101
23	F	T	F	T	F	T	P0101
24	F	T	F	T	T	F	P1101
25	F	T	F	T	T	T	P0101 & P012B
26	F	T	T	F	F	F	P1101
27	F	T	T	F	F	T	P1101
28	F	T	T	F	T	F	P1101
29	F	T	T	F	T	T	P1101
30	F	T	T	T	F	F	P1101
31	F	T	T	T	F	T	P1101

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

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

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

Description: P0101_P0106_P0121_P0236_P1101 TIAP Residual Weight Factor based on RPM

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

y/x	0	650	700	1,000	1,300	1,600	1,900	2,200	2,500	2,800	3,100	3,400	3,700	4,000	4,500	5,500	6,200
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 - 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.

y/x	15.00	20.00	25.00	30.00	35.00	40.00	45.00	50.00	100.00
1.00	41.66	25.48	47.84	69.23	255.00	255.00	255.00	255.00	255.00

Initial Supporting table - P0068_Delta MAP Threshold f(TPS)

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

y/x	15.00	20.00	25.00	30.00	35.00	40.00	45.00	50.00	100.00
1.00	23.61	10.94	14.38	14.72	255.00	255.00	255.00	255.00	255.00

Initial Supporting table - P0068_Maximum MAF f(RPM)

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

y/x	600.00	1,400.00	2,200.00	3,000.00	3,800.00	4,600.00	5,400.00	6,200.00	7,000.00
1.00	38.28	104.38	191.73	285.43	393.89	492.32	511.99	511.99	511.99

Initial Supporting table - P0068_Maximum MAF f(Volts)

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

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

Description: P0101_P0106_P010B_P0121_P012B_P0236_P1101 MAF1 Residual Weight Factor based on MAF Est

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

y/x	0	15	40	65	90	115	140	165	200	250	300	350	400	450	500	550	600
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

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	650	700	1,000	1,300	1,600	1,900	2,200	2,500	2,800	3,100	3,400	3,700	4,000	4,500	5,500	6,200
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	0.992	0.530	0.450

Initial Supporting table - P0116_Fail if power up ECT exceeds IAT by these values

Description: KtECTD_T_HSC_FastFailTempDiff

Value Units: Fast Failure temp difference (°C)
X Unit: IAT Temperature at Power up (°C)

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	80	80	80	60	60	40	40	30	30	30	30	30	30	30	30	30	30

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	23.000	85.000	95.000	105.000	125.000
1.000	7.000	8.699	9.000	9.199	10.000

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	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000
2	0.51	0.17	0.18	0.50	0.62	0.74	0.61	0.66	0.63	0.70	0.29	0.58	0.69	0.69	0.60	0.59	0.50
8	0.19	0.19	0.29	0.07	0.15	0.07	0.06	0.12	0.19	0.21	0.29	0.58	0.69	0.69	0.60	0.59	0.50
12	0.19	0.19	0.33	-0.06	0.00	0.20	0.13	0.16	0.09	0.01	0.14	0.11	0.26	0.23	0.19	0.21	0.05
16	1.00	0.85	0.41	-0.15	-0.04	0.00	0.00	-0.03	0.05	-0.16	-0.10	0.04	-0.08	0.02	0.04	-0.03	-0.22
20	1.00	0.71	1.22	-0.15	0.00	-0.03	-0.13	-0.05	0.10	-0.13	-0.08	-0.03	-0.06	0.12	0.05	0.03	-0.17
24	1.00	0.71	0.19	0.50	-0.04	0.06	-0.17	-0.16	-0.10	-0.21	0.00	-0.08	-0.16	-0.12	-0.13	-0.14	-0.13
30	1.00	0.71	0.04	1.00	-0.18	-0.10	-0.09	-0.16	-0.05	-0.14	-0.07	-0.05	-0.14	-0.14	-0.08	-0.09	-0.20
40	1.00	0.71	0.04	0.59	-0.18	-0.10	-0.09	-0.16	-0.17	-0.14	-0.07	-0.07	-0.14	-0.14	-0.08	-0.09	-0.20
60	1.00	0.71	0.04	0.59	-0.18	-0.10	-0.09	-0.16	-0.17	-0.14	-0.07	-0.07	-0.14	-0.14	-0.08	-0.09	-0.20

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	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000
2	-1.96	-1.50	-1.50	-0.90	-1.00	-1.17	-1.22	-1.10	-1.30	-1.12	-1.16	-1.05	-1.00	-1.18	-0.95	-1.29	-1.55
8	-1.96	-0.80	-1.25	-1.25	-1.00	-1.12	-0.98	-1.25	-1.17	-1.50	-1.10	-1.25	-1.00	-1.00	-1.10	-1.29	-1.25
12	-1.96	-1.25	-1.09	-1.00	-1.36	-1.33	-1.31	-1.21	-1.40	-1.27	-1.40	-1.00	-1.00	-1.25	-1.35	-1.33	-1.30
16	-1.96	-1.25	-1.96	-1.80	-1.35	-1.50	-1.30	-1.30	-1.80	-2.00	-1.50	-1.44	-1.64	-1.37	-1.05	-1.50	-1.75
20	-1.96	-1.96	-1.50	-2.00	-1.88	-1.40	-1.30	-1.50	-1.50	-1.51	-1.56	-1.70	-1.44	-1.12	-1.30	-1.00	-1.40
24	-1.96	-1.96	-1.94	-1.50	-1.25	-1.40	-1.30	-1.50	-1.30	-1.25	-1.50	-1.73	-1.63	-1.78	-1.76	-1.80	-1.60
30	-1.96	-1.96	-1.94	-1.99	-1.61	-1.63	-1.40	-1.50	-1.34	-1.40	-1.40	-1.61	-1.58	-1.55	-1.33	-1.60	-1.77
40	-1.96	-1.96	-1.94	-2.31	-1.61	-1.63	-1.43	-1.58	-1.34	-1.42	-1.61	-1.76	-1.69	-1.68	-1.69	-1.79	-1.90
60	-1.96	-1.96	-1.94	-2.31	-1.61	-1.63	-1.43	-1.58	-1.34	-1.42	-1.61	-1.76	-1.69	-1.68	-1.69	-1.79	-1.90

Initial Supporting table - 1stFireAfterMisJerkAFM

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 - 1stFireAftrMisAcelAFM

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

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

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

Initial Supporting table - Abnormal Cyl Mode

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

Value Units: Number of consecutive number of decelerating cylinders (integer)
X Unit: thousands of RPM (rpm/1000)

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

Initial Supporting table - Abnormal Rev Mode

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

Value Units: Number of consecutive number of decelerating cylinders (integer)
X Unit: thousands of RPM (rpm/1000)

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

Initial Supporting table - Abnormal SCD Mode

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

Value Units: Number of consecutive number of decelerating cylinders (integer)
X Unit: thousands of RPM (rpm/1000)

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

Initial Supporting table - Bank_SCD_Decel

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

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	500	600	700	800	900	1,000	1,100	1,200
2	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
8	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
12	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
16	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
20	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
24	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
30	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
40	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
60	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75

Initial Supporting table - Bank_SCD_Jerk

Description: Used for P0300 - P0308, Mulitplier to Medres SCD jerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: mulitplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	500	600	700	800	900	1,000	1,100	1,200
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - BankCylModeDecel

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

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000
2	1.17	0.78	1.03	1.07	0.89	1.42	2.00	1.45	2.00	3.00	2.25	2.25	2.15	2.15	2.50	2.25	2.00
8	1.17	0.92	0.89	0.88	0.43	0.61	0.80	1.18	0.46	1.06	1.27	1.15	1.13	1.15	1.30	1.24	0.94
12	0.30	0.25	0.32	0.30	0.40	0.44	0.11	0.14	0.00	0.65	0.93	0.67	0.28	0.33	0.97	0.83	0.74
16	0.69	0.52	0.59	0.69	0.70	0.72	0.59	0.00	0.58	0.56	0.50	0.62	0.55	0.58	0.56	0.45	0.16
20	0.59	0.45	0.47	0.53	0.73	0.66	0.38	0.58	0.65	0.51	0.44	0.53	0.56	0.55	0.46	0.55	0.54
24	0.79	0.51	0.49	0.59	0.80	0.62	0.55	0.51	0.54	0.55	0.48	0.38	0.42	0.38	0.39	0.40	0.38
30	0.90	0.68	0.42	0.65	0.75	0.62	0.68	0.56	0.52	0.47	0.50	0.41	0.43	0.45	0.50	0.34	0.36
40	1.18	0.82	0.64	0.62	0.70	0.58	0.81	0.57	0.54	0.41	0.49	0.35	0.44	0.41	0.42	0.32	0.33
60	1.21	0.81	0.59	0.56	0.64	0.55	0.92	0.55	0.53	0.35	0.49	0.30	0.45	0.38	0.34	0.31	0.28

Initial Supporting table - BankCylModeJerk

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

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000
2	1.73	1.73	1.86	1.54	2.00	2.11	2.50	2.30	3.00	3.50	3.50	2.80	3.05	3.20	3.00	3.50	3.25
8	1.38	1.13	1.54	1.86	2.00	0.44	1.00	0.93	1.25	2.30	3.00	2.15	2.04	2.18	2.00	2.50	2.27
12	0.52	0.45	0.63	0.76	1.06	1.28	0.93	1.22	0.81	1.06	1.45	1.27	1.22	1.69	1.92	1.52	1.50
16	0.74	0.68	0.79	1.08	1.06	1.48	1.07	1.18	2.44	2.13	1.26	1.23	1.30	1.24	1.38	1.70	1.33
20	0.74	0.68	0.59	0.83	1.30	1.37	1.12	1.33	1.79	1.41	1.42	1.46	1.33	1.44	1.57	1.33	1.30
24	1.03	0.89	0.88	0.98	1.08	1.30	1.38	1.06	1.05	1.16	1.41	1.54	1.41	1.53	1.10	1.50	1.28
30	1.72	1.41	1.14	1.03	1.15	1.23	1.28	1.25	1.28	1.34	1.58	1.51	1.32	1.17	1.03	1.29	1.25
40	2.99	1.98	1.57	1.33	1.27	1.15	1.20	0.99	1.21	1.16	1.15	1.49	1.27	1.13	0.89	1.19	1.19
60	3.15	2.12	1.57	1.25	1.15	1.12	1.11	0.94	1.19	1.04	1.09	1.46	1.21	1.08	0.75	1.07	1.13

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	11.3	11.3	10.3	7.5	4.8	4.8	4.8	4.8
10	11.3	11.3	9.4	6.3	4.8	4.8	4.8	4.8
20	9.2	7.8	7.3	4.8	4.8	4.8	4.8	4.8
30	7.3	6.3	6.3	4.8	4.8	4.8	4.8	4.8
40	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
50	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
60	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
70	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
80	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
90	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
100	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8

Initial Supporting table - ClyAfterAFM_Decel

Description: Used for P0300 - P0308, Mulitplier to Lores decel to account for different pattern of misfire after a deactivated cylider. Similar to the second cylinder of consecutive cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,400	1,600	2,000	2,400	2,600	3,000
8	1.50	1.50	1.50	1.50	1.50	1.50	1.50	2.00	2.00
10	1.05	1.05	1.30	1.20	1.05	1.00	1.20	1.50	1.50
12	0.70	0.70	0.85	0.80	0.65	0.60	0.55	0.90	1.50
14	0.60	0.60	0.65	0.55	0.45	0.45	0.70	0.65	1.15
16	0.65	0.65	0.55	0.45	0.35	0.35	0.50	0.50	1.30
20	0.55	0.55	0.25	0.20	0.15	0.25	0.35	0.35	0.55
24	0.20	0.20	0.20	0.20	0.15	0.20	0.25	0.25	0.45
30	0.30	0.30	0.20	0.20	0.20	0.25	0.30	0.25	0.25
40	0.30	0.30	0.20	0.20	0.20	0.25	0.30	0.25	0.25

Initial Supporting table - ClyBeforeAFM_Jerk

Description: Used for P0300 - P0308, Mulitplier to Lores decel to account for different pattern of misfire before a deactivated cylider, but after an active cylinder that follows an deactive cylinder on engine that supports cylinder deactivation in non even fire patterns.. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,400	1,600	2,000	2,400	2,600	3,000
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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

Initial Supporting table - CombustModeIdleTbl

Description: Used for P0300 - P0308, Only used on Diesel engines. Combustion modes that will force use of Idle table. A value of CeCMBR_i_CombModesMax means not selected.

Value Units: Enumerated value of differant combustion modes (enumeration)
X Unit: Current Combustion Mode (enumeration)

CombustModeIdleTbl - Part 1						
y/x	0	1	2	3	4	5
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax

CombustModeIdleTbl - Part 2						
y/x	6	7	8	9	10	11
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax

CombustModeIdleTbl - Part 3						
y/x	12	13	14	15	16	
1	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	CeCMBR_i_CombModesMax	

Initial Supporting table - ConsecCylModDecel

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

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000
2	1.22	0.80	1.50	1.20	1.50	1.40	1.55	1.38	1.52	1.54	1.66	1.52	1.49	1.52	1.31	1.19	1.60
8	1.33	0.99	1.00	1.03	1.25	0.96	1.00	1.55	0.99	1.16	1.52	1.56	1.72	1.15	1.20	1.06	1.06
12	1.17	0.86	1.11	0.95	0.77	0.66	0.85	0.85	0.75	0.76	1.04	0.88	0.97	0.98	1.00	1.04	0.89
16	0.91	0.74	1.15	0.95	0.70	0.53	1.00	0.53	1.00	0.62	0.78	0.77	0.71	0.58	0.71	0.65	0.69
20	0.96	0.71	0.79	0.82	0.80	0.83	0.67	0.71	0.69	0.53	0.69	0.75	0.66	0.76	0.70	0.88	0.80
24	0.92	0.70	0.69	0.75	0.99	0.79	0.62	0.80	0.75	0.78	0.75	0.77	0.83	0.77	0.75	0.83	0.73
30	1.24	0.87	0.76	0.82	1.18	0.99	0.94	0.83	0.71	0.75	0.86	0.74	0.82	0.72	0.76	0.78	0.72
40	1.17	0.76	0.64	0.62	1.11	1.18	0.88	0.76	0.66	0.72	0.80	0.68	0.78	0.72	0.72	0.73	0.66
60	1.11	0.77	0.60	0.57	1.04	1.08	0.79	0.69	0.61	0.67	0.73	0.63	0.72	0.68	0.67	0.70	0.61

Initial Supporting table - ConsecCylModeJerk

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

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000
2	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
8	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
12	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-3
16	-1	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2
20	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	-1
24	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
30	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
40	-1	-1	-1	-1	-1	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	-1
60	-1	-1	-1	-1	-1	-1	-1	-1	0	-1	-1	-1	-1	-1	-1	-1	-1

Initial Supporting table - ConsecSCD_Decel

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

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	500	600	700	800	900	1,000	1,100	1,200
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - ConsecSCD_Jerk

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

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	500	600	700	800	900	1,000	1,100	1,200
2	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
8	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
12	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
16	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
20	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
24	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
30	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
40	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
60	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25

Initial Supporting table - CylAfterAFM_Jerk

Description: Used for P0300 - P0308, Mulitplier to Lores Jerk to account for different pattern of misfire after a deactivated cylider. Similar to the second cylinder of consecutive cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,400	1,600	2,000	2,400	2,600	3,000
8	1	1	1	1	1	2	2	2	2
10	0	0	1	1	0	1	1	2	2
12	0	0	0	0	0	-1	0	0	1
14	0	0	0	0	-1	-1	-1	0	0
16	0	0	0	-1	-1	-1	0	0	0
20	-1	-1	-1	-1	-1	-1	-1	0	0
24	-1	-1	-1	-1	-1	-1	-1	-1	-1
30	-2	-2	-2	-1	-1	-1	-1	-1	-1
40	-2	-2	-2	-1	-1	-1	-1	-1	-1

Initial Supporting table - CylBeforeAFM_Decel

Description: Used for P0300 - P0308, Mulitplier to Lores decel to account for different pattern of misfire before a deactivated cylider, but after an active cylinder that follows an deactive cylinder on engine that supports cylinder deactivation in non even fire patterns.. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,400	1,600	2,000	2,400	2,600	3,000
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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

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	779	708	643	400	245	172	118	90	73	50	34	25	19
6	938	853	573	409	287	201	158	110	76	56	40	27	19
8	1,150	1,045	921	570	354	237	203	147	107	77	48	31	23
10	1,573	1,430	1,301	600	545	346	248	196	131	81	55	39	31
12	1,888	1,716	1,641	874	666	399	287	238	146	101	63	40	37
14	2,202	2,002	1,820	976	672	422	320	240	175	113	79	60	42
16	2,517	2,288	2,080	1,216	801	606	425	296	239	127	95	65	49
18	2,832	2,574	2,340	1,456	771	655	472	306	244	167	111	70	60
20	3,146	2,860	2,600	1,718	1,108	693	500	345	251	164	140	92	68
22	3,461	3,146	2,860	1,936	1,284	729	560	457	336	186	144	110	78
24	3,775	3,432	3,120	2,176	1,437	806	620	511	376	223	160	122	87
26	4,090	3,718	3,380	2,416	1,589	883	680	566	416	245	176	135	96
30	4,719	4,290	3,900	2,896	1,895	1,036	800	674	496	289	208	159	114
40	6,292	5,720	5,200	4,096	2,659	1,420	1,100	946	697	399	289	221	160
60	9,438	8,580	7,800	6,496	4,188	2,188	1,700	1,489	1,098	619	450	345	250
78	12,191	11,083	10,075	8,596	5,525	2,859	2,225	1,964	1,449	812	591	453	329
97	15,337	13,943	12,675	10,996	7,054	3,627	2,825	2,507	1,850	1,032	752	577	419

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	15	13	11	10	7	15	12	14	18	15	15	15	15
6	15	12	11	9	7	14	10	12	17	14	14	14	14
8	16	13	10	9	8	12	9	11	15	12	12	12	12
10	24	18	14	10	9	12	9	10	13	11	11	11	11
12	29	20	16	12	10	13	9	10	12	10	10	10	10
14	33	25	20	15	12	17	11	6	12	9	10	10	10
16	39	33	24	20	16	29	13	7	9	9	9	9	9
18	45	37	24	22	18	36	15	8	6	7	8	8	8
20	54	34	29	20	18	30	17	11	6	7	8	7	7
22	57	48	36	26	23	34	19	12	6	7	6	7	7
24	63	53	40	29	26	37	21	13	8	9	7	7	7

Initial Supporting table - CylModeDecel

26	69	58	41	32	29	42	22	14	7	11	7	7	7
30	81	68	52	38	35	51	26	17	9	12	8	8	8
40	111	93	72	54	49	51	34	21	12	15	8	8	8
60	171	143	112	84	78	51	34	21	12	15	8	8	8
78	223	187	147	111	103	51	34	21	12	15	8	8	8
97	283	237	187	141	132	51	34	21	12	15	8	8	8

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	648	540	450	339	248	152	111	83	66	38	30	29	25
6	684	570	480	350	268	182	123	88	61	49	32	24	18
8	1,296	1,080	947	550	369	261	205	137	98	70	34	29	21
10	1,548	1,290	1,075	650	489	327	246	178	128	81	53	35	26
12	1,750	1,458	1,377	825	605	399	294	229	168	93	70	43	32
14	1,951	1,626	1,355	902	596	430	280	221	156	103	76	54	37
16	2,153	1,794	1,495	1,028	631	570	350	306	209	81	62	61	42
18	2,355	1,962	1,635	1,154	648	576	413	313	232	123	82	66	48
20	2,556	2,130	1,775	1,524	885	501	460	348	226	128	118	77	52
22	2,758	2,298	1,915	1,406	1,044	729	520	413	308	141	141	89	50
24	2,959	2,466	2,055	1,532	1,156	830	580	461	346	216	150	108	62
26	3,161	2,634	2,195	1,658	1,268	910	640	509	384	238	171	108	72
30	3,564	2,970	2,475	1,910	1,492	1,070	760	605	460	282	205	115	86
40	4,572	3,810	3,175	2,540	2,052	1,470	1,060	845	650	392	285	197	118
60	6,588	5,490	4,575	3,800	3,172	2,270	1,660	1,325	1,030	612	445	307	182
78	8,352	6,960	5,800	4,903	4,152	2,970	2,185	1,745	1,363	805	585	404	238
97	10,368	8,640	7,200	6,163	5,272	3,770	2,785	2,225	1,743	1,025	745	514	302

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	22	16	14	12	11	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	14	11	9	7	6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	14	11	11	7	6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	20	16	11	9	8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	26	15	13	11	8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	31	22	15	13	13	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	31	27	20	12	11	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	38	30	21	11	16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	45	29	22	20	17	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	35	28	24	20	18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	52	37	30	22	20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - CylModeJerk

26	60	40	30	24	20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	71	57	44	31	26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	98	77	62	43	37	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	152	118	96	67	57	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
78	199	154	127	88	76	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	252	195	162	112	96	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - DeacCylInversionDecel

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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	1,400	1,600	2,000	2,400	2,600	3,000
8	150	136	40	29	23	26	18	18	10
10	0	0	0	0	0	26	18	18	10
12	0	0	0	0	0	0	18	18	10
14	101	92	56	26	10	0	0	18	10
16	156	142	86	55	30	12	0	0	0
20	214	195	114	106	68	36	12	5	0
24	318	289	166	138	96	46	17	13	0
30	550	500	204	171	110	58	35	20	13
40	605	550	224	188	121	64	38	22	15

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	1,400	1,600	2,000	2,400	2,600	3,000
8	272	247	74	51	40	43	28	29	21
10	104	95	31	23	27	43	28	28	21
12	271	247	111	33	44	23	28	28	21
14	399	363	168	125	82	24	0	29	21
16	509	463	263	198	124	42	16	4	0
20	785	714	424	305	213	108	34	20	8
24	1,093	994	647	415	276	137	51	41	14
30	1,595	1,450	859	540	352	178	83	64	37
40	1,755	1,595	945	594	387	196	92	71	41

Initial Supporting table - EngineOverSpeedLimit

Description: Engine OverSpeed Limit versus gear

Value Units: RPM
X Unit: Enumeration of transmission gear state (enumeration)

EngineOverSpeedLimit - Part 1

y/x	CeTGRR_e_TransGr1	CeTGRR_e_TransGr2	CeTGRR_e_TransGr3	CeTGRR_e_TransGr4	CeTGRR_e_TransGr5	CeTGRR_e_TransGr6	CeTGRR_e_TransGr9
1	6,600	6,600	6,600	6,600	6,600	6,600	6,600

EngineOverSpeedLimit - Part 2

y/x	CeTGRR_e_TransGr10	CeTGRR_e_TransGrNeut	CeTGRR_e_TransGrRvrs	CeTGRR_e_TransGrPark	CeTGRR_e_TransGr7	CeTGRR_e_TransGr8	
1	6,600	6,600	6,600	6,600	6,600	6,600	

Initial Supporting table - InfrequentRegen

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

Value Units: Enumerated value of differant combustion modes (enumeration)
X Unit: Current Combustion Mode (enumeration)

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

Initial Supporting table - Number of Normals

Description: Used for P0300-P0308. Number of Normals for the Driveline Ring Filter
After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.

Value Units: Number of Engine cycles after isolated misfire (Engine cycles)
X Unit: thousands of RPM (rpm/1000)

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

Initial Supporting table - 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	6.14	7.03	7.92	8.82	9.71	10.60	11.49	12.39	13.28	14.17	15.06	15.95	16.85	17.74	18.63	19.52	20.41
488.00	1.99	1.44	1.14	1.02	0.84	0.74	0.67	0.61	0.57	0.54	0.51	0.46	0.41	0.39	0.38	0.36	0.35
546.00	2.04	1.48	1.17	1.04	0.86	0.76	0.69	0.63	0.58	0.55	0.52	0.47	0.42	0.40	0.39	0.37	0.36
604.00	2.09	1.52	1.20	1.07	0.88	0.78	0.70	0.64	0.60	0.56	0.53	0.49	0.43	0.41	0.40	0.38	0.37
662.00	2.15	1.56	1.23	1.10	0.90	0.80	0.72	0.66	0.61	0.58	0.54	0.50	0.44	0.42	0.41	0.39	0.38
720.00	2.21	1.60	1.27	1.12	0.93	0.82	0.74	0.68	0.63	0.59	0.56	0.51	0.46	0.44	0.42	0.41	0.39
778.00	2.26	1.64	1.30	1.15	0.95	0.84	0.76	0.69	0.64	0.60	0.57	0.52	0.47	0.45	0.43	0.42	0.40
836.00	2.33	1.69	1.34	1.18	0.97	0.86	0.78	0.71	0.66	0.62	0.58	0.54	0.48	0.46	0.44	0.43	0.41
894.00	2.39	1.73	1.37	1.21	1.00	0.88	0.80	0.73	0.68	0.63	0.60	0.55	0.50	0.47	0.46	0.44	0.42
952.00	2.45	1.78	1.41	1.24	1.03	0.91	0.82	0.75	0.69	0.65	0.61	0.56	0.51	0.49	0.47	0.45	0.43

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	6.14	7.03	7.92	8.82	9.71	10.60	11.49	12.39	13.28	14.17	15.06	15.95	16.85	17.74	18.63	19.52	20.41
488.00	3.33	2.29	1.74	1.37	1.14	0.95	0.87	0.84	0.73	0.68	0.67	0.61	0.55	0.53	0.51	0.46	0.46
546.00	3.39	2.33	1.77	1.39	1.16	0.99	0.89	0.86	0.74	0.70	0.68	0.62	0.56	0.54	0.52	0.47	0.47
604.00	3.44	2.37	1.80	1.42	1.18	1.01	0.90	0.88	0.76	0.71	0.69	0.63	0.57	0.55	0.53	0.48	0.48
662.00	3.50	2.41	1.83	1.45	1.20	1.03	0.92	0.89	0.77	0.72	0.70	0.65	0.58	0.57	0.54	0.49	0.49
720.00	3.56	2.45	1.87	1.47	1.23	1.05	0.94	0.91	0.79	0.74	0.72	0.66	0.60	0.58	0.55	0.50	0.50
778.00	3.62	2.49	1.90	1.50	1.25	1.07	0.96	0.92	0.80	0.75	0.73	0.67	0.61	0.59	0.56	0.52	0.51
836.00	3.68	2.54	1.94	1.53	1.27	1.09	0.98	0.94	0.82	0.77	0.75	0.69	0.62	0.60	0.57	0.53	0.52
894.00	3.74	2.58	1.97	1.56	1.30	1.11	1.00	0.96	0.84	0.78	0.76	0.70	0.63	0.61	0.58	0.54	0.53
952.00	3.80	2.63	2.01	1.59	1.33	1.14	1.02	0.98	0.85	0.80	0.77	0.71	0.65	0.63	0.60	0.55	0.54

Initial Supporting table - P08A8 EngTorqueThreshold Table

Description: The diagnostic is inhibited if torque (NM) is less than this value. Prevents false fails in regions where false in-gear N/TOS ratios are possible due to low torque, where high torque would otherwise cause slip and prevent a valid in-gear state.

Value Units: Torque (NM)
X Unit: Percent Clutch Pedal Position (%)

y/x	0.00	6.25	12.50	18.75	25.00	31.25	37.50	43.75	50.00	56.25	62.50	68.75	75.00	81.25	87.50	93.75	100.00
1	50.0	50.0	50.0	53.0	59.0	69.0	83.0	106.0	125.0	130.0	-8,192.0	-8,192.0	-8,192.0	-8,192.0	-8,192.0	-8,192.0	-8,192.0

Initial Supporting table - P08A8 ResidualErrEnableHigh Table

Description: Represents the upper threshold of a deadband where the diagnostic will be inhibited to prevent false fails due to clutch slip that can falsely indicate a valid in-gear N/TOS ratio. The lower threshold of the deadband is represented by the table "P08A8 ResidualErrEnableLow Table". A lower threshold value that is greater than or equal to the upper threshold for the same gear is an indication that this portion of the diagnostic's enable critera is ignored in that gear. Conversely if the lower threshold value is at or near 0% and the upper threshold for the same gear is at or near 100%, then diagnosis is not enabled in that gear.

Value Units: Percent Clutch Pedal Position (%)
X Unit: Gear, where "0" - "6" is gear 1 - 7, respectively; "7" is reverse

y/x	CeMTCI_e_Gear1	CeMTCI_e_Gear2	CeMTCI_e_Gear3	CeMTCI_e_Gear4	CeMTCI_e_Gear5	CeMTCI_e_Gear6	CeMTCI_e_Gear7	CeMTCI_e_Reverse
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - P08A8 ResidualErrEnableLow Table

Description: Represents the lower threshold of a deadband where the diagnostic will be inhibited to prevent false fails due to clutch slip that can falsely indicate a valid in-gear N/TOS ratio. The upper threshold of the deadband is represented by the table "P08A8 ResidualErrEnableHigh Table". An upper threshold value that is less than or equal to the lower threshold for the same gear is an indication that this portion of the diagnostic's enable critera is ignored in that gear. Conversely if the lower threshold value is at or near 0% and the upper threshold for the same gear is at or near 100%, then diagnosis is not enabled in that gear.

Value Units: Percent Clutch Pedal Position (%)
X Unit: Gear, where "0" - "6" is gear 1 - 7, respectively; "7" is reverse

y/x	CeMTCI_e_Gear1	CeMTCI_e_Gear2	CeMTCI_e_Gear3	CeMTCI_e_Gear4	CeMTCI_e_Gear5	CeMTCI_e_Gear6	CeMTCI_e_Gear7	CeMTCI_e_Reverse
1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Initial Supporting table - P17A2 Slip Detection Ratio Offset

Description: Represents the error offset to the standard gear ratios of the vehicle. Values larger than this offset will be called clutch slip.

Value Units: Percent Gear Ratio Error
X Unit: Gear, where "0" - "6" is gear 1-7, respectively "7" is reverse

y/x	0	1	2	3	4	5	6	7
1	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0

Initial Supporting table - P17A2 Trans Gear Static Ratio

Description: Represents the Static Gear Ratio for the vehicles transmission

Value Units: Engine Speed / Vehicle Speed Gear Ratio
X Unit: Trans Gear

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
1	2.3	1.6	1.2	1.0	0.8	0.7	0.5	0.5	0.4	0.4

Initial Supporting table - Pair_SCD_Decel

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

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	500	600	700	800	900	1,000	1,100	1,200
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - Pair_SCD_Jerk

Description: Used for P0300 - P0308, Mulitplier to P0300_SCD_Jerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	500	600	700	800	900	1,000	1,100	1,200
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - PairCylModeDecel

Description: Used for P0300 - P0308, Mulitplier to Cyl Mode Deceleration to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: mulitplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000
2	0.67	0.67	0.83	1.00	1.00	1.10	1.10	1.10	1.20	0.90	0.90	1.11	1.10	0.92	0.95	0.85	1.14
8	0.77	0.77	0.90	0.69	0.84	0.80	0.80	0.67	0.66	0.84	1.00	1.11	1.10	1.00	0.85	0.94	0.88
12	0.58	0.58	0.82	0.69	1.03	0.96	0.40	0.58	0.68	0.79	0.90	0.84	0.71	0.78	0.81	1.00	1.05
16	0.61	0.61	0.85	0.84	0.76	0.77	0.78	0.64	0.80	0.94	0.60	0.86	0.65	0.91	0.90	0.78	0.94
20	0.58	0.58	0.72	0.66	0.93	0.85	0.75	0.70	0.80	0.76	0.75	0.76	0.61	0.96	0.86	1.10	1.03
24	0.58	0.58	0.78	0.72	0.95	0.85	0.83	0.72	0.90	0.83	0.72	0.76	0.70	1.20	1.08	1.16	0.96
30	0.57	0.57	0.92	0.81	0.90	0.77	0.98	0.99	0.85	0.70	0.89	0.72	0.57	1.06	1.17	1.22	1.09
40	0.57	0.57	0.79	0.60	0.88	0.90	0.75	0.68	0.87	0.63	0.76	0.65	0.53	1.01	1.04	1.07	0.88
60	0.56	0.56	0.76	0.58	0.86	0.89	0.74	0.66	0.86	0.60	0.75	0.62	0.49	1.01	1.05	1.03	0.83

Initial Supporting table - PairCylModeJerk

Description: Used for P0300 - P0308, Mulitplier to P0300_CylModeJerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000
2	1.00	0.75	0.25	0.75	1.00	1.25	1.25	1.25	1.61	1.46	1.00	1.25	1.25	1.00	1.24	1.71	2.00
8	0.60	0.60	0.70	0.70	0.10	0.10	0.20	0.60	0.25	0.40	1.00	1.25	1.25	1.00	1.24	1.71	2.00
12	0.91	1.19	1.05	1.16	1.22	1.10	0.71	0.37	0.55	0.46	0.70	0.50	1.10	1.62	1.42	1.43	1.56
16	1.16	1.75	1.17	1.42	1.04	1.10	0.68	0.48	0.75	0.83	0.60	0.95	1.11	1.15	1.23	1.61	1.52
20	1.36	2.09	1.25	1.02	1.35	0.75	0.43	0.39	0.89	0.61	0.69	1.04	0.89	1.28	1.00	1.18	1.03
24	2.03	2.37	1.67	1.36	1.01	0.01	0.04	0.23	0.60	0.88	0.65	0.99	0.88	1.16	1.00	1.23	0.98
30	2.74	2.29	2.24	1.36	0.80	0.00	0.00	0.52	0.70	0.35	1.17	1.08	0.00	0.58	0.69	0.84	0.69
40	2.19	2.01	1.78	0.84	0.87	0.00	0.00	0.63	0.56	0.00	0.50	0.81	0.00	0.87	0.69	0.97	0.88
60	2.51	2.23	1.86	0.82	0.86	0.00	0.00	0.60	0.54	0.00	0.46	0.79	0.00	0.86	0.66	0.90	0.61

Initial Supporting table - Random_SCD_Decel

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

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	500	600	700	800	900	1,000	1,100	1,200
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - Random_SCD_Jerk

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

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	400	500	600	700	800	900	1,000	1,100	1,200
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RandomAFM_Decl

Description: Used for P0300 - P0308, Mulitplier to Cylinder_Decel while in Cylnder Deactivation mode to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,400	1,600	2,000	2,400	2,600	3,000
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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

Initial Supporting table - RandomAFM_Jerk

Description: Used for P0300 - P0308, Mulitplier to Cylinder_Jerk while in Cylnder Deactivation mode to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	800	1,000	1,200	1,400	1,600	2,000	2,400	2,600	3,000
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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

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	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

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	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RandomRevModDecl

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

Value Units: multiplier
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	3,001	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RepetSnapDecayAdjst

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

Value Units: multiplier
X Unit: RPM

y/x	900	1,100	1,400	1,800	2,200	2,600	3,000	4,000	5,000
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RevMode_Decel

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

Value Units: Delta time between revolutions (usec)
X Unit: RPM
Y Units: percent load of max indicated torque (%)

y/x	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,001	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	80	67	67	67	50	44	29	29
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	72	61	61	61	45	40	26	26
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	66	55	55	61	41	36	23	23
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	70	50	50	55	37	33	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	90	56	40	51	33	30	19	19
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	110	69	33	34	31	27	17	17
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	130	81	33	30	23	25	16	16
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	150	93	44	30	26	23	18	18
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	170	105	60	30	28	20	16	16
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	190	117	68	46	36	32	20	20
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	210	129	76	59	38	36	25	25
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	230	141	84	65	45	40	32	32
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	270	165	100	78	55	50	39	39
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	370	225	140	110	92	65	57	57
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	570	345	220	174	148	105	93	93
78	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	745	450	290	230	197	140	125	125
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	945	570	370	294	253	180	161	161

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	7	7	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	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
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	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
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 ddt_jerk 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
0	1.60	2.30	2.70	2.10	2.00	2.00	1.90	1.90	1.90
1	1.60	2.30	2.70	2.10	2.00	2.00	1.90	1.90	1.90
1	1.60	2.30	2.70	2.10	2.00	2.00	1.90	1.90	1.90
1	1.60	2.30	2.70	2.10	2.00	2.00	1.90	1.90	1.90
2	1.60	2.30	2.70	2.10	2.00	2.00	1.90	1.90	1.90
2	1.60	2.30	2.70	2.10	2.00	2.00	1.90	1.90	1.90
3	1.60	2.30	2.70	2.10	2.00	2.00	1.90	1.90	1.90
5	1.60	2.30	2.70	2.10	2.00	2.00	1.90	1.90	1.90
5	1.60	2.30	2.70	2.10	2.00	2.00	1.90	1.90	1.90

Initial Supporting table - TOSSRoughRoadThres

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

Value Units: change in rpm per sec (rpm)
X Unit: Engine Speed (RPM)
Y Units: Transmission Speed (RPM)

y/x	600	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000
100	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
200	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
300	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
400	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
500	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
600	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
700	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
800	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
900	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
1,000	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
1,100	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
1,200	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
1,300	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
1,400	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0

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	0.24255	0.25647	0.27026	0.28418	0.29797	0.31189	0.32568	0.33960	0.36035	0.38110	0.40881	0.44348	0.47119	0.48511	0.48511	0.48511	0.48511

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	-4.20	-4.20	-4.20	-4.00	-4.00	-3.80	-3.70	-3.50	-3.50	-3.10	-1.80	-1.40	-1.00
75	-3.50	-3.50	-3.50	-3.50	-3.30	-3.30	-3.30	-3.20	-3.20	-2.70	-1.40	-1.00	-0.60
85	-3.00	-3.00	-3.00	-3.00	-2.80	-2.80	-2.80	-2.70	-2.70	-2.20	-1.30	-0.90	-0.50
95	-2.50	-2.50	-2.50	-2.50	-2.30	-2.30	-2.30	-2.20	-2.20	-1.70	-0.80	-0.60	-0.20
105	-2.50	-2.50	-2.50	-2.50	-2.30	-2.30	-2.30	-2.20	-2.20	-1.70	-0.80	-0.60	-0.20

ZeroTorqueAFM - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,001	3,500	4,000	4,500	5,000	5,500	6,000	7,000
65	-0.80	-0.50	-0.50	-1.00	-1.00	-1.00	1.79	4.60	7.40	10.20	13.00	15.80	21.41
75	-0.40	-0.10	-0.20	-0.40	-0.60	-0.60	1.79	4.60	7.40	10.20	13.00	15.80	21.41
85	-0.30	0.00	-0.10	-0.30	-0.50	-0.50	1.79	4.60	7.40	10.20	13.00	15.80	21.41
95	0.00	0.20	0.10	-0.10	-0.30	-0.30	1.79	4.60	7.40	10.20	13.00	15.80	21.41
105	0.00	0.20	0.10	-0.10	-0.30	-0.30	1.79	4.60	7.40	10.20	13.00	15.80	21.41

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	-4.20	-4.20	-4.20	-4.00	-4.00	-3.80	-3.70	-3.50	-3.50	-3.10	-1.80	-1.40	-1.00
75	-3.50	-3.50	-3.50	-3.50	-3.30	-3.30	-3.30	-3.20	-3.20	-2.70	-1.40	-1.00	-0.60
85	-3.00	-3.00	-3.00	-3.00	-2.80	-2.80	-2.80	-2.70	-2.70	-2.20	-1.30	-0.90	-0.50
95	-2.50	-2.50	-2.50	-2.50	-2.30	-2.30	-2.30	-2.20	-2.20	-1.70	-0.80	-0.60	-0.20
105	-2.50	-2.50	-2.50	-2.50	-2.30	-2.30	-2.30	-2.20	-2.20	-1.70	-0.80	-0.60	-0.20

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	-0.80	-0.50	-0.50	-1.00	-1.00	-1.00	0.44	1.88	3.32	4.75	6.20	7.64	10.52
75	-0.40	-0.10	-0.20	-0.40	-0.60	-0.60	0.44	1.88	3.32	4.75	6.20	7.64	10.52
85	-0.30	0.00	-0.10	-0.30	-0.50	-0.50	0.44	1.88	3.32	4.75	6.20	7.64	10.52
95	0.00	0.20	0.10	-0.10	-0.30	-0.30	0.44	1.88	3.32	4.75	6.20	7.64	10.52
105	0.00	0.20	0.10	-0.10	-0.30	-0.30	0.44	1.88	3.32	4.75	6.20	7.64	10.52

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

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

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

y/x	-10	-4	1	7	13	18	24	29	35	41	46	52	58	63	69	74	80
1	45	150	210	210	250	320	425	550	600	600	600	600	600	600	600	600	600

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	70	70	70	70	74	82	105	153	320	480	480	480	480	480	480	480	480

Initial Supporting table - P0442 EONV Pressure Threshold (Pascals)

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

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

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6
2	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6
3	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6
4	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6
5	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6
6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6
7	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6
8	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6
9	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6
10	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6
11	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6
12	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6
13	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6
14	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6
15	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6
16	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6
17	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6	-700.6

Initial Supporting table - P0442 Estimate of Ambient Temperature Valid Conditioning Time as a Function of Ign Off Time

Description: EONV estimated ambient temperature valid conditioning time as a function of ignition off time

Value Units: Estimated Ambient Temperature Valid Conditioning Time (seconds)
X Unit: Ignition Off Time (seconds)

P0442 Estimate of Ambient Temperature Valid Conditioning Time as a Function of Ign Off Time - Part 1																	
y/x	0	600	1,200	1,800	2,400	3,000	3,600	4,200	4,800	5,400	6,000	6,600	7,200	7,800	8,400	9,000	9,600
1	300	450	500	600	650	650	650	650	650	650	625	600	575	550	525	500	480

P0442 Estimate of Ambient Temperature Valid Conditioning Time as a Function of Ign Off Time - Part 2																	
y/x	10,200	10,800	11,700	12,600	13,500	14,400	15,300	16,200	17,100	18,000	19,200	20,400	21,600	22,800	24,000	25,200	
1	460	440	420	400	380	360	340	320	300	280	260	240	220	200	200	200	

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	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40

Initial Supporting table - P0521_P06DD_P06DE_OP_HiStatePressure

Description: Two Stage Oil Pump Oil Pressure in High State

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

y/x	-7.0	0.0	20.0	40.0	60.0	80.0	100.0	120.0	140.0
1,000.0	463.2	463.2	371.0	371.0	339.0	285.0	237.0	180.0	127.0
1,500.0	470.9	470.9	389.0	384.0	372.0	337.0	289.0	246.0	194.0
2,000.0	488.9	488.9	399.0	391.0	382.0	345.0	318.0	272.0	238.0
2,500.0	506.9	506.9	394.0	382.0	382.0	345.0	323.0	294.0	263.0
3,000.0	477.1	477.1	395.0	377.0	366.0	355.0	335.0	302.0	277.0
3,500.0	477.1	477.1	402.0	373.0	369.0	352.0	323.0	299.0	272.0
4,000.0	477.1	477.1	446.0	384.0	372.0	353.0	327.0	303.0	274.0
4,500.0	477.1	477.1	453.0	390.0	374.0	355.0	321.0	290.0	264.0
5,500.0	477.1	477.1	509.0	387.0	370.0	339.0	301.0	270.0	247.0

Initial Supporting table - P0521_P06DD_P06DE_OP_LoStatePressure

Description: Two Stage Oil Pump Oil Pressure in Low State

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

y/x	-7	0	20	40	60	80	100	120	140
1,000	325	325	251	251	248	243	228	177	131
1,500	333	333	257	257	258	256	246	230	186
2,000	335	335	260	259	260	258	256	238	220
2,500	336	336	265	264	263	259	257	244	233
3,000	331	331	271	266	259	256	262	248	238
3,500	335	335	269	263	261	261	258	246	235
4,000	335	335	297	265	266	264	258	250	241
4,500	335	335	295	269	266	270	258	246	234
5,500	335	335	327	280	272	267	251	238	224

Initial Supporting table - P06DD_P06DE_MaxEnableTorque_OP

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

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

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

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

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

y/x	-7	0	20	40	60	80	100	120	140
1,000	39	39	39	39	39	39	39	39	39
1,500	67	67	67	67	67	67	67	67	67
2,000	101	101	101	101	101	101	101	101	101
2,500	116	116	116	116	116	116	116	116	116
3,000	127	127	127	127	127	127	127	127	127
3,500	138	138	138	138	138	138	138	138	138
4,000	148	148	148	148	148	148	148	148	148
4,500	153	153	153	153	153	153	153	153	153
5,500	163	163	163	163	163	163	163	163	163

Initial Supporting table - P06DD_P06DE_OP_StateC□angeMin

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

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

y/x	-7.0	0.0	20.0	40.0	60.0	80.0	100.0	120.0	140.0
1,000.0	5.0	5.0	25.0	40.0	17.0	5.0	5.0	5.0	5.0
1,500.0	5.0	5.0	43.0	42.0	38.0	27.0	5.0	5.0	5.0
2,000.0	5.0	5.0	46.0	43.0	40.0	29.0	20.0	5.0	5.0
2,500.0	5.0	5.0	43.0	39.0	39.0	29.0	19.0	16.0	5.0
3,000.0	5.0	5.0	41.0	36.0	35.0	32.0	24.0	18.0	5.0
3,500.0	5.0	5.0	44.0	36.0	36.0	30.0	21.0	17.0	5.0
4,000.0	5.0	5.0	49.0	39.0	35.0	30.0	23.0	5.0	5.0
4,500.0	5.0	5.0	50.0	40.0	36.0	28.0	21.0	5.0	5.0
5,500.0	5.0	5.0	60.0	35.0	16.0	16.0	16.0	5.0	5.0

Initial Supporting table - P18C8 Gear position sensor range/performance (sensor A max area A)

Description: Sensor A threshold values that define the invalid areas (between shifter gates) for the P18C8 diagnostic. Thresholds are a function of Gear Position Sensor B.

Value Units: PWM % duty cycle
X Unit: PWM % duty cycle

y/x	15.00	19.00	23.00	27.00	31.00
1.0	36.00	36.00	36.00	36.00	36.00

Initial Supporting table - P18C8 Gear position sensor range/performance (sensor A max area B)

Description: Sensor A threshold values that define the invalid areas (between shifter gates) for the P18C8 diagnostic. Thresholds are a function of Gear Position Sensor B.

Value Units: PWM % duty cycle
X Unit: PWM % duty cycle

y/x	15.00	19.00	23.00	27.00	31.00
1.0	54.00	54.00	54.00	54.00	54.00

Initial Supporting table - P18C8 Gear position sensor range/performance (sensor A max area C)

Description: Sensor A threshold values that define the invalid areas (between shifter gates) for the P18C8 diagnostic. Thresholds are a function of Gear Position Sensor B.

Value Units: PWM % duty cycle
X Unit: PWM % duty cycle

y/x	15.00	19.00	23.00	27.00	31.00
1.0	72.00	72.00	72.00	72.00	72.00

Initial Supporting table - P18C8 Gear position sensor range/performance (sensor A max area D)

Description: Sensor A threshold values that define the invalid areas (between shifter gates) for the P18C8 diagnostic. Thresholds are a function of Gear Position Sensor B.

Value Units: PWM % duty cycle
X Unit: PWM % duty cycle

y/x	64.00	68.00	72.00	76.00	80.00
1.0	34.00	35.70	35.70	36.70	36.70

Initial Supporting table - P18C8 Gear position sensor range/performance (sensor A max area E)

Description: Sensor A threshold values that define the invalid areas (between shifter gates) for the P18C8 diagnostic. Thresholds are a function of Gear Position Sensor B.

Value Units: PWM % duty cycle
X Unit: PWM % duty cycle

y/x	64.00	68.00	72.00	76.00	80.00
1.0	51.40	53.00	54.00	55.00	55.00

Initial Supporting table - P18C8 Gear position sensor range/performance (sensor A max area F)

Description: Sensor A threshold values that define the invalid areas (between shifter gates) for the P18C8 diagnostic. Thresholds are a function of Gear Position Sensor B.

Value Units: PWM % duty cycle
X Unit: PWM % duty cycle

y/x	64.00	68.00	72.00	76.00	80.00
1.0	69.00	71.50	73.00	74.00	74.30

Initial Supporting table - P18C8 Gear position sensor range/performance (sensor A min area A)

Description: Sensor A threshold values that define the invalid areas (between shifter gates) for the P18C8 diagnostic. Thresholds are a function of Gear Position Sensor B.

Value Units: PWM % duty cycle
X Unit: PWM % duty cycle

y/x	15.00	19.00	23.00	27.00	31.00
1.0	32.00	32.50	33.00	33.50	34.00

Initial Supporting table - P18C8 Gear position sensor range/performance (sensor A min area B)

Description: Sensor A threshold values that define the invalid areas (between shifter gates) for the P18C8 diagnostic. Thresholds are a function of Gear Position Sensor B.

Value Units: PWM % duty cycle
X Unit: PWM % duty cycle

y/x	15.00	19.00	23.00	27.00	31.00
1.0	51.00	51.00	51.50	51.50	53.00

Initial Supporting table - P18C8 Gear position sensor range/performance (sensor A min area C)

Description: Sensor A threshold values that define the invalid areas (between shifter gates) for the P18C8 diagnostic. Thresholds are a function of Gear Position Sensor B.

Value Units: PWM % duty cycle
X Unit: PWM % duty cycle

y/x	15.00	19.00	23.00	27.00	31.00
1.0	67.00	67.00	68.00	68.50	69.00

Initial Supporting table - P18C8 Gear position sensor range/performance (sensor A min area D)

Description: Sensor A threshold values that define the invalid areas (between shifter gates) for the P18C8 diagnostic. Thresholds are a function of Gear Position Sensor B.

Value Units: PWM % duty cycle
X Unit: PWM % duty cycle

y/x	64.00	68.00	72.00	76.00	80.00
1.0	31.50	31.00	30.50	30.50	30.50

Initial Supporting table - P18C8 Gear position sensor range/performance (sensor A min area E)

Description: Sensor A threshold values that define the invalid areas (between shifter gates) for the P18C8 diagnostic. Thresholds are a function of Gear Position Sensor B.

Value Units: PWM % duty cycle
X Unit: PWM % duty cycle

y/x	64.00	68.00	72.00	76.00	80.00
1.0	50.00	50.00	50.00	50.00	50.00

Initial Supporting table - P18C8 Gear position sensor range/performance (sensor A min area F)

Description: Sensor A threshold values that define the invalid areas (between shifter gates) for the P18C8 diagnostic. Thresholds are a function of Gear Position Sensor B.

Value Units: PWM % duty cycle
X Unit: PWM % duty cycle

y/x	64.00	68.00	72.00	76.00	80.00
1.0	68.00	68.00	68.00	68.00	68.00

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_PurgOnAirMode5	CeFADR_e_Cell01_PurgOnAirMode4	CeFADR_e_Cell02_PurgOnAirMode3	CeFADR_e_Cell03_PurgOnAirMode2
1	65,535	65,535	65,535	65,535
Minimum Non-Purge Samples for Purge Vapor Fuel - Part 2				
y/x	CeFADR_e_Cell04_PurgOnAirMode1	CeFADR_e_Cell05_PurgOnAirMode0	CeFADR_e_Cell06_PurgOnIdle	CeFADR_e_Cell07_PurgOnDecel
1	65,535	65,535	65,535	65,535
Minimum Non-Purge Samples for Purge Vapor Fuel - Part 3				
y/x	CeFADR_e_Cell08_PurgOffAirMode5	CeFADR_e_Cell09_PurgOffAirMode4	CeFADR_e_Cell10_PurgOffAirMode3	CeFADR_e_Cell11_PurgOffAirMode2
1	65,535	65,535	65,535	65,535
Minimum Non-Purge Samples for Purge Vapor Fuel - Part 4				
y/x	CeFADR_e_Cell12_PurgOffAirMode1	CeFADR_e_Cell13_PurgOffAirMode0	CeFADR_e_Cell14_PurgOffIdle	CeFADR_e_Cell15_PurgOffDecel
1	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_NonSelectedCell" are not used for diagnosis.

P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage - Part 1				
y/x	CeFADR_e_Cell00_PurgOnAirMode5	CeFADR_e_Cell01_PurgOnAirMode4	CeFADR_e_Cell02_PurgOnAirMode3	CeFADR_e_Cell03_PurgOnAirMode2
1	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell
P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage - Part 2				
y/x	CeFADR_e_Cell04_PurgOnAirMode1	CeFADR_e_Cell05_PurgOnAirMode0	CeFADR_e_Cell06_PurgOnIdle	CeFADR_e_Cell07_PurgOnDecel
1	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_NonSelectedCell
P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage - Part 3				
y/x	CeFADR_e_Cell08_PurgOffAirMode5	CeFADR_e_Cell09_PurgOffAirMode4	CeFADR_e_Cell10_PurgOffAirMode3	CeFADR_e_Cell11_PurgOffAirMode2
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_PurgOffAirMode1	CeFADR_e_Cell13_PurgOffAirMode0	CeFADR_e_Cell14_PurgOffIdle	CeFADR_e_Cell15_PurgOffDecel
1	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_NonSelectedCell

Initial Supporting table - P219B Normalizer Bank2 Table

Description: Bank 2 Normalizer table 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	980	1,160	1,340	1,520	1,700	1,880	2,060	2,240	2,420	2,600	2,780	2,960	3,140	3,320	3,500	3,680
120	53.25	53.25	45.25	44.50	41.25	35.50	36.50	36.50	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
150	53.25	53.25	45.25	44.50	41.25	35.50	36.50	52.00	67.25	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
180	74.50	74.50	83.50	64.00	74.50	60.50	61.50	67.25	72.25	77.50	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
210	119.00	119.00	102.50	88.50	84.00	108.75	91.75	92.25	77.50	89.00	98.25	80.50	80.50	9,999.00	9,999.00	9,999.00	9,999.00
240	141.00	141.00	126.00	138.50	153.50	109.25	100.00	118.75	104.75	100.50	98.25	80.50	80.50	9,999.00	9,999.00	9,999.00	9,999.00
270	150.25	150.25	126.50	119.75	148.00	134.25	121.50	123.75	113.25	103.00	88.25	81.00	81.00	9,999.00	9,999.00	9,999.00	9,999.00
300	145.00	145.00	162.50	158.75	170.75	147.75	123.75	132.25	123.50	102.75	94.00	91.75	91.75	9,999.00	9,999.00	9,999.00	9,999.00
330	181.00	181.00	174.50	174.50	171.75	132.00	118.50	143.50	98.50	83.25	86.25	88.25	88.25	9,999.00	9,999.00	9,999.00	9,999.00
360	216.75	216.75	136.00	139.00	151.50	128.50	136.50	138.50	98.00	75.50	74.00	68.00	68.00	9,999.00	9,999.00	9,999.00	9,999.00
390	238.50	238.50	85.50	137.25	123.00	122.00	126.00	111.75	89.25	77.00	95.75	91.00	91.00	9,999.00	9,999.00	9,999.00	9,999.00
420	243.50	243.50	195.50	132.75	140.25	115.00	120.50	107.00	67.00	62.00	78.25	86.50	86.50	9,999.00	9,999.00	9,999.00	9,999.00
450	243.50	228.75	213.75	128.25	145.00	124.75	132.25	100.50	98.25	71.75	93.25	75.75	75.75	9,999.00	9,999.00	9,999.00	9,999.00
480	9,999.00	220.00	220.00	138.00	122.50	126.50	125.75	104.50	100.00	99.50	97.75	91.00	91.00	9,999.00	9,999.00	9,999.00	9,999.00
510	9,999.00	220.00	183.25	146.25	148.50	121.25	133.25	96.50	94.00	113.00	106.50	98.75	91.00	9,999.00	9,999.00	9,999.00	9,999.00
540	9,999.00	9,999.00	174.75	174.75	192.75	155.75	146.50	135.00	133.50	115.75	111.00	106.50	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
570	9,999.00	9,999.00	174.75	174.75	192.75	155.75	146.50	135.00	133.50	115.75	115.75	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
600	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00

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	980	1,160	1,340	1,520	1,700	1,880	2,060	2,240	2,420	2,600	2,780	2,960	3,140	3,320	3,500	3,680
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
150	0.00	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	0.00	0.00	0.00
180	0.00	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	0.00	0.00
210	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	0.00
240	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
270	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
300	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
330	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
360	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
390	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
420	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
450	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
480	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
510	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
540	0.00	0.00	0.00	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
570	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
600	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Initial Supporting table - P219B Variance Threshold Bank2 Table

Description: Bank 2 lookup table of Variance metric used to calculate the Ratio for the current sample period

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

y/x	800	980	1,160	1,340	1,520	1,700	1,880	2,060	2,240	2,420	2,600	2,780	2,960	3,140	3,320	3,500	3,680
120	14.75	14.75	18.50	14.50	16.00	15.25	12.75	12.75	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
150	14.75	14.75	18.50	14.50	16.00	15.25	12.75	13.25	13.75	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
180	24.00	24.00	17.00	21.75	23.50	24.00	14.50	13.75	21.75	30.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
210	26.00	26.00	25.75	28.00	30.50	40.50	33.25	27.00	30.00	30.50	34.00	38.25	38.25	9,999.00	9,999.00	9,999.00	9,999.00
240	46.50	46.50	40.00	32.25	37.00	62.50	59.25	50.00	40.75	31.25	34.00	38.25	38.25	9,999.00	9,999.00	9,999.00	9,999.00
270	50.25	50.25	60.00	47.75	39.00	46.25	52.50	54.00	45.00	38.25	48.75	47.00	47.00	9,999.00	9,999.00	9,999.00	9,999.00
300	26.75	26.75	52.75	48.50	47.75	53.50	64.50	66.25	54.00	52.75	55.00	50.00	50.00	9,999.00	9,999.00	9,999.00	9,999.00
330	36.50	36.50	62.25	60.00	58.25	81.25	72.50	64.00	62.50	60.25	62.75	59.75	59.75	9,999.00	9,999.00	9,999.00	9,999.00
360	36.00	36.00	103.50	88.50	80.75	92.50	74.75	69.25	76.25	65.25	86.75	81.75	81.75	9,999.00	9,999.00	9,999.00	9,999.00
390	38.25	38.25	146.50	97.50	95.00	97.00	85.50	92.00	88.75	88.50	90.00	83.00	83.00	9,999.00	9,999.00	9,999.00	9,999.00
420	50.25	50.25	48.50	103.25	83.00	100.25	93.75	89.75	123.25	125.75	120.50	113.25	113.25	9,999.00	9,999.00	9,999.00	9,999.00
450	50.25	55.75	61.00	114.00	100.00	108.00	98.75	108.25	110.25	130.00	132.50	119.50	119.50	9,999.00	9,999.00	9,999.00	9,999.00
480	9,999.00	67.75	67.75	112.50	132.25	115.00	113.00	125.00	124.25	131.00	131.75	119.25	119.25	9,999.00	9,999.00	9,999.00	9,999.00
510	9,999.00	67.75	95.75	123.75	118.50	129.50	114.50	141.25	140.25	133.25	134.00	126.75	119.25	9,999.00	9,999.00	9,999.00	9,999.00
540	9,999.00	9,999.00	115.50	115.50	90.50	109.00	116.50	118.25	121.50	135.25	134.75	134.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
570	9,999.00	9,999.00	115.50	115.50	90.50	109.00	116.50	118.25	121.50	135.25	135.25	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
600	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00

Initial Supporting table - P0068_Delta MAF Threshold f(TPS)

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

Value Units: Delta MAF Values (dm)
X Unit: Desired Throttle Position (Pct)

y/x	15.00	20.00	25.00	30.00	35.00	40.00	45.00	50.00	100.00
1.00	41.66	25.48	47.84	69.23	255.00	255.00	255.00	255.00	255.00

Initial Supporting table - P0068_Delta MAP Threshold f(TPS)

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

Value Units: Delta MAP Values (kPa)
X Unit: Desired Throttle Position (Pct)

y/x	15.00	20.00	25.00	30.00	35.00	40.00	45.00	50.00	100.00
1.00	23.61	10.94	14.38	14.72	255.00	255.00	255.00	255.00	255.00

Initial Supporting table - P0068_Maximum MAF f(RPM)

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

Value Units: Delta MAF Values (dm)
X Unit: Engine Speed (RPM)

y/x	600.00	1,400.00	2,200.00	3,000.00	3,800.00	4,600.00	5,400.00	6,200.00	7,000.00
1.00	38.28	104.38	191.73	285.43	393.89	492.32	511.99	511.99	511.99

Initial Supporting table - P0068_Maximum MAF f(Volts)

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

Value Units: Delta MAF Values (dm)
X Unit: System Voltage (V)

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

Initial Supporting table - 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 - 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	32,767	32,767	734	410	258	153	165	104	101	77	64	37	29
6	32,767	32,767	0	547	409	416	198	152	118	64	53	31	24
8	32,767	32,767	635	930	520	338	102	93	233	76	55	0	37
10	32,767	32,767	422	380	578	419	133	142	44	85	26	46	33
12	32,767	32,767	593	0	664	504	318	119	133	110	84	51	45
14	32,767	32,767	0	0	844	607	360	342	231	151	106	70	55
16	32,767	32,767	642	0	1,052	682	397	398	270	165	129	85	63
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
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

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	32,767	32,767	658	646	383	229	239	164	145	115	58	54	42
6	32,767	32,767	0	650	329	361	171	138	99	96	48	45	35
8	32,767	32,767	574	786	423	297	138	148	100	76	46	0	29
10	32,767	32,767	382	294	530	318	81	153	54	51	38	33	24
12	32,767	32,767	459	0	664	397	256	158	129	85	63	39	37
14	32,767	32,767	0	326	719	492	388	280	186	114	75	51	40
16	32,767	32,767	489	0	812	485	391	309	204	131	74	61	45
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
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

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 alititude shifts. (especially decel and jerk thresholds since they track actual air trapped in cylinder)

Value Units: Delta time per cylinder (usec)
X Unit: rpm
Y Units: percent load of max indicated torque (%)

RufSCD_Decel - Part 1

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
3	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
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	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
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 - Multiple DTC Use_Green Sensor Delay Criteria - Limit

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

Value Units: Grams
X Unit: Acculmulated Engine Airflow

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

Initial Supporting table - P0011_P05CC_StablePositionTimeIc1

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

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

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
400	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
800	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
1,200	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
1,600	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
2,000	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
2,400	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
2,800	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
3,200	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
3,600	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
4,000	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
4,400	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
4,800	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
5,200	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
5,600	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
6,000	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
6,400	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
6,800	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0

Initial Supporting table - P0014_P05CE_StablePositionTimeEc1

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

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

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
400	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
800	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
1,200	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
1,600	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
2,000	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
2,400	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
2,800	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
3,200	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
3,600	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
4,000	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
4,400	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
4,800	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
5,200	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
5,600	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
6,000	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
6,400	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
6,800	100.0	80.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP)-Camshaft Position (CMP) Correlation Bank 1 Sensor A (end-park phaser)	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	2 cam sensor pulses less than or greater than nominal position in one cam revolution.	-11.0 Crank Degrees 77.0 Crank Degrees	Crankshaft and camshaft position signals are synchronized Engine is Spinning Cam phaser is in "parked" position No Active DTCs: Time since last execution of diagnostic Delay diagnostic if Engine RPM and Cam is Enabled for	 CrankSensor_FA P0340, P0341 < 1.0 seconds > 8,200.00 < 3.00	2 failures out of 3 tests. A failed test is 4 failures out of 5 samples. . One sample per cam rotation	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP) Sensor A Circuit	P0335	Diagnostic will fail if a crank sensor pulse was not received during a period of time; if crank sensor pulses are received the diagnostic will pass.	Time since last crankshaft position sensor pulse received	>= 4.0 seconds	Starter engaged AND (cam pulses being received OR (MAF_SensorFA AND Engine Air Flow	 = FALSE > 0.0 grams/second))	Continuous every 100 msec	Type A, 1 Trips
			No crankshaft pulses received	>= 0.3 seconds	Engine is Running Starter is not engaged		Continuous every 12.5 msec	
			No crankshaft pulses received		Engine is Running OR Starter is engaged No DTC Active:	 P0340 P0341	2 failures out of 10 samples One sample per engine revolution	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP) Sensor A Performance	P0336	1. Fail counts will occur if the engine goes out of synchronization repeatedly over a period of time and will pass if the engine stays in synchronization. 2. Diagnostic will fail if synchronization gap is not found in a specified period of time and will pass if the synchronization gap is found. 3. Diagnostic will fail if the incorrect number of crank sensor teeth are detected in-between detecting the synchronization gap and will pass if the correct number of teeth are seen.	Time in which 4 or more crank re-synchronizations occur	< 4.0 seconds	Engine Air Flow Cam-based engine speed No DTC Active:	>= 0.0 grams/second > 60 RPM P0335	Continuous every 250 msec	Type A, 1 Trips
			No crankshaft synchronization gap found	>= 0.4 seconds	Engine is Running Starter is not engaged		Continuous every 12.5 msec	
			Time since starter engaged without detecting crankshaft synchronization gap	>= 3.3 seconds	Starter engaged AND (cam pulses being received OR (MAF_SensorFA AND Engine Air Flow	 = FALSE > 0.0 grams/second))	Continuous every 100 msec	
			Crank pulses received in one engine revolution OR Crank pulses received in one engine revolution	< 0 > 65,535	Engine is Running OR Starter is engaged No DTC Active:	 P0340 P0341	8 failures out of 10 samples One sample per engine revolution	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 OR Time that starter has been engaged without a camshaft sensor pulse	>= 5.5 seconds >= 4.0 seconds	Starter engaged AND (crank pulses being received OR (MAF_SensorFA AND Engine Air Flow	= FALSE > 0.0 grams/second))	Continuous every 100 msec	Type A, 1 Trips
			Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Engine is running Starter is not engaged		Continuous every 100 msec	
			No camshaft pulses received during first 24 MEDRES events (There are 24 MEDRES events per engine cycle		Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	CrankSensor_FA	Continuous every MEDRES event	
			The number of camshaft pulses received during 100 engine cycles	= 0	Crankshaft is synchronized No DTC Active:	CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Not Programmed	P0602	This DTC will be stored if the 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 >	0.47500 s			When dual store updates occur.	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal ECM Processor Integrity Fault	P0606	Indicates that the ECM has detected an internal processor integrity fault. These include diagnostics done on the SPI Communication as well as a host of diagnostics for both the primary and secondary processsors.	2 fails in a row in the MAIN processor's ALU check			KePISD_b_ALU_TestEnbld == 1 Value of KePISD_b_ALU_TestEnbld is: 1.00 . (If 0, this test is disabled)	25 ms	Type A, 1 Trips
			2 fails in a row in the MAIN processor's configuration register masks versus known good data			KePISD_b_ConfigRegTestEnbld == 1 Value of KePISD_b_ConfigRegTestEnbld is: 1 . (If 0, this test is disabled)	12.5 to 25 ms	
			Voltage deviation >	0.4950		KePISD_b_A2D_CnvrtrTestEnbld == 1 Value of KePISD_b_A2D_CnvrtrTestEnbld is: 1 . (If 0, this test is disabled)	5 / 10 counts or 0.150 seconds continuous; 50 ms/count in the ECM main processor	
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		KeMEMD_b_FlashECC_CktTestEnbl == 1 Value of KeMEMD_b_FlashECC_CktTestEnbl is: 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.
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		KeMEMD_b_RAM_ECC_CktTestEnbl == 1 Value of KeMEMD_b_RAM_ECC_CktTestEnbl is: 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			KePISD_b_DMA_XferTestEnbld == 1 Value of KePISD_b_DMA_XferTestEnbld is: 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.		Table, f(Core, Loop Time). See supporting tables: **P0606_Program Sequence Watch Enable f(Core, Loop Time)** (If 0, this Loop Time 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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							processor	
			MAIN processor determines a seed has not changed within a specified time period within the 50ms task.	Previous seed value equals current seed value.		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.
Powertrain Internal Control Module EEPROM Error	P062F	This DTC detects a NVM long term performance. There are two types of diagnostics that run during controller power up. One for HWIO reports that writing to NVM (at shutdown) will not succeed, and the other HWIO reports the assembly calibration integrity check has failed.	HWIO reports that writing to NVM (at shutdown) will not succeed				Diagnostic runs at controller power up.	Type B, 2 Trips
			HWIO reports the assembly calibration integrity check has failed				Diagnostic runs at controller power up.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
VIN Not Programmed or Mismatched - Engine Control Module (ECM)	P0630	This DTC checks that the VIN is correctly written	At least one of the programmed VIN digits	= 00 or FF	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.
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 A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Powertrain Relay Feedback Circuit High	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 commanded “OFF” No active DTCs:	>= 2.00 seconds PowertrainRelayStateOn_FA	50 failures out of 63 samples 100ms / Sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Secondary Fuel Disable signal circuit shorted to power (FICM)	P13BE	Controller specific signal circuit diagnoses Secondary Fuel Disable circuit for a short to power failure when the device is enabled by comparing a voltage measurement to the expected state recieved from the ECM via serial data.	Voltage measurement is compared to commanded circuit state received over serial data. When the commanded state is 'on', a high voltage measurements indicates a short to power failure. Controller specific signal circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 0.5 Ohms impedance between signal and Run/Crank voltage	Run/Crank active and present for a duration and Engine Cranking and commanded state has not changed for	== TRUE >= 0.50 seconds == FALSE >= 0.10 seconds	20 failures out of 25 samples 12.5 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.
Secondary Fuel Disable signal circuit shorted to ground (FICM)	P13BF	Controller specific signal circuit diagnoses Secondary Fuel Disable circuit for a short to ground failure when the device is disabled by comparing a voltage measurement to the expected state recieved from the ECM via serial data.	Voltage measurement is compared to commanded circuit state received over serial data. When the commanded state is 'off', a low voltage measurements indicates a short to ground failure. Controller specific signal circuit voltage thresholds are set to meet the following controller specification for a short to ground.	<= 0.5 Ohms impedance between signal and controller ground	Run/Crank active and present for a duration and Engine Cranking and commanded state has not changed for	== TRUE >= 0.50 seconds == FALSE >= 0.10 seconds	20 failures out of 25 samples 12.5 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.
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 commanded on AND (Run/Crank voltage > Table, f(IAT). See supporting tables: **P1682_PT Relay Pull-in Run/Crank Voltage f(IAT)** OR PT Relay Ignition voltage) AND Run/Crank voltage	 > 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.
Fuel Injector Control Module driver stuck on (FICM)	P1687	Controller specific solenoid output driver circuit voltages are monitored to determine if the FICM's internal diisable circuitry is capable of overriding the output drivers to the 'off/disabled' state. This test runs once ignition key cycle at the first opportunity when the enigne is running, the FICM fuel disable signal is active, and the FICM solenoid drivers are commanded 'on'. A failure is indicated if any FICM solenoid driver exhibits high voltage for a period.	When engine is running and FICM solenoids are enabled and FICM disable circuit is enabled, voltages at the FICM solenoid output drivers are monitored. If any circuit shows high voltage for long enough to mature an X out of Y counters, a failure is indicated. Controller specific signal circuit voltage thresholds are set to meet the following controller specification for a short to ground.	<= 0.5 Ohms impedance between signal and ground	Engine Running and FICM solenoids enabled and FICM disable signal and High voltage at solenoid A and Solenoid A check 0 : or High voltage at solenoid B and Solenoid B check 0 : or High voltage at solenoid B and Solenoid B check 0 : or High voltage at solenoid B and Solenoid B check 0 : or High voltage at solenoid B and Solenoid B check 0 : or High voltage at solenoid B and Solenoid B check 0 :	== TRUE == TRUE == TRUE == TRUE == 1 == TRUE == 1 == TRUE == 1 == TRUE == 1 == TRUE == 1 == TRUE == 1	20 failures out of 25 samples 12.5 ms /sample once per key cycle	Type X, No MIL

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 commanded on AND (Run/Crank voltage > Table, f(IAT). See supporting tables: **P1682_PT Relay Pull-in Run/Crank Voltage f(IAT)** OR PT Relay Ignition voltage) AND Run/Crank voltage	 > 5.50 Volts > 5.50 Volts	240 / 480 counts; or 0.175 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Controls Ignition Relay Feedback Circuit 2 Low Voltage - (GEN III Controllers ONLY)	P16AF	Detects low voltage in the engine controls ignition relay feedback circuit 2. This diagnostic reports the DTC when low voltage is present. Monitoring occurs when run crank voltage is above a calibrated value.	Engine controls ignition relay feedback circuit 2 low voltage	Relay voltage <= 5.00	Powertrain relay low diag enable Powertrain relay voltage Run Crank voltage Powertrain relay state	= 1.00 >= 11.00 > 9.00 = ON	5 failures out of 6 samples 1000 ms / sample	Type 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 High Voltage - (GEN III Controllers ONLY)	P16B3	Detects high voltage in the engine controls ignition relay feedback circuit 2. This diagnostic reports the DTC when high voltage is present. Monitoring occurs when the relay state is inactive.	Engine controls ignition relay feedback circuit 2 high voltage	Relay voltage >= 4.00	Powertrain relay high diag enable Powertrain relay state	= 1.00 = INACTIVE	50 failures out of 63 samples 100 ms / sample	Type 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 B Open Circuit (FICM)	P21CF	Controller specific output driver circuit diagnoses Cylinder 1 Injector B 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 within a controller specific unacceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 2 Injector B Open Circuit (FICM)	P21D0	Controller specific output driver circuit diagnoses Cylinder 2 Injector B 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 within a controller specific unacceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 3 Injector B Open Circuit (FICM)	P21D1	Controller specific output driver circuit diagnoses Cylinder 3 Injector B 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 within a controller specific unacceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 4 Injector B Open Circuit (FICM)	P21D2	Controller specific output driver circuit diagnoses Cylinder 4 Injector B 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 within a controller specific unacceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 5 Injector B Open Circuit (FICM)	P21D3	Controller specific output driver circuit diagnoses Cylinder 5 Injector B 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 within a controller specific unacceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 6 Injector B Open Circuit (FICM)	P21D4	Controller specific output driver circuit diagnoses Cylinder 6 Injector B 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 within a controller specific unacceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 7 Injector B Open Circuit (FICM)	P21D5	Controller specific output driver circuit diagnoses Cylinder 7 Injector B 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 within a controller specific unacceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 8 Injector B Open Circuit (FICM)	P21D6	Controller specific output driver circuit diagnoses Cylinder 8 Injector B 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 within a controller specific unacceptable range during driver off state indicates open circuit failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for an open circuit.	>= 200 KOhms impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 B Low side circuit shorted to ground (FICM)	P21DB	Controller specific output driver circuit diagnoses Cylinder 1 Injector B 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 Ohms impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 B Low side circuit shorted to power (FICM)	P21DC	Controller specific output driver circuit diagnoses Cylinder 1 Injector B 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	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 0.5 Ohms impedance between signal and controller power	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 2 Injector B Low side circuit shorted to ground (FICM)	P21DE	Controller specific output driver circuit diagnoses Cylinder 2 Injector B 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 Ohms impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 2 Injector B Low side circuit shorted to power (FICM)	P21DF	Controller specific output driver circuit diagnoses Cylinder 2 Injector B 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	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 0.5 Ohms impedance between signal and controller power	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 3 Injector B Low side circuit shorted to ground (FICM)	P21E0	Controller specific output driver circuit diagnoses Cylinder 3 Injector B 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 Ohms impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 3 Injector B Low side circuit shorted to power (FICM)	P21E1	Controller specific output driver circuit diagnoses Cylinder 3 Injector B 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	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 0.5 Ohms impedance between signal and controller power	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 4 Injector B Low side circuit shorted to ground (FICM)	P21E2	Controller specific output driver circuit diagnoses Cylinder 4 Injector B 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 Ohms impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 4 Injector B Low side circuit shorted to power (FICM)	P21E3	Controller specific output driver circuit diagnoses Cylinder 4 Injector B 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	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 0.5 Ohms impedance between signal and controller power	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 5 Injector B Low side circuit shorted to ground (FICM)	P21E4	Controller specific output driver circuit diagnoses Cylinder 5 Injector B 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 Ohms impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 5 Injector B Low side circuit shorted to power (FICM)	P21E5	Controller specific output driver circuit diagnoses Cylinder 5 Injector B 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	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 0.5 Ohms impedance between signal and controller power	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 6 Injector B Low side circuit shorted to ground (FICM)	P21E6	Controller specific output driver circuit diagnoses Cylinder 6 Injector B 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 Ohms impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 6 Injector B Low side circuit shorted to power (FICM)	P21E7	Controller specific output driver circuit diagnoses Cylinder 6 Injector B 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	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 0.5 Ohms impedance between signal and controller power	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 7 Injector B Low side circuit shorted to ground (FICM)	P21E8	Controller specific output driver circuit diagnoses Cylinder 7 Injector B 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 Ohms impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 7 Injector B Low side circuit shorted to power (FICM)	P21E9	Controller specific output driver circuit diagnoses Cylinder 7 Injector B 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	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 0.5 Ohms impedance between signal and controller power	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 8 Injector B Low side circuit shorted to ground (FICM)	P21EA	Controller specific output driver circuit diagnoses Cylinder 8 Injector B 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 Ohms impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 8 Injector B Low side circuit shorted to power (FICM)	P21EB	Controller specific output driver circuit diagnoses Cylinder 8 Injector B 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	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 0.5 Ohms impedance between signal and controller power	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 B low side circuit shorted to high side circuit (FICM)	P3150	Controller specific output driver circuit diagnoses Cylinder 1 Injector B low sided driver for a short to high sided driver failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement within controller specific unacceptable range during driver off state indicates low sided driver short to high sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for low sided driver for a short to high sided driver failure.	10 amp >= through high side driver	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 2 Injector B low side circuit shorted to high side circuit (FICM)	P3151	Controller specific output driver circuit diagnoses Cylinder 2 Injector B low sided driver for a short to high sided driver failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement within controller specific unacceptable range during driver off state indicates low sided driver short to high sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for low sided driver for a short to high sided driver failure.	10 amp >= through high side driver	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 3 Injector B low side circuit shorted to high side circuit (FICM)	P3152	Controller specific output driver circuit diagnoses Cylinder 3 Injector B low sided driver for a short to high sided driver failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement within controller specific unacceptable range during driver off state indicates low sided driver short to high sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for low sided driver for a short to high sided driver failure.	10 amp >= through high side driver	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 4 Injector B low side circuit shorted to high side circuit (FICM)	P3153	Controller specific output driver circuit diagnoses Cylinder 4 Injector B low sided driver for a short to high sided driver failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement within controller specific unacceptable range during driver off state indicates low sided driver short to high sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for low sided driver for a short to high sided driver failure.	10 amp >= through high side driver	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 5 Injector B low side circuit shorted to high side circuit (FICM)	P3154	Controller specific output driver circuit diagnoses Cylinder 5 Injector B low sided driver for a short to high sided driver failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement within controller specific unacceptable range during driver off state indicates low sided driver short to high sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for low sided driver for a short to high sided driver failure.	10 amp >= through high side driver	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 6 Injector B low side circuit shorted to high side circuit (FICM)	P3155	Controller specific output driver circuit diagnoses Cylinder 6 Injector B low sided driver for a short to high sided driver failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement within controller specific unacceptable range during driver off state indicates low sided driver short to high sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for low sided driver for a short to high sided driver failure.	10 amp >= through high side driver	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 7 Injector B low side circuit shorted to high side circuit (FICM)	P3156	Controller specific output driver circuit diagnoses Cylinder 7 Injector B low sided driver for a short to high sided driver failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement within controller specific unacceptable range during driver off state indicates low sided driver short to high sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for low sided driver for a short to high sided driver failure.	10 amp >= through high side driver	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 8 Injector B low side circuit shorted to high side circuit (FICM)	P3157	Controller specific output driver circuit diagnoses Cylinder 8 Injector B low sided driver for a short to high sided driver failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement within controller specific unacceptable range during driver off state indicates low sided driver short to high sided driver failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for low sided driver for a short to high sided driver failure.	10 amp >= through high side driver	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 B high side circuit shorted to ground (FICM)	P3158	Controller specific output driver circuit diagnoses Cylinder 1 Injector B high 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 Ohms impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 B high side circuit shorted to power (FICM)	P3159	Controller specific output driver circuit diagnoses Cylinder 1 Injector B high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 0.5 Ohms impedance between signal and controller power	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 2 Injector B high side circuit shorted to ground (FICM)	P315A	Controller specific output driver circuit diagnoses Cylinder 2 Injector B high 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 Ohms impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 2 Injector B high side circuit shorted to power (FICM)	P315B	Controller specific output driver circuit diagnoses Cylinder 2 Injector B high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 0.5 Ohms impedance between signal and controller power	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 3 Injector B high side circuit shorted to ground (FICM)	P315C	Controller specific output driver circuit diagnoses Cylinder 3 Injector B high 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 Ohms impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 3 Injector B high side circuit shorted to power (FICM)	P315D	Controller specific output driver circuit diagnoses Cylinder 3 Injector B high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 0.5 Ohms impedance between signal and controller power	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 4 Injector B high side circuit shorted to ground (FICM)	P315E	Controller specific output driver circuit diagnoses Cylinder 4 Injector B high 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 Ohms impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 4 Injector B high side circuit shorted to power (FICM)	P315F	Controller specific output driver circuit diagnoses Cylinder 4 Injector B high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 0.5 Ohms impedance between signal and controller power	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 5 Injector B high side circuit shorted to ground (FICM)	P3160	Controller specific output driver circuit diagnoses Cylinder 5 Injector B high 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 Ohms impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 5 Injector B high side circuit shorted to power (FICM)	P3161	Controller specific output driver circuit diagnoses Cylinder 5 Injector B high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 0.5 Ohms impedance between signal and controller power	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 6 Injector B high side circuit shorted to ground (FICM)	P3162	Controller specific output driver circuit diagnoses Cylinder 6 Injector B high 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 Ohms impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 6 Injector B high side circuit shorted to power (FICM)	P3163	Controller specific output driver circuit diagnoses Cylinder 6 Injector B high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 0.5 Ohms impedance between signal and controller power	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 7 Injector B high side circuit shorted to ground (FICM)	P3164	Controller specific output driver circuit diagnoses Cylinder 7 Injector B high 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 Ohms impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 7 Injector B high side circuit shorted to power (FICM)	P3165	Controller specific output driver circuit diagnoses Cylinder 7 Injector B high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 0.5 Ohms impedance between signal and controller power	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 8 Injector B high side circuit shorted to ground (FICM)	P3166	Controller specific output driver circuit diagnoses Cylinder 8 Injector B high 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 Ohms impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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 8 Injector B high side circuit shorted to power (FICM)	P3167	Controller specific output driver circuit diagnoses Cylinder 8 Injector B high sided driver for a short to power failure when the output is powered off by comparing a voltage measurement to controller specific voltage thresholds	Voltage measurement outside of controller specific acceptable range during driver off state indicates short to power failure. Controller specific output driver circuit voltage thresholds are set to meet the following controller specification for a short to power.	<= 0.5 Ohms impedance between signal and controller power	Powertrain Relay Voltage within range for a duration Engine Running	>= 11.00 Volts >= 0.00 Seconds >= 0.00 Seconds	20 failures out of 25 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.
Secondary Fuel Injector Commands Signal Message Counter Incorrect (FICM)	P3168	Diagnostic to determine if the secondary fuel injector commands recieved by the FICM are valid. Data integrity parameters in the $087 serial data message are used to determine if a fault condition is present.	When Alive Rolling Count (ARC) or Checksum (CHKSUM) failures exceed an (X of Y) threshold, a fault condition is reported When the engine is running at low engine speeds, a mismatch in the current firing event (CYLID) increments the fail counter	embedded CHKSUM <> calculation or embedded ARC <> calculation or embedded CYLID <> calculaiton	Run/Crank voltage active for a duration and ARC check enabled 1 and Engine Running and Engine Speed	== TRUE >= 0.50 (sec) == TRUE == TRUE <= 1,700 (rpm)	69 failures out of 80 samples Performed on every received message: 12.5ms when engine is not running On cylinder events when engine is running	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Secondary Fuel System Commands Signal Message Counter Incorrect (FICM)	P3169	Diagnostic to determine if the secondary fuel system commands recieved by the FICM are valid. Data integrity parameters in the $193 serial data message are used to determine if a fault condition is present.	When Alive Rolling Count (ARC) or Checksum (CHKSUM) failures exceed an (X of Y) threshold, a fault condition is reported	embedded CHKSUM <> calculation embedded ARC <> calculation	Run/Crank voltage active for a duration	== TRUE >= 2.50 (sec)	69 failures out of 80 samples Performed on every received message: 12.5ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures exceeds before the sample time of is reached	5 counts (equivalent to 0.06 seconds) 0.81 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds CAN hardware is bus OFF for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts > 0.1625 seconds	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.
Control Module Communication Bus B Off	U0074	This DTC monitors for a BUS B off condition	Bus off failures exceeds before the sample time of is reached	5 counts (equivalent to 0.06 seconds) 0.81 seconds	General Enable Criteria: U0074 Normal CAN transmission on Bus B Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds CAN hardware is bus OFF for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts > 0.1625 seconds	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.
Lost Communication With ECM	U0100	This DTC monitors for a loss of communication with the engine control module	Message is not received from controller for Message $0C9 Message $287 Message $3E9 Message $4C1 Message $4D1 Message $4F1	 ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds ≥ 10.00 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Network Management is not active for U0100 ECM	> 0.4000 seconds Not Active on Current Key Cycle is present on the bus		

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_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	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_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	500.000	500.000	1,000.000	8,191.875	8,191.875	8,191.875	

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

Description: Fail threshold for PSW per operating loop.

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	5	3	5	3	5	3	5

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	5	5	5	3	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_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	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	23.000	85.000	95.000	105.000	125.000
1.000	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_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	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_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	500.000	500.000	1,000.000	8,191.875	8,191.875	8,191.875	

Initial Supporting table - P0606_Program Sequence Watch Enable f(Core, Loop Time)

Description: The enabling flags for the program sequence watch as a function of processor core and operating loop time sequence.

Value Units: PSW enable flag (boolean)
X Unit: Processor Core (enum)
Y Units: Operating Loop Time Sequence (enum)

y/x	CeTSKR_e_CPU	CeTSKR_e_CPU2	CeTSKR_e_CPU3	CeTSKR_e_CPU4
CePISR_e_5msSeq	0	0	0	0
CePISR_e_6p25msSeq	1	0	0	0
CePISR_e_10msSeq	0	0	0	0
CePISR_e_12p5msSeq	1	0	0	0
CePISR_e_20msSeq	0	0	0	0
CePISR_e_25msSeq	1	0	0	0
CePISR_e_40msSeq	0	0	0	0
CePISR_e_50msSeq	0	0	0	0
CePISR_e_80msSeq	0	0	0	0
CePISR_e_100msSeq	0	0	0	0
CePISR_e_EventA_Seq	0	0	0	0
CePISR_e_EventB_Seq	0	0	0	0
CePISR_e_EventC_Seq	0	0	0	0

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_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	5	3	5	3	5	3	5

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	5	5	5	3	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_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lateral Acceleration Sensor Performance	C1251	Controller specific analog circuit diagnoses the raw lateral acceleration signal for a signal value that is stuck in a valid range by comparing raw signal value to fail thresholds.	ABS(raw lateral acceleration signal) AND ABS(raw lateral acceleration signal) update raw lateral acceleration signal fail, 50 millisecond update rate	≥ 0.5300 g ≤ 3.8500 g	battery voltage run crank voltage diagnostic monitor enable update raw lateral acceleration signal stablity time: TOSS vehicle speed automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnsotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear attained gear slip ABS(raw lateral acceleration signal) update sample time U0073 fault active U0073 test fail this key on DTCs not fault active	≥ 11.00 volts ≥ 11.00 volts = 1 Boolean ≥ 15.0 KPH = TRUE = TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th ≤ 100.0 RPM < 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA	raw lateral acceleration signal stability time ≥ 30.0 seconds, fail time ≥ 75.0 seconds out of sample time ≥ 120.0 seconds, 50 millisecond update rate	Emissions Neutral Diagnostic – Type C

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Longitudinal Acceleration Sensor Performance	C1254	Controller specific analog circuit diagnoses the raw longitudinal acceleration signal rationalized against the TOSS vehicle speed acceleration. The diagnostic monitor can be designed to detect an invalid longitudinal acceleration signal based on the TOSS vehicle speed windows and TOSS vehicle speed acceleration, 4 windows can be enabled. The delta between the TOSS vehicle speed acceleration and longitudinal acceleration signal is taken within each window to verify the delta is small, no failure indicated, or the delta is large indicating the longitudinal acceleration signal is in error.	ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) update raw longitudinal acceleration signal region 1 fail time, 50 millisecond update rate	≥ 0.5300 g	battery voltage run crank voltage diagnostic monitor enable region 1 specific enable update raw lateral longitudinal acceleration signal stablity time: TOSS vehicle speed TOSS vehicle speed acceleration automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnsotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear attained gear slip ABS(raw longitudinal acceleration signal) AND ABS(raw longitudinal acceleration signal) update region 1 sample time: brake pedal position engine torque TOSS vehicle speed acceleration TOSS vehicle speed TOSS vehicle speed	≥ 11.00 volts ≥ 11.00 volts = 1 Boolean = 0 Boolean ≥ 15.0 KPH ≤ 0.5300 g = TRUE = TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th ≤ 100.0 RPM ≥ 0.5300 g ≤ 3.8500 g ≤ 0.70 % ≥ 80.0 Nm ≥ 0.1500 g ≥ 15.0 KPH ≤ 200.0 KPH	raw lateral longitudinal acceleration signal stability time ≥ 10.0 seconds, fail time ≥ 75.0 seconds out of sample time ≥ 120.0 seconds, 50 millisecond update rate region 1 fail time ≥ 75.0 seconds out of region 1 sample time ≥ 120.0 seconds, 50 millisecond update rate	Emissions Neutral Diagnostic – Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					ABS(raw longitudinal acceleration signal) update sample time	< 0.5300 g		
					U0073 fault active	= FALSE		
					U0073 test fail this key on	= FALSE		
					DTCs not fault active	VehicleSpeedSensor_FA VehicleSpeedSensorError		
			ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) update raw longitudinal acceleration signal region 2 fail time, 50 millisecond update rate	≥ 0.0000 g	battery voltage	≥ 11.00 volts	raw lateral longitudinal acceleration signal stability time ≥ 10.0 seconds, fail time ≥ 75.0 seconds out of sample time ≥ 120.0 seconds, 50 millisecond update rate	
					run crank voltage	≥ 11.00 volts		
					diagnostic monitor enable	= 1 Boolean		
					region 2 specific enable	= 0 Boolean		
					update raw lateral longitudinal acceleration signal stablity time:			
					TOSS vehicle speed	≥ 15.0 KPH		
					TOSS vehicle speed acceleration	≤ 0.5300 g		
					automatic transmission is clutch to clutch OR dual clutch	= TRUE		
					high side drive 1 enable	= TRUE		
					high side drive 2 enable	= TRUE		
					diagnsotic fault sequence gear active	= FALSE		
					P0716 fault active	= FALSE		
					P0716 test fail this key on	= FALSE		
					P0717 fault active	= FALSE		
					P0717 test fail this key on	= FALSE		
					P07BF fault active	= FALSE		
					P07BF test fail this key on	= FALSE		
					P07C0 fault active	= FALSE		
					P07C0test fail this key on	= FALSE		
					attained gear	= 1st thru 10th		
					attained gear slip	≤ 100.0 RPM		
					ABS(raw longitudinal acceleration signal) AND	≥ 0.5300 g		
					ABS(raw longitudinal	≤ 3.8500 g		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear attained gear slip ABS(raw longitudinal acceleration signal) AND ABS(raw longitudinal acceleration signal) update region 3 sample time: brake pedal position engine torque ABS(TOSS vehicle speed acceleration) TOSS vehicle speed ABS(raw longitudinal acceleration signal) update sample time U0073 fault active U0073 test fail this key on DTCs not fault active	= FALSE = FALSE = FALSE = FALSE = 1st thru 10th ≤ 100.0 RPM ≥ 0.5300 g ≤ 3.8500 g ≤ 0.70 % ≥ 80.0 Nm ≤ 0.1000 g ≥ 0.0 KPH < 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError	region 3 fail time ≥ 75.0 seconds out of region 3 sample time ≥ 120.0 seconds, 50 millisecond update rate	
			ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) update raw longitudinal acceleration signal region 4 fail time, 50 millisecond update rate	≥ 0.0000 g	battery voltage run crank voltage diagnostic monitor enable region 3 specific enable update raw lateral longitudinal acceleration signal stablity time: TOSS vehicle speed TOSS vehicle speed acceleration automatic transmission is clutch to clutch OR dual	≥ 11.00 volts ≥ 11.00 volts = 1 Boolean = 0 Boolean ≥ 15.0 KPH ≤ 0.5300 g = TRUE	raw lateral longitudinal acceleration signal stability time ≥ 10.0 seconds, fail time ≥ 75.0 seconds out of sample time ≥ 120.0 seconds, 50 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					clutch high side drive 1 enable high side drive 2 enable diagnsotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear attained gear slip ABS(raw longitudinal acceleration signal) AND ABS(raw longitudinal acceleration signal) update region 4 sample time: brake pedal position engine torque TOSS vehicle speed acceleration TOSS vehicle speed TOSS vehicle speed ABS(raw longitudinal acceleration signal) update sample time U0073 fault active U0073 test fail this key on DTCs not fault active	= TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th ≤ 100.0 RPM ≥ 0.5300 g ≤ 3.8500 g ≤ 0.70 % ≤ 80.0 Nm ≤ 0.1500 g ≥ 0.0 KPH ≤ 0.0 KPH < 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError	region 4 fail time ≥ 75.0 seconds out of region 4 sample time ≥ 120.0 seconds, 50 millisecond update rate	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if the calibration check sum is incorrect or the flash memory detects an uncorrectable error via the Error Correcting Code.	The Primary Processor's calculated checksum does not match the stored checksum value. Covers all software and calibrations.	1 failure if the fault is detected during the first pass. 5.00 failures if the fault occurs after the first pass is complete.			Diagnostic runs continuously in the background.	Type A, 1 Trips
			The Primary Processor's Error Correcting Code hardware in the flash memory detects an error. Covers all software and calibrations.	254 failures detected via Error Correcting Code			Diagnostic runs continuously via the flash hardware.	
			The Primary Processor's calculated checksum does not match the stored checksum value for a selected subset of the calibrations.	2 consecutive failures detected or 5 total failures detected.			Diagnostic runs continuously. Will report a detected fault within 200 ms.	
			The Secondary Processor's calculated checksum does not match the stored checksum value. Covers all software and calibrations.	1 failure if the fault is detected during the first pass. 5 failures if the fault occurs after the first pass is complete.			Diagnostic runs continuously in the background.	
				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.
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.	
			ECC ROM fault detected in NVM Flash region ECC ROM Error Count >	 3			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 >=	3 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
			Indicates that the primary processor is unable to correctly read data from or write data to TPU RAM. Detects data read does not match data written >=	5 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
			Indicates that the primary processor detects a mismatch between the data and dual data is found during RAM updates. Detects a mismatch in data and dual data updates >	0.40000 s			When dual store updates occur.	

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

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 processsors.	Loss or invalid message of SPI communication from the Secondary Processor at initialization detected by the Primary Processor or loss or invalid message of SPI communication from the Secondary Processor after a valid message was received by the Primary Processor	Loss or invalid message at initialization detected or loss or invalid message after a valid message was recieved	Run/Crank voltage Run/Crank voltage	>= 8.00 Volts or >= 11.00 Volts, else the failure will be reported for all conditions	In the primary processor, 8 / 16 counts intermittent or 10 counts continuous; 100 counts continuous @ initialization. 12.5 ms /count in the ECM main processor	Type A, 1 Trips
			Loss or invalid message of SPI communication from the Primary Processor at initialization detected by the Secondary Processor or loss or invalid message of SPI communication from the Primary Processor after a valid message was received by the Secondary Processor	Loss or invalid message at initialization detected or loss or invalid message after a valid message was recieved			In the secondary processor, 20 / 200 counts intermittent or 0.1875 s continuous; 0.4750 s continuous @ initialization. 12.5 ms /count in the ECM secondary processor	
			Checks for stack over or underflow in secondary processor by looking for corruption of known pattern at stack boundaries. Checks number of stack over/ under flow 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	
			MAIN processor is verified by responding to a seed sent from the secondary with a key response to secondary. Checks number of incorrect keys	2 incorrect seeds within 8 messages, 0.2000 seconds		ignition in Run or Crank	150 ms for one seed continually failing	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			received > or Secondary processor has not received a new within time limit					
			Time new seed not received exceeded			always running	0.450 seconds	
			MAIN processor receives seed in wrong order			always running	3 / 17 counts intermittent. 50 ms/count in the ECM main processor	
			2 fails in a row in the Secondary processor's ALU check			KePISD_b_ALU_TestEnbld == 1 Value of KePISD_b_ALU_TestEnbld 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_ConfigRegTestEnbld == 1 Value of KePISD_b_ConfigRegTestEnbld is: 1 . (If 0, this test is disabled)	12.5 to 25 ms	
			Secondary processor detects an error in the toggling of a hardware discrete line controlled by the MAIN processor: number of discrete changes > = or < = over time window(50ms)	7 17		KePISD_b_MainCPU_SOH_FltEnbld == 1 Value of KePISD_b_MainCPU_SOH_FltEnbld is: 0 . (If 0, this test is disabled) time from initialization >= 0.4875 seconds	50 ms	
			Software background task first pass time to complete exceeds			Run/Crank voltage > 6.41	35.000 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			2 fails in a row in the MAIN processor's ALU check			KePISD_b_ALU_TestEnbld == 1 Value of KePISD_b_ALU_TestEnbld is: 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			KePISD_b_ConfigRegTestEnbld == 1 Value of KePISD_b_ConfigRegTestEnbld is: 1 . (If 0, this test is disabled)	12.5 to 25 ms	
			Checks number of stack over/under flow 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	
			Voltage deviation >	0.4950		KePISD_b_A2D_CnvrtrTestEnbld == 1 Value of KePISD_b_A2D_CnvrtrTestEnbld is: 1 . (If 0, this test is disabled)	5 / 10 counts or 0.150 seconds continuous; 50 ms/count in the ECM main processor	
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		KeMEMD_b_FlashECC_CktTestEnbl == 1 Value of KeMEMD_b_FlashECC_CktTestEnbl is: 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.
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		KeMEMD_b_RAM_ECC_CktTestEnbl == 1 Value of KeMEMD_b_RAM_ECC_CktTestEnbl is: 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			KePISD_b_DMA_XferTestEnbld == 1 Value of KePISD_b_DMA_XferTestEnbld is: 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.		Table, f(Core, Loop Time). See supporting tables: **P0606_Program Sequence Watch Enable f(Core, Loop Time)** (If 0, this Loop Time 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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							processor	
			MAIN processor determines a seed has not changed within a specified time period within the 50ms task.	Previous seed value equals current seed value.		KePISD_b_SeedUpdKeyStorFltEnbl == 1 Value of KePISD_b_SeedUpdKeyStorFltEnbl 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.
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 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 Ω impedance between signal and controller ground	diagnostic monitor enable high side drive ON service mode $04 not active service fast learn not active P0658 fault active P0658 test fail this key on	= 1 Boolean = TRUE = FALSE = FALSE	fail count ≥ 6 counts out of sample count ≥ 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.
Torque Managment System - Forced Engine Shutdown	P06AF	This THCP Diagnostic checks that the ECM is processing code correctly. The ECM has a main and a secondary processor. As long as the main ECM processor responds to the secondary ECM processor correctly then the correct pattern is sent via CAN message to the THCP. When the ECM does not have correct interaction between its two microprocessors then an incorrect pattern is sent to the THCP and the THCP sets the DTC.	Received pattern from the ECM OR Received malfunction pattern	≠ expected pattern (F, 5, B, D, A, 6, 3, 0) >= 2 counts	Run/Crank Voltage OR Ignition Run/Crank Voltage Run Crank Active Time	>= 8.00 V >= 11.00 V >= 0.10 seconds	0.1 seconds out of a 0.15 seconds window	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						EngineTorqueEstInaccurate AcceleratorPedalFailure CrankSensor_FA ECT_Sensor_FA VehicleSpeedSensor_FA		
			current transmission fluid temperature string length = previous transmission fluid temperature transmission temperature string length + (raw transmission fluid temperature - previous raw transmission fluid temperature, update rate 100 milliseconds, increment sample count	≥ 80.0 °C			sample count ≥ 10 counts evaluate fail temperature threshold, 100 millisecond update rate, if transmission fluid temperature string length above fail threshold increment fail time fail time ≥ 8.0 seconds out of sample time ≥ 12.0 seconds	
					diagnsotic monitor enable P0712 NOT fault active P0713 NOT fault active	= 1 Boolean		
					battery voltage	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					run crank voltage	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	
					intermittent test enable propulsion system active	= 1 Boolean = TRUE		
			raw transmission fluid temperature - previous	≤ 0.0000 °C			fail time ≥ 300.0 seconds	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Fluid Temperature Sensor Circuit Low Voltage	P0712	Controller specific analog circuit diagnoses the transmission fluid temperature sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds, converted to a resistance value.	circuit resistance update fail time 1 seconds update rate	≤ 13.500 Ω	diagnostic monitor enable battery voltage run crank voltage run crank voltage in range time	= 1 Boolean ≥ 9.00 volts ≥ 9.00 volts	fail time ≥ 5.00 seconds out of sample time ≥ 6.00 seconds 1 seconds update rate battery voltage in range time ≥ 0.100 seconds run crank voltage in range time ≥ 0.100 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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	≥ 49,411,396.0 Ω	diagnostic monitor enable battery voltage run crank voltage run crank voltage in range time	= 1 Boolean ≥ 9.00 volts ≥ 9.00 volts	fail time ≥ 5.00 seconds out of fail time ≥ 6.00 seconds 1 seconds update rate battery voltage in range time ≥ 0.100 seconds run crank voltage in range time ≥ 0.100 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Input Speed Sensor Performance	P0716	Detects unrealistic drop in raw transmission input speed signal RPM. Drop events are counted up to fail threshold. A drop event is defined by a sudden delta change in RPM from one value to a lower value. The raw transmission input speed must achieve a value high enough to record an unrealistic drop sample to sample. Once the drop threshold is met, fail time is accumualted indicating the raw transmission input speed has not recovered above a threshold, allowing the fail event count to increment. Multiple fail event counts must occur, but if the signal remains low, no further deltas occur, the "Input Speed Sensor Circuit Low Voltage" DTC will set before P0716, as P0716 is designed to set based on an intermittent raw transmission input speed signal RPM.	delta raw transmission input speed delta raw transmission input speed = raw transmission input speed - last valid raw transmission input speed, 25 millisecond update rate	≥ 2,000.0 RPM	service mode $04 active	= FALSE	fail time ≥ 1.500 seconds updated fail event count, fail event count ≥ 5 counts, 25 millisecond update rate	Type A, 1 Trips
					diagnostic monitor enable	= 1 Boolean		
					P0717 test fail this key on	= FALSE		
					P07BF test fail this key on	= FALSE		
					P07C0 test fail this key on	= FALSE		
					last valid raw transmission input speed OR	≥ 160.0 RPM	raw transmission input speed time ≥ 2.000 seconds	
					valid raw transmission input speed (before drop event)	≥ 160.0 RPM		
					last valid raw transmission input speed updates very 25 milliseconds when stablity time complete as long as			
					(delta delta raw transmission input speed AND	≤ 320.0 RPM	stability time ≥ 0.100 seconds	
					raw transmission input speed)	> 160.0 RPM		
					raw transmission output speed	≥ 254.0 RPM		
					accelerator pedal position	≥ 5.0 %		
					engine torque	≤ 8,191.9 Nm		
					engine torque	≥ 30.0 Nm		
					transmission hydraulic pressure available:			
					engine speed	≥ 400.0 RPM	engine speed time ≥	
					DTCs not fault active	AcceleratorPedalFailure EngineTorqueEstInaccurate		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							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 ciruit electrical failure mode or sensor internal faults, or, controller internal failure modes. The raw transmission input speed signal RPM is rationalized against vehicle conditions in which the the powertrain is producing torque available at the drive wheels, but raw transmission input speed signal RPM remains low. After a sudden drop in raw transmission input speed signal RPM, a race condition can occur between P0717 and "Input Speed Sensor Performance" depending on the true nature of the failure.	raw transmission input speed OR TISS/TOSS fault (single power supply to TISS and TOSS) = TRUE, update fail time 25 millisecond update rate	≤ 100.0 RPM < 475.0 RPM	service mode $04 active diagnostic monitor enable run crank voltage service fast learn active run crank voltage P0722 fault active P0723 fault active P077C fault active P077D fault active brake pedal position sesnor must be OBDII to use brake pedal conditional brake pedal position sesnor type brake pedal position P0716 test fail this key on P07BF test fail this key on P07C0 test fail this key on accelerator pedal position engine torque engine torque (transmission current attained gear transmission current attained gear raw transmission output speed OR transmission current attained gear transmission current attained gear raw transmission output speed) P0717 fault active P0717 test fail this key on	= FALSE = 1 Boolean ≥ 5.00 volts = FALSE ≥ 9.00 volts = FALSE = FALSE = FALSE = FALSE = CeBRKR_e_OBD < 70.0 % = FALSE = FALSE = FALSE ≥ 5.0 % ≥ 30.0 Nm ≤ 8,191.9 Nm ≤ CeCGSR_e_CR_Seventh ≥ CeCGSR_e_CR_First ≥ 162.0 RPM ≤ CeCGSR_e_CR_Tenth ≥ CeCGSR_e_CR_Seventh	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.
					TISS/TOSS fault (single power supply to TISS and TOSS) = TRUE occurs when: (P0722 fail time high gear exceeds fail threshold OR P0722 fail time low gear exceeds fail threshold) TISS/TOSS has single power supply calibration TISS/TOSS single power supply test enabled transmission hydraulic pressure available: engine speed DTCs not fault active	≥ 162.0 RPM = FALSE = FALSE = 0 Boolean = 1 Boolean ≥ 400.0 RPM EngineTorqueEstInaccurate	engine speed time ≥ **engine speed time for transmission hydraulic pressure available**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 ≥ 25.0 RPM	service mode $04 active diagnostic monitor enable TOSS count sample period P0721 fault active P0721 test fail this key on TOSS transitional period detected = FALSE when: on period on period when direction unknown OR on period on period when direction is reverse OR on period on period when direction is forward TOSS transitional period detected = TRUE when: on period on period when direction unknown senor type is directional senor type cailbration	= FALSE = 1 Boolean ≠ 0 counts = FALSE = FALSE ≥ 0.4434 seconds ≤ 0.2773 seconds < 0.2363 seconds > 0.1240 seconds < 0.0811 seconds > 0.0088 seconds < 0.4434 seconds > 0.2773 seconds = CeTOSR_e_Directional	fail time ≥ 3.500 seconds out of sample time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Output Speed Sensor Circuit Low Voltage	P0722	Detects no activity in raw transmission output speed signal RPM due to open ciruit electrical failure mode or sensor internal faults, or, controller internal failure modes. The raw transmission output speed signal RPM is rationalized against vehicle conditions in which the the powertrain is producing torque, but raw transmission output speed signal RPM remains low. After a sudden drop in raw transmission output speed signal RPM, a race condition can occur between P0722 and "Output Speed Sensor Circuit Intermittent" depending on the true nature of the failure.	raw transmission output speed, update fail time 6.25 millisecond update rate when: attained gear attained gear AND attained gear use high gear fail time threshold ELSE use low gear fail time threshold	≤ 30.0 RPM ≥ CeCGSR_e_CR_First ≤ CeCGSR_e_CR_Tenth > CeCGSR_e_CR_Fourth	service mode $04 active diagnostic monitor enable when neutral range occurs: (garage shift OR PRNDL OR PRNDL OR range inhibit state) AND (engine torque accelerator pedal position) when not neutral range occurs: attained gear attained gear (attained gear engine torque hysteresis high engine torque hysteresis low accelerator pedal position hysteresis high accelerator pedal position hysteresis low) when not neutral range occurs: (attained gear engine torque hysteresis high engine torque hysteresis low	= FALSE = 1 Boolean ≠ COMPLETE = PARK = NEUTRAL ≠ no inhibt active ≥ 8,192.0 Nm ≥ 100.0 % ≥ CeCGSR_e_CR_First ≤ CeCGSR_e_CR_Tenth > CeCGSR_e_CR_Fourth ≥ 50.0 Nm > 30.0 Nm ≥ 5.0 % > 3.0 % ≤ CeCGSR_e_CR_Fourth ≥ 80.0 Nm > 50.0 Nm	fail time ≥ 5.00 seconds high gear OR fail time ≥ 3.50 seconds low gear	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					accelerator pedal position hysteresis high	≥ 8.0 %		
					accelerator pedal position hysteresis low)	> 5.0 %		
					TISS enable occurs when:			
					(TISS speed select	= 1 Boolean		
					OR			
					TISS/TOSS has single power supply calibration	= 0 Boolean		
					AND			
					TISS	≤ 8,191.9 RPM		
					AND			
					TISS)	≥ 475.0 RPM		
					OR			
					(TISS speed select	≠ 1 Boolean		
					OR			
					TISS/TOSS has single power supply calibration	= 0 Boolean		
					AND			
					TISS	≤ 8,191.9 RPM		
					AND			
					TISS)	≥ 5,800.0 RPM		
					P0716 test fail this key on	= FALSE		
					P0717 test fail this key on	= FALSE		
					P07BF test fail this key on	= FALSE		
					P07C0 test fail this key on	= FALSE		
					PTO check:			
					PTO enable calibration is FALSE	≠ 1 Boolean		
					OR			
					(PTO enable calibration is TRUE	= 1 Boolean		
					AND			
					PTO active)	= TRUE		
					run crank voltage	≥ 5.00 volts	run crank voltage time ≥ 25 milliseconds	
					service fast learn active	= FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					run crank voltage transmission 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	≥ 9.00 volts ≥ -40.00 °C = FALSE = FALSE = FALSE = FALSE = FALSE ≥ 400.0 RPM AcceleratorPedalFailure EngineTorqueEstInaccurate	engine speed time ≥ **engine speed time for transmission hydraulic pressure available**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Output Speed Sensor Circuit Intermittent	P0723	Detects unrealistic drop in raw transmission output speed signal RPM. Drop events are counted up to fail threshold. A drop event is defined by a sudden delta change in RPM from one value to a lower value. The raw transmission output speed must achieve a value high enough to record an unrealistic drop sample to sample. Once the drop threshold is met, fail time is accumualted indicating the raw transmission output speed has not recovered above a threshold, allowing the fail event count to increment. Multiple fail event counts must occur, but if the signal remains low, no further deltas occur, the "Output Speed Sensor Circuit Low Voltage" DTC will set before P0723, as P0723 is designed to set based on an intermittent raw transmission output speed signal RPM.	4WD low fail threshold: delta raw transmission output speed OR NOT 4WD low fail threshold, update fail time, delta raw transmission output speed = raw transmission output speed previous loop - raw transmission output speed, 25 millisecond update rate	≥ 700.0 RPM ≥ 700.0 RPM	service mode $04 active diagnostic monitor enable transmission engaged state 4WD low state PTO check: PTO enable calibration is FALSE OR (PTO enable calibration is TRUE AND PTO active) run crank voltage service fast learn active run crank voltage P077C test fail this key on P077D test fail this key on when PRNDL is moved to	= FALSE = 1 Boolean ≠ not engaged = 4WD low state previous loop, 25 millisecond update rate ≠ 1 Boolean = 1 Boolean = TRUE ≥ 5.00 volts = FALSE ≥ 9.00 volts = FALSE = FALSE	fail time ≥ 1.500 seconds updated fail event count, fail event count ≥ 5 counts, 25 millisecond update rate transmission engaged state time ≥ **P0723 transmission engaged state time threshold** 4WD low change time ≥ 3.0 seconds run crank voltage time ≥ 25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 (TISS/TOSS has single power supply calibration AND raw transmission input speed)	= CeTRGR_e_PRNDL_Neutral = CeTRGR_e_PRNDL_Transitional1 N-D transitional = CeTRGR_e_PRNDL_Transitional4 R-N transitional ≥ 250.0 RPM ≥ 250.0 RPM ≤ 4,095.9 RPM ≥ 160.0 RPM = 0 Boolean = 0.0 RPM	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.
					select delta RPM fail theshold: (4WD low state AND $WD low valid) select P0723 4WD TOSS delta fail threshold otherwise use P0723 TOSS delta fail threshold last valid raw transmission output speed OR valid raw transmission output speed (before drop event) last valid raw transmission output speed updates very 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 DTCs not fault active	= TRUE = TRUE > 89.0 RPM > 89.0 RPM ≤ 140.0 RPM ≥ 89.0 RPM ≥ 400.0 RPM AcceleratorPedalFailure EngineTorqueEstInaccurate	raw transmission output speed time ≥ 2.00 seconds stability time ≥ 0.100 seconds 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.
Pressure Control (PC) Solenoid A Stuck Off	P0746	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C1 clutch slip speed, update fail time 6.25 milliscond update	≥ 200.0 RPM	use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled service fast learn active service solenoid cleaning procedure active hydraulic pressure	= 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean	fail time ≥ 3.00 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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			available: engine speed enable C1 clutch slip speed fail compare when: diagnostic clutch test C1 ((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 FASLE (startle mitigation) clutch steady state adaptive active transmission output shaft speed C1 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation accelerator pedal position engine speed diagnostic clutch test C1 set to HOLDING CLUTCH when: clutch solenoid test state	≥ 400.0 RPM = HOLDING CLUTCH = FALSE = TRUE ≠ initial startle mitigation gear = FALSE = 0 Boolean = FALSE ≥ 89.0 RPM = TRUE ≥ 2.00 % ≥ 1,500.0 RPM = NEUTRAL TEST	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

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 a clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to the GF9 C1 CB123456, or, GR10 C1 CB123456R, clutch pressure control solenoid.			((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) C1 clutch pressured map clutch solenoid test state set to NEUTRAL TEST when: test trigger initialize range shift complete time, when range shift state, range shift complete time must time down to zero when range shift complete test trigger set to TRUE: enable forward gear AND direction request OR enable reverse gear AND direction request current loop test trigger clutch control solenoid test state range shift state NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on	= FALSE = TRUE ≠ initial startle mitigation gear = mapped to line pressure, C1 clutch pressure has transtioned from off-applying-applied = TRUE ≠ range shift completed = 1 Boolean = forward gear = 0 Boolean = reverse gear = FALSE ≠ NEUTRAL TEST = range shift completed	initialize range shift complete time = 1.000 seconds, range shift complete time must time down to zero when range shift complete	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			
					DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		
					DTCs not test fail this key on	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821		
					DTCs not fault active	AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

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 not power down shift, C1 clutch slip speed update fail time 6.25 milliscond update	< 50.0 RPM < 50.0 RPM	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	= 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean	shift type is power down shift, fail time ≥ 0.800 seconds, OR shift type is not power down shift, fail time ≥ 0.150 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 a clutch pressure control solenoid stuck			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: engine speed transmission output shaft speed set solenoid stuck on test trigger to TRUE when: clutch pressure control solenoid stuck off stuck intrusive shift request startle mitigation active (see startle mitigation active NOTE below) clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) initialize active clutch controller (clutch control processing in process of sequencing clutches on	= TRUE Boolean = FALSE Boolean = FALSE Boolean ≥ 400.0 RPM ≥ 89.0 RPM = FALSE = FALSE ≠ TIE UP TEST TEST STATE ≠ TIE UP TEST HOLD = TRUE	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		on test is disabled. This diagnostic monitor is relative to the GF9 C1 CB123456, or, GR10 C1 CB123456R, clutch pressure control solenoid.			and off for auto trans shift) (shift type enable for staged steady state shift - shift in process when new shift type occurs - interrupted shift OR shift type enable for garage shift OR shift type enable for negative torque up shift OR shift type enable for open throttle power on up shift OR shift type enable for closed throttle down shift OR shift type enable for open throttle power down shift OR shift type enable for closed throttle lift foot up shift) OR clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) transition clutch controller active clutch controller (staged steady sate shift - shift not in process, no new shift type occuring, no interrupted shift) set clutch control solenoid test state to TIE UP TEST	= 0 Boolean = 0 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = TIE UP TEST TEST STATE = TIE UP TEST HOLD = TRUE ≠ staged steady state		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					TEST STATE when:			
					solenoid stuck on test trigger	= TRUE		
					current loop clutch control solenoid test state OR	= TEST WAITING		
					current loop clutch control solenoid test state (see clutch control solenoid test state NOTE below)	= TIE UP TEST HOLD		
					range shift state	≠ range shift complete		
					solenoid stuck on test trigger	= TRUE		
					additional off going clutch occured	= TRUE		
					(clutch control solenoid test state OR	= TIE UP TEST TEST STATE		
					clutch control solenoid test state) (see clutch control solenoid test state NOTE below)	= TIE UP TEST HOLD		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					(C1 off going clutch pressure control ramp time out complete AND	= TRUE		
					off going clutch pressure ramp control ramp time out enable) OR	= 1 Boolean		
					C1 off going clutch pressure	≤ 350.0 kPa	for C1 off going clutch pressure time ≥ **P0747 C1 clutch exhaust delay time closed throttle lift foot up shift** OR	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							P0747 C1 clutch exhaust delay time open throttle power on up shift OR **P0747 C1 clutch exhaust delay time garage shift** OR **P0747 C1 clutch exhaust delay time closed throttle down shift** OR **P0747 C1 clutch exhaust delay time negative torque up shift** OR **P0747 C1 clutch exhaust delay time open throttle power down shift** see supporting tables	
					engine torque primary on coming clutch active primary on coming control state closed throttle lift foot up shift primary on coming clutch pressure OR open throttle power on up shift primary on coming clutch pressure OR garage shift primary on	≥ 8,191.8 Nm = TRUE ≠ clutch fill phase ≥ 690.0 kPa ≥ 2,100.0 kPA ≥ 750.0 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					coming clutch pressure OR negative torque up shift primary on coming clutch pressure OR open throttle power down shift primary on coming clutch pressure OR closed throttle down shift primary on coming clutch pressure C1 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an automatic transmission shift due to two conditions: Current value of clutch control solenoid test state is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND	 ≥ 690.0 kPa ≥ 400.0 kPa ≥ 690.0 kPa = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed ≥ clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift state = range shift complete. NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821. DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		

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 DTCs not fault active	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821 AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Stuck Off	P0776	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C1 clutch slip speed, update fail time 6.25 milliscond update	≥ 200.0 RPM			fail time ≥ 3.00 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update	Type A, 1 Trips
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					use run crank voltage calibration is FALSE	= 0 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 0 Boolean		
					AND			
					run crank voltage	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	
					TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure			

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			available: engine speed enable C2 clutch slip speed fail compare when: diagnostic clutch test C2 ((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 FASLE (startle mitigation) clutch steady state adaptive active transmission output shaft speed C2 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation accelerator pedal position engine speed diagnostic clutch test C2 set to HOLDING CLUTCH when: clutch solenoid test state	≥ 400.0 RPM = HOLDING CLUTCH = FALSE = TRUE ≠ initial startle mitigation gear = FALSE = 0 Boolean = FALSE ≥ 89.0 RPM = TRUE ≥ 2.00 % ≥ 1,500.0 RPM = NEUTRAL TEST	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

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 a clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to the GF9 C2 CB29 or GR10 C2 CB128910R, clutch pressure control solenoid.			((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) C2 clutch pressured map clutch solenoid test state set to NEUTRAL TEST when: test trigger initialize range shift complete time, when range shift state, range shift complete time must time down to zero when range shift complete test trigger set to TRUE: enable forward gear AND direction request OR enable reverse gear AND direction request current loop test trigger clutch control solenoid test state range shift state NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on	= FALSE = TRUE ≠ initial startle mitigation gear = mapped to line pressure, C2 clutch pressure has transtioned from off-applying-applied = TRUE ≠ range shift completed = 1 Boolean = forward gear = 0 Boolean = reverse gear = FALSE ≠ NEUTRAL TEST = range shift completed	 initialize range shift complete time = 1.000 seconds, range shift complete time must time down to zero when range shift complete	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			
					DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		
					DTCs not test fail this key on	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821		
					DTCs not fault active	AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

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 not power down shift, C2 clutch slip speed update fail time 6.25 milliscond update	< 50.0 RPM < 50.0 RPM	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	= 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean	shift type is power down shift, fail time ≥ 0.800 seconds, OR shift type is not power down shift, fail time ≥ 0.150 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 a clutch pressure control solenoid stuck			TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available: engine speed	≥ 400.0 RPM	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	
					transmission output shaft speed	≥ 89.0 RPM		
					set solenoid stuck on test trigger to TRUE when:			
					clutch pressure control solenoid stuck off stuck intrusive shift request	= FALSE		
					startle mitigation active (see startle mitigation active NOTE below)	= FALSE		
					clutch control solenoid test state	≠ TIE UP TEST TEST STATE		
					clutch control solenoid test state (see clutch control solenoid test state NOTE below)	≠ TIE UP TEST HOLD		
					initialize active clutch controller (clutch control processing in process of sequencing clutches on	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		on test is disabled. This diagnostic monitor is relative to the GF9 C2 CB29 or GR10 C2 CB128910R, clutch pressure control solenoid.			and off for auto trans shift) (shift type enable for staged steady state shift - shift in process when new shift type occurs - interrupted shift OR shift type enable for garage shift OR shift type enable for negative torque up shift OR shift type enable for open throttle power on up shift OR shift type enable for closed throttle down shift OR shift type enable for open throttle power down shift OR shift type enable for closed throttle lift foot up shift) OR clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) transition clutch controller active clutch controller (staged steady sate shift - shift not in process, no new shift type occuring, no interrupted shift) set clutch control solenoid test state to TIE UP TEST	= 0 Boolean = 0 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = TIE UP TEST TEST STATE = TIE UP TEST HOLD = TRUE ≠ staged steady state		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					TEST STATE when:			
					solenoid stuck on test trigger	= TRUE		
					current loop clutch control solenoid test state	= TEST WAITING		
					OR			
					current loop clutch control solenoid test state (see clutch control solenoid test state NOTE below)	= TIE UP TEST HOLD		
					range shift state	≠ range shift complete		
					solenoid stuck on test trigger	= TRUE		
					additional off going clutch occured	= TRUE		
					(clutch control solenoid test state OR	= TIE UP TEST TEST STATE		
					clutch control solenoid test state) (see clutch control solenoid test state NOTE below)	= TIE UP TEST HOLD		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					(C2 off going clutch pressure control ramp time out complete AND	= TRUE		
					off going clutch pressure ramp control ramp time out enable)	= 1 Boolean		
					OR			
					C2 off going clutch pressure	≤ 350.0 kPa	for C2 off going clutch pressure time ≥ **P0777 C2 clutch exhaust delay time closed throttle lift foot up shift** OR	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							P0777 C2 clutch exhaust delay time open throttle power on up shift OR **P0777 C2 clutch exhaust delay time garage shift** OR **P0777 C2 clutch exhaust delay time closed throttle down shift** OR **P0777 C2 clutch exhaust delay time negative torque up shift** OR **P0777 C2 clutch exhaust delay time open throttle power down shift** see supporting tables	
					engine torque primary on coming clutch active primary on coming control state closed throttle lift foot up shift primary on coming clutch pressure OR open throttle power on up shift primary on coming clutch pressure OR garage shift primary on	≥ 8,191.8 Nm = TRUE ≠ clutch fill phase ≥ 800.0 kPa ≥ 800.0 kPA ≥ 750.0 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					coming clutch pressure OR negative torque up shift primary on coming clutch pressure OR open throttle power down shift primary on coming clutch pressure OR closed throttle down shift primary on coming clutch pressure C2 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an automatic transmission shift due to two conditions: Current value of clutch control solenoid test state is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND	 ≥ 800.0 kPa ≥ 800.0 kPa ≥ 800.0 kPa = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed ≥ clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift state = range shift complete. NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821. DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		

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 DTCs not fault active	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821 AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Output Speed Sensor Circuit Low	P077C	Controller specific analog circuit diagnoses the transmission output speed sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission output speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	≤ 0.2500 volts (≤ 0.5 Ω impedance between signal and controller ground)	service mode $04 active diagnostic monitor enable P077D fault active service fast learn run crank voltage battery voltage P077C fault active P077C test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE ≥ 10.00 volts ≥ 10.00 volts = FALSE = FALSE	fail time ≥ 0.050 seconds, update fail count 12.5 millisecond update rate fail count ≥ 16 counts 12.5 millisecond update rate run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Output Speed Sensor Circuit High	P077D	Controller specific analog circuit diagnoses the transmission output speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission output speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	≥ 4.7500 volts (≤ 0.5 Ω impedance between signal and controller power)	service mode $04 active diagnostic monitor enable P077C fault active service fast learn run crank voltage battery voltage P077D fault active P077D test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE ≥ 10.00 volts ≥ 10.00 volts = FALSE = FALSE	fail time ≥ 0.050 seconds, update fail count 12.5 millisecond update rate fail count ≥ 16 counts 12.5 millisecond update rate run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid C Stuck Off	P0796	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C1 clutch slip speed, update fail time 6.25 milliscond update	≥ 200.0 RPM			fail time ≥ 3.00 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update	Type A, 1 Trips
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					use run crank voltage calibration is FALSE	= 0 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 0 Boolean		
					AND			
					run crank voltage	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	
					TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure			

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			available: engine speed enable C3 clutch slip speed fail compare when: diagnostic clutch test C3 ((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 FASLE (startle mitigation) clutch steady state adaptive active transmission output shaft speed C3 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation accelerator pedal position engine speed diagnostic clutch test C3 set to HOLDING CLUTCH when: clutch solenoid test state	≥ 400.0 RPM = HOLDING CLUTCH = FALSE = TRUE ≠ initial startle mitigation gear = FALSE = 0 Boolean = FALSE ≥ 89.0 RPM = TRUE ≥ 2.00 % ≥ 1,500.0 RPM = NEUTRAL TEST	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

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 a clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to the GF9 C3 CB38, or, GR10 C3 CB123456R, clutch pressure control solenoid.			((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) C3 clutch pressured map clutch solenoid test state set to NEUTRAL TEST when: test trigger initialize range shift complete time, when range shift state, range shift complete time must time down to zero when range shift complete test trigger set to TRUE: enable forward gear AND direction request OR enable reverse gear AND direction request current loop test trigger clutch control solenoid test state range shift state NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on	= FALSE = TRUE ≠ initial startle mitigation gear = mapped to line pressure, C3 clutch pressure has transtioned from off-applying-applied = TRUE ≠ range shift completed = 1 Boolean = forward gear = 0 Boolean = reverse gear = FALSE ≠ NEUTRAL TEST = range shift completed	initialize range shift complete time = 1.000 seconds, range shift complete time must time down to zero when range shift complete	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			
					DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		
					DTCs not test fail this key on	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821		
					DTCs not fault active	AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

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 not power down shift, C3 clutch slip speed update fail time 6.25 milliscond update	< 50.0 RPM < 50.0 RPM	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	= 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean	shift type is power down shift, fail time ≥ 0.800 seconds, OR shift type is not power down shift, fail time ≥ 0.150 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 a clutch pressure control solenoid stuck			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: engine speed transmission output shaft speed set solenoid stuck on test trigger to TRUE when: clutch pressure control solenoid stuck off stuck intrusive shift request startle mitigation active (see startle mitigation active NOTE below) clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) initialize active clutch controller (clutch control processing in process of sequencing clutches on	= TRUE Boolean = FALSE Boolean = FALSE Boolean ≥ 400.0 RPM ≥ 89.0 RPM = FALSE = FALSE ≠ TIE UP TEST TEST STATE ≠ TIE UP TEST HOLD = TRUE	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		on test is disabled. This diagnostic monitor is relative to the GF9 C3 CB38, or, GR10 C3 CB123456R, clutch pressure control solenoid.			and off for auto trans shift) (shift type enable for staged steady state shift - shift in process when new shift type occurs - interrupted shift OR shift type enable for garage shift OR shift type enable for negative torque up shift OR shift type enable for open throttle power on up shift OR shift type enable for closed throttle down shift OR shift type enable for open throttle power down shift OR shift type enable for closed throttle lift foot up shift) OR clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) transition clutch controller active clutch controller (staged steady sate shift - shift not in process, no new shift type occuring, no interrupted shift) set clutch control solenoid test state to TIE UP TEST	= 0 Boolean = 0 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = TIE UP TEST TEST STATE = TIE UP TEST HOLD = TRUE ≠ staged steady state		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					TEST STATE when: solenoid stuck on test trigger current loop clutch control solenoid test state OR current loop clutch control solenoid test state (see clutch control solenoid test state NOTE below) range shift state solenoid stuck on test trigger additional off going clutch occured (clutch control solenoid test state OR clutch control solenoid test state) (see clutch control solenoid test state NOTE below) diagnostic clutch test (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 pressure	= TRUE = TEST WAITING = TIE UP TEST HOLD ≠ range shift complete = TRUE = TRUE = TIE UP TEST TEST STATE = TIE UP TEST HOLD = OFF GOING CLUTCH TEST = TRUE = 1 Boolean ≤ 350.0 kPa	for C3 off going clutch pressure time ≥ **P0797 C3 clutch exhaust delay time closed throttle lift foot up shift** OR	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							P0797 C3 clutch exhaust delay time open throttle power on up shift OR **P0797 C3clutch exhaust delay time garage shift** OR **P0797 C3 clutch exhaust delay time closed throttle down shift** OR **P0797 C3 clutch exhaust delay time negative torque up shift** OR **P0797 C3 clutch exhaust delay time open throttle power down shift** see supporting tables	
					engine torque primary on coming clutch active primary on coming control state closed throttle lift foot up shift primary on coming clutch pressure OR open throttle power on up shift primary on coming clutch pressure OR garage shift primary on	≥ 8,191.8 Nm = TRUE ≠ clutch fill phase ≥ 500.0 kPa ≥ 500.0 kPA ≥ 750.0 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					coming clutch pressure OR negative torque up shift primary on coming clutch pressure OR open throttle power down shift primary on coming clutch pressure OR closed throttle down shift primary on coming clutch pressure C3 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an automatic transmission shift due to two conditions: Current value of clutch control solenoid test state is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND	 ≥ 500.0 kPa ≥ 500.0 kPa ≥ 500.0 kPa = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed ≥ clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift state = range shift complete. NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821. DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		

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 DTCs not fault active	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821 AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Input/Turbine Speed Sensor A Circuit Low	P07BF	Controller specific analog circuit diagnoses the transmission input/ turbine speed sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission intput/turbine speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	≤ 0.2500 volts (≤ 0.5 Ω impedance between signal and controller ground)	service mode $04 active diagnostic monitor enable P07C0 fault active service fast learn run crank voltage battery voltage P07BF fault active P07BF test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE ≥ 10.00 volts ≥ 10.00 volts = FALSE = FALSE	fail time ≥ 0.050 seconds, update fail count 12.5 millisecond update rate fail count ≥ 16 counts 12.5 millisecond update rate run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Input/Turbine Speed Sensor A Circuit High	P07C0	Controller specific analog circuit diagnoses the transmission input/ turbine speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission input/turbine speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	≥ 4.7500 volts (≤ 0.5 Ω impedance between signal and controller power)	service mode $04 active diagnostic monitor enable P07BF fault active service fast learn run crank voltage battery voltage P07C0 fault active P07C0 test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE ≥ 10.00 volts ≥ 10.00 volts = FALSE = FALSE	fail time ≥ 0.050 seconds, update fail count 12.5 millisecond update rate fail count ≥ 16 counts 12.5 millisecond update rate run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Upshift Switch Circuit	P0815	Diagnoses the state of the upshift switch circuit, stuck in the state "tap up" (upshift) active.	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 P1761 fault active P0826 fault active P0826 test fail this key on P0826 fault pending (P0815 fault active OR P0815 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10 OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = 1 Boolean ≥ 5.00 volts ≥ 9.00 volts = 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 = 0 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity	fail time 1 ≥ 1.00 seconds run crank voltage time ≥ 25 milliseconds	Emissions Neutral Diagnostic – 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 P1761 fault active P0826 fault active P0826 test fail this key on	= FALSE = 1 Boolean ≥ 5.00 volts ≥ 9.00 volts = FALSE = FALSE = FALSE	fail time 2 ≥ 120.00 seconds run crank voltage time ≥ 25 milliseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P0826 fault pending (P0815 fault active OR P0815 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10 OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = FALSE = FALSE ≥ 1.00 seconds = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 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.	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 P1761 fault active P0826 fault active P0826 test fail this key on P0826 fault pending (P0816 fault active OR P0816 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10 OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = 1 Boolean ≥ 5.00 volts ≥ 9.00 volts = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity	fail time 1 ≥ 1.00 seconds run crank voltage time ≥ 25 milliseconds ≥ 1.00 seconds	Emissions Neutral Diagnostic – 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 P1761 fault active P0826 fault active P0826 test fail this key on	= FALSE = 1 Boolean ≥ 5.00 volts ≥ 9.00 volts = FALSE = FALSE = FALSE	fail time 2 ≥ 120.00 seconds run crank voltage time ≥ 25 milliseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P0826 fault pending (P0816 fault active OR P0816 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10 OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = FALSE = FALSE ≥ 1.00 seconds = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 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.	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 Diagnostic – Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid A Control Circuit Open	P0960	Controller specific circuit diagnoses 9 speed CB123456 or 10 speed CB123456R 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 Increment fail time	≥ 200 K Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid A Control Circuit Low Voltage	P0962	Controller specific circuit diagnoses 9 speed CB123456 or 10 speed CB123456R 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid A Control Circuit High Voltage	P0963	Controller specific circuit diagnoses 9 speed CB123456 or 10 speed CB123456R 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller voltage source	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Control Circuit Open	P0964	Controller specific circuit diagnoses 9 speed CB29 or 10 speed CB128910R 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 Increment fail time	≥ 200 K Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Control Circuit Low Voltage	P0966	Controller specific circuit diagnoses 9 speed CB123456 or 10 speed CB123456R 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Control Circuit High Voltage	P0967	Controller specific circuit diagnoses 9 speed CB123456 or 10 speed CB123456R 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller voltage source	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid C Control Circuit Open	P0968	Controller specific circuit diagnoses 9 speed CB38 or 10 speed C23457910 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 Increment fail time	≥ 200 K Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid C Control Circuit Low Voltage	P0970	Controller specific circuit diagnoses 9 speed CB38 or 10 speed C23457910 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid C Control Circuit High Voltage	P0971	Controller specific circuit diagnoses 9 speed CB38 or 10 speed C23457910 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller voltage source	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Serial Peripheral Interface Bus 1	P16F0	This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor before receiving a valid message.		Run/Crank voltage	> 6.41 Volts	100 / 16 counts continuous; 12.5 ms /count in the ECM main processor	Type A, 1 Trips
			This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor after receiving a valid message.		Run/Crank voltage	> 6.41 Volts	8 / 16 counts continuous; 12.5 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 Redundant Memory Performance	P16F3	The diagnostic monitor is a rationalization of command values: command clutch pressures and command gear. The monitor is broken up into two fault detection routines, command pressure (tie up) fault detection and command gear/shift fault detection. The command pressure (tie up) fault detection is designed to verify the number of clutches applied in a given gear state is limited, in order to prevent a transmission internal mechanical tie-up condition. A condition which could lead to a vehicle deceleration above the design safety metric. If commanded clutch pressures are above a threshold which would allow multiple clutches to carry torque, the clutch is considered applied, otherwise the clutch is considered released. If there are more clutches applied, via the commanded clutch pressures, in a given gear state than is rational, one or more of	command pressure (tie up) fault detection minimum # of clutches ON by attained gear and by comanded gear, take lower of the 2 values, where attained gear is the current operating gear and command gear is the targetted value to transtion toward see **9 speed transmission clutch definition and gear state to clutch map** and **10 speed transmission clutch definition and gear state to clutch map** attached supporting tables for clutch 1 through clutch 7 definition and gear state to clutch map	≤ **NumClchTieUp** See Attached Supporting Tables	Reduandant Memory Command Pressure Enable Calibraiton Not Reduandant Memory Command Pressure Enable Calibraiton No traction event in progress: ABS((driven wheel speed - non-drive wheel speed) / driven wheel speed) 25 millisecond derivative TOSS RPM, (TOSS delta 25 millisecond loop to 25 milsecond loop) / 25 millisecond for time Clutch 1 hydraulic volume fill factor Clutch 2 hydraulic volume fill factor Clutch 3 hydraulic volume fill factor Clutch 4 hydraulic volume fill factor Clutch 5 hydraulic volume fill factor Clutch 6 hydraulic volume fill factor Clutch 7 hydraulic volume fill factor when clutch is off going (releasing) clutch the commanded clutch pressure equation = ((pressure control solenoid command	= 0 Boolean = 1 Boolean ≥ 0.00 % < 0.750 * **P2D2 Cltch Slip Sum** see attached supporting Table ≥ 0.0500 seconds ≥ 1.000 unitless ≥ 1.000 unitless ≥ 1.000 unitless ≥ 1.000 unitless ≥ 1.000 unitless ≥ 1.000 unitless ≥ 1.000 unitless	single event 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		the clutch pressure command values are in error. Given rate of change of transmission output shaft speed, command gear state clutches and clutch hydraulic fill volumes, those clutches in transition from the hydraulic released state to the hydraulic applied state and from the hydraulic applied state to the hydraulic released state, the rationality detects any number of command clutch pressures above a threshold, that are simultaneously active to cause a vehicle deceleration above the design safety metric. The command gear/ shift fault detection is designed to verify the commanded gear will not induce a downshift resulting in a gear state that is erroneous given vehicle operating conditions. The detection rationalizes the command gear against a minimum gear, highest gear ratio, for given vehicle speed and driver accelerator position.			pressure - pressure offset) * regulator valve gain) - regulator valve return spring pressure adaptive when clutch 1 is off going clutch: clutch 1 command pressure clutch 1 state is OFF when: clutch 1 command pressure, else clutch is ON and count clutch 1 toward minimum # of clutches ON when clutch 2 is off going clutch: clutch 2 command pressure clutch 2 state is OFF when: clutch 2 command pressure, else clutch is ON and count clutch 2 toward minimum # of clutches ON when clutch 3 is off going clutch: clutch 3 command pressure	= ((clutch 1 pressure control solenoid command pressure - 0.00) * 1.00) - regulator valve return spring pressure adaptive, kPa **P2D2 Decel Pressure - ≤ C1** see attached supporting tables = ((clutch 2 pressure control solenoid command pressure - 0.00) * 1.00) - regulator valve return spring pressure adaptive, kPa **P2D2 Decel Pressure - ≤ C2** see attached supporting tables = ((clutch 3 pressure		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						control solenoid command pressure - 177.00) * 1.51) - regulator valve return spring pressure adaptive, kPa		
					clutch 3 state is OFF when: clutch 3 command pressure, else clutch is ON and count clutch 3 toward minimum # of clutches ON	**P2D2 Decel Pressure - ≤ C3** see attached supporting tables		
					when clutch 4 is off going clutch: clutch 4 command pressure	= ((clutch 4 pressure control solenoid command pressure - 160.00) * 2.25) - regulator valve return spring pressure adaptive, kPa		
					clutch 4 state is OFF when: clutch 4 command pressure, else clutch is ON and count clutch 4 toward minimum # of clutches ON	**P2D2 Decel Pressure - ≤ C4** see attached supporting tables		
					when clutch 5 is off going clutch: clutch 5 command pressure	= ((clutch 5 pressure control solenoid command pressure - 0.00) * 1.00) - regulator valve return spring pressure adaptive, kPa		
					clutch 5 state is OFF when: clutch 5 command pressure,			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					else clutch is ON and count clutch 5 toward minimum # of clutches ON when clutch 6 is off going clutch: clutch 6 command pressure clutch 6 state is OFF when: clutch 6 command pressure, else clutch is ON and count clutch 6 toward minimum # of clutches ON when clutch 7 is off going clutch: clutch 7 command pressure clutch 7 state is OFF when: clutch 7 command pressure, else clutch is ON and count clutch 7 toward minimum # of clutches ON service fast learn not active	**P2D2 Decel Pressure - ≤ C5** see attached supporting tables = ((clutch 6 pressure control solenoid command pressure - 0.00) * 1.00) - regulator valve return spring pressure adaptive, kPa **P2D2 Decel Pressure - ≤ C6** see attached supporting tables = ((clutch 7 pressure control solenoid command pressure - 0.00) * 1.00) - regulator valve return spring pressure adaptive, kPa **P2D2 Decel Pressure - ≤ C7** see attached supporting tables		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					no speed sensor DTCs fault active: P0716, P0717, P0721, P0722, P0723, P077C, P077D, P07BF, P07C0, P172A, P172B, P176B, P176C, P176D, P1783, P178F, P17C4, P17C5, P17C6, P17CC, P17CD, P17CE, P17D3, P17D6 no high side driver DTCs fault active: P0658, P2670			
			command gear/shift fault detection 1st gear commanded and vehicle seed OR 2nd gear commanded and vehicle seed OR 3rd gear commanded and vehicle seed OR 4th gear commanded and vehicle seed OR 5th gear commanded and vehicle seed OR 6th gear commanded and vehicle seed OR 7th gear commanded and vehicle seed OR 8th gear commanded and	 > 57.24 KPH > 81.18 KPH > 89.10 KPH > 109.72 KPH > 139.56 KPH > 185.60 KPH > 268.38 KPH	Reduandant Memory Command Gear Enable Calibraiton Not Reduandant Memory Command Gear Enable Calibraiton service fast learn not active no speed sensor DTCs fault active: P0716, P0717, P0721, P0722, P0723, P077C, P077D, P07BF, P07C0, P172A, P172B, P176B, P176C, P176D, P1783, P178F, P17C4, P17C5, P17C6, P17CC, P17CD, P17CE, P17D3, P17D6 no high side driver DTCs fault active:	= 0 Boolean = 1 Boolean	command gear fail event count ≥ 3 counts 6.25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			vehicle seed OR 9th gear commanded and vehicle seed OR 10th gear commanded and vehicle seed THEN increment command gear fail event count and abort commanded gear and delay for time before next fail evaluation	> 359.27 KPH > 434.97 KPH > 434.97 KPH > 5.00 seconds	P0658, P2670			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Speed Signal Analog to Digital Converter Performance	P16FB	The diagnostic monitor validates the controller calculated transmission output speed sensor data parameters, calculated in multiple paths/subroutines and at different rates. There are multiple transmission output speed sensor data parameters, calculated at rates of 6.25 milliseconds, 12.5 milliseconds and 25 milliseconds. While the same subroutine, a generic “calculate TOSS” is called from different time loops, each call stores that current value of the calculated TOSS to a different memory location. For example, a 12.5 millisecond loop calling “calculate TOSS” stores the calculated TOSS value to a “12.5 millisecond TOSS calculated” data parameter in memory, while a 25 millisecond loop calling “calculate TOSS” stores the calculated TOSS value to a “25 millisecond TOSS calculated” data parameter in memory. The raw transmission output speed sensor	ABS(raw transmission output speed, 6.25 millisecond data parameter - raw transmission output speed, 25 millisecond data parameter) update fail and sample time 25 millisecond update rate	≥ 60.0 RPM	service mode $04 active diagnsotic monitor enable raw transmission output speed, 25 millisecond data parameter raw transmission output speed, 6.25 millisecond data parameter run crank voltage battery voltage	= FALSE = 1 Boolean ≥ 356.0 RPM ≥ 356.0 RPM ≥ 10.00 volts ≥ 10.00 volts	fail time ≥ 8.000 seconds out of sample time ≥ 10.000 seconds 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.
		signal is diagnosed independently electrically and for performance of this DTC. The transmission output speed sensor data parameters that are calculated at different rates must always be within a negligible difference of each other.						

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Surge Solenoid Circuit Low	P171B	Controller specific transmission surge accumulator control circuit diagnoses the transmission surge accumulator and wiring for a ground short circuit fault by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short Increment fail time	≤ 0.5 Ω impedance between signal and controller ground	battery voltage battery voltage battery enable time run/crank voltage run crank voltage time ≥ diagnostic monitor enable	≥ 9.00 volts ≤ 32.00 volts ≥ 1.00 seconds ≥ 5.00 volts 25 milliseconds = 1 Boolean	fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Surge Solenoid Circuit High	P171C	Controller specific transmission surge accumulator control circuit diagnoses the transmission surge accumulator and wiring for a short to voltage circuit fault by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage Increment fail time	≤ 0.5 Ω impedance between signal and controller voltage source	battery voltage battery voltage battery voltage enable time run/crank voltage run crank voltage time diagnostic monitor enable	≥ 9.00 volts ≤ 32.00 volts ≥ 1.00 seconds ≥ 5.00 volts time ≥ 25 milliseconds = 1 Boolean	fail time ≥ 0.300 seconds out of ≥ 0.500 seconds sample time	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Surge Accumulator System Performance	P171D	Detects when the surge accumulator system, used to provide transmission hydraulic pressure, is not capable of supplying adequate hydraulic pressure during an engine auto-start. The transmission holding clutch pressures are commanded to meet the engine crank shaft torque output, to prevent clutch slip to those holding clutches, during the engine auto-start. The diagnostic monitors transmission input shaft speed during the auto-start event as the primary malfunction criteria. Measured input shaft speed that is excessive is an indication the holding clutches are slipping due to inadequate hydraulic pressure, as a result of a failed surge accumulator system.	Transmission turbine speed is greater than predicted turbine speed during autostart event, update initial fail count	**P171D predicted ≥ turbine speed error** Refer to "Transmission Supporting Tables" for details	PRNDL state defaulted Transmission shift lever position Propulsion system active Ignition voltage Ignition voltage Transmission fluid temp Transmission fluid temp Hybrid state AutoStop duration min During autostop Engine speed was ********** If above conditions are met then the following must occur: Turbine speed Engine speed Hydraulic pressure delay time If above conditions are met then increment time-out timer. Time-out timer Note: The initial fail	= False = Forward range A = True > 9.00 volts < 31.99 volts > 0.00 °C < 110.00 °C = Engine off ≥ 1.200 seconds < 5.0 RPM ≥ 80.0 RPM ≥ 450.0 RPM **P171D hydraulic ≥ pressure delay** Refer to "Transmission Supporting Tables" for details ≤ 0.38 seconds	≥ 8 counts (initial fail count) Frequency =12.5ms Once the above counts are achieved then increment the final fail counter once. The final fail counter can only increment once per autostart event ≥ 3 counts (final fail counter) If above counter is greater than threshold then report DTC failed. Frequency = 12.5ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					counter must achieve it's fail threshold in less than the time-out time. ********** If vehicle is launched then: Transmission gear ratio Trans 1st gear ratio Trans 1st gear ratio Trans gear ratio not 1st gear Trans gear ratio not 1st gear Valid transmission gear ratio achieved time OR If vehicle is not launched but autostart occurs then: Turbine speed Turbine speed less then above threshold for Note: During an autostart event the lack of hydraulic pressure will result in momentary clutch slip in	 ********** = 4.689 1st gear ratio = 3.306 2nd gear ratio = 3.012 3rd gear ratio = 2.446 4th gear ratio = 1.923 5th gear ratio = 1.446 6th gear ratio ≤ 1.120 % of 1st gear ratio ≥ 0.880 % of 1st gear ratio ≤ 1.070 % of gear ratio ≥ 0.930 % of gear ratio ≥ 0.500 seconds ≤ 5.00 RPM ≥ 0.500 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					the C1234 clutch. After the clutch slip event, the main transmission pump and clutch will gain capacity, clutch slip will go to zero. If the vehicle is launching (moving) then a valid transmission ratio can be achieved. Or if the brake is continually applied and an autostart occurs naturally, then no ratio can be measured. In this case turbine speed will return to near zero rpm. ********** DTCs not fault active	CrankSensor_FA Transmission Output Shaft Angular Velocity Validity Transmission Turbine Angular Velocity Validity Transmission Oil Temperature Validity P171A P171B P171C U0101 P182E P1915		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Control System - Shift Limiting Active	P175E	The latent fault diagnostic monitors detects when the vehicle has been driven excessively with an emission MIL request. The DTCs requesting the emission MIL are all due to a safety critical system or component fault present in which a DTC is set fault active, test fail this key on or fault pending (fault pending is fail time ≠ 0). The safety critical systems or safety critical components include: transmission input, output and intermediate speed sensors, transmission range sensors, clutch pressure control solenoids including unintended deceleration detected due to clutch pressure control solenoids, driver accelerator pedal position, engine crankshaft position and engine torque. The DTCs for these safety critical systems or safety critical components include both electrical fault DTCs and performance fault DTCs. The latent fault diagnostic monitor	P0747 OR P0777 OR P0797 OR P2715 OR P2724 OR P2731 OR P2733 fault active due to unintended deceleration detection, increment unintended deceleration latent fault fail count		transmission default gear active (emission MIL active) calibration CeTRDR_e_DSG_DfltGr Opt5_Action any non-zero (0) option	> CeTRDR_e_DSG_DfltGr OptNone, zero (0) element in default gear array	unintended deceleration latent fault fail count ≥ 100 counts 25 millisecond update rate	Type A, 1 Trips
			P0747 OR P0777 OR P0797 OR P2715 OR P2724 OR P2731 OR P2733 clutch pressure control solenoid fault active due to clutch stuck on during shift, increment clutch pressure control solenoid latent fault fail count		transmission default gear active (emission MIL active) calibration CeTRDR_e_DSG_DfltGr Opt5_Action any non-zero (0) option	> CeTRDR_e_DSG_DfltGr OptNone, zero (0) element in default gear array	clutch pressure control solenoid latent fault fail count ≥ 100 counts 25 millisecond update rate	
			P2802 OR P2803 fault active, increment transmission range sensor latent fault fail count		transmission default gear active (emission MIL active) calibration CeTRDR_e_DSG_DfltGr OptNone any non-zero (0) option	> CeTRDR_e_DSG_DfltGr OptNone, zero (0) element in default gear array	transmission range sensor latent fault fail count ≥ 200 counts 25 millisecond update rate	
			P0721 OR P0722 OR P0723 OR P077C OR P077D or P172A fault active, increment transmission output speed sensor latent fault fail count		transmission default gear active (emission MIL active) calibration CeTRDR_e_DSG_DfltGr Opt5_Action any non-zero (0) option	> CeTRDR_e_DSG_DfltGr OptNone, zero (0) element in default gear array	transmission output speed sensor latent fault fail count ≥ 100 counts 25 millisecond update rate	
			P0716 OR P0717 OR P0721 OR P07BF OR P07C0 fault active OR		transmission default gear active (emission MIL active) calibration	>	transmission input output speed sensor latent fault fail	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		counts the run/crank ignition cycles before the latent fault DTC is set fault active.	P077D OR P077D OR P1783 OR P17CE fault active OR P0722 OR P0723 OR P172A test fail this key on OR P0716 OR P0717 OR P0721 OR P0722 OR P0723 OR P077C OR P077D OR P07BF OR P07C0 Or P172A OR P172B OR P1783 OR P17CE fault pending (fail time ≠ 0) increment transmission input output speed sensor latent fault fail count		CeTRDR_e_DSG_DfltGr Opt5_Action any non-zero (0) option	CeTRDR_e_DSG_DfltGr OptNone, zero (0) element in default gear array	count ≥ 100 counts 25 millisecond update rate	
			AcceleratorPedalFailure OR EngineTorqueEstInaccurate OR P2534 fault active OR CrankSensor_FA OR P0707 OR P0708 fault active OR test fail this key on OR P2805 fault active OR P0716 OR P0717 OR P07BF OR P07C0 fault active OR P0722 OR P0723 test fail this key on OR P077C OR P077D fault active OR P176C OR P176D OR	= TRUE = TRUE = TRUE	transmission default gear active (emission MIL active) calibration CeTRDR_e_DSG_DfltGr Opt5_Action any non-zero (0) option ignition run crank voltage for time	> CeTRDR_e_DSG_DfltGr OptNone, zero (0) element in default gear array > 5.00 volts ≥ 12.5 milliseconds	system latent fault fail count ≥ 100 counts 6.25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			P17CC OR P17CD OR P176B OR P17D6 fault active OR test fail this key on OR P0747 OR P0777 OR P0797 OR P2715 OR P2724 OR P2733 OR P0746 OR P0776 OR P0796 OR P2714 OR P2723 OR P2732 OR P178F OR P17C4 OR P17C6 OR P172A OR P172B test fail this key on OR P0960 OR P0962 OR P0963 OR P0964 OR P0966 OR P0967 OR P0968 OR P0970 OR P0971 OR P2718 OR P2720 OR P2721 OR P2727 OR P2729 OR P2730 OR P2736 OR P2738 OR P2739 OR P17C5 OR P17D3OR P0721 fault active OR P0716 OR P0717 OR P0721 OR P0722 OR P0723 OR P077C OR P077D OR P07BF OR P07C0 fault pending (fail time ≠ 0) OR P176B OR P176C OR P176D OR P17CC OR P17CD OR P17D6 OR P1783 OR P178F OR P17C4 OR P17C5 OR P17C6 OR P17CE OR P17D3 OR P172A or P172B fault pending (fail					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			time ≠ 0) OR P1783 fault active OR P1783 fault pending (fail time ≠ 0) update system fault time when system fault time increment system latent fault fail count	≥ 10.0 seconds				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Acceleration Sensor Signal Message Counter Incorrect	P175F	The diagnostic monitor detects an alive rolling count error or checksum error in the CAN frame containing the lateral acceleration signal value and longitudinal acceleration sensor signal value.	rolling count value received from EBCM and expected TCM calculated value not equal OR checksum lateral and longitudinal acceleration CAN frame message value error 50 millisecond update rate	= TRUE = TRUE	enable alive rolling count error detection: diagnostic monitor enable lateral and longitudinal acceleration CAN frame message received battery voltage run crank voltage enable checksum error detection: diagnostic monitor enable lateral and longitudinal acceleration CAN frame message received normal CAN battery voltage run crank voltage communication enabled DTCs not fault active	 = 1 Boolean = TRUE ≥ 11.0 volts ≥ 11.0 volts = 1 Boolean = TRUE ≥ 11.0 volts ≥ 11.0 volts = TRUE U0073	alive rolling count errors ≥ 54 out of 9 sample counts 50 millisecond update rate checksum error time ≥ 54.00 seconds	Emissions Neutral Diagnostic – Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Up and Down Shift Switch Signal Circuit	P1761	The alive rolling count normally cycles 0, 1, 2, and 3 as a serial data periodic frame is processed normally. The diagnostic monitor counts the number of times an alive rolling count error occurs over a period of time. The TCM receives a serial data frame at a periodic rate, during which, the receive data is processed the comparing the current value of the alive rolling count in the frame date to the incremented value of the diagnostic alive rolling count. When the two values of the alive rolling count do not agree, an alive rolling count error has occurred. The error indicator is saved in an array buffer, and when the number of error indicators in the buffer exceed the fail threshold the fail time is allowed to time up.	alive rolling count error counter update fail time 100 millisecond update rate	≥ 3 counts	service mode $04 active diagnostic monitor enable run crank voltage up and down shift serial data frame receive occurred when up and down shift serial data frame receive occurred: increment the diagnsotic alive rolling count data value, if the diagnsotic alive rolling count data value, set alive rolling count error to TRUE, when alive rolling count error AND previous alive rolling count error in 10 element arrary buffer, increment alive rolling count error counter	= FALSE = 1 Boolean ≥ 9.00 volts = TRUE ≠ frame alive rolling count data value = TRUE = FALSE	fail time ≥ 10.00 seconds run crank voltage time ≥ 0.100 seconds	Emissions Neutral Diagnostic – Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Planetary Gearset Ring Gear Speed Sensor Circuit Range/ Performance	P176B	The diagnostic monitor rationalizes the transmission intermediate shaft speed sensor by using the transmission output shaft output speed sensor and the known ratio between the transmission intermediate shaft speed and the transmission output shaft output speed based on the commanded gear and the transmission lever node design. The estimated transmission intermediate shaft speed is equal to the gear ratio times the transmission output shaft output speed. The absolute value of the delta between the measured transmission intermediate shaft speed and the estimated transmission intermediate shaft speed is used to determine if the measured transmission intermediate shaft speed is rational.	delta1 = ABS (transmission input speed - (transmission output speed * gear ratio commanded)) update faiil time 25 millisecond update rate	> 10.0 RPM	diagnostic monitor enable speed sesnor configuration calibration is single OR dual ratio calibration is function of command gear and intermediate speed sesnor when not REVERSE ratio calibration is function of command gear and intermediate speed sesnor when REVERSE ********** delay time updates when: estimated transmission intermediate speed (transmission input speed / ratio calibration)	= 1 Boolean = CeTNSR_e_NSPD_SinglSpdSnsr **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** see supporting tables	fail time ≥ **P176B intermediate speed sensor fail time threshold** see supporting tables fail time threshold met increments fail count, fail count ≥ **P176B intermediate speed sensor fail count threshold** see supporting tables ********** delay time ≥	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					with 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	**P176B minimum transmission input speed to enable fail ≥ evaluation** see supporting tables **P176B holding clutch = states** see supporting tables = REVERSE OR = 1st thru 10th ********** ≥ 172.0 RPM ≥ 89.0 RPM = nuetral idle mode ON = range shift complete = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE ≥ 9.00 volts = FALSE ≥ 9.00 volts	**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	 ≥ 400.0 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 sesnor raw voltage, update fail time, 12.5 millisecond update rate	≤ 0.2500 volts (≤ 0.5 Ω impedance between signal and controller ground)	service mode $04 active diagnostic monitor enable P176D fault active service fast learn run crank voltage battery voltage P176C fault active P176C 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 12.5 millisecond update rate fail count ≥ 40 counts 12.5 millisecond update rate run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Planetary Gearset Ring Gear Speed Sensor Circuit High	P176D	Controller specific analog circuit diagnoses the transmission intermediate speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission intermediate speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	≥ 4.7500 volts (≤ 0.5 Ω impedance between signal and controller power)	service mode $04 active diagnostic monitor enable P176C fault active service fast learn run crank voltage battery voltage P176D fault active P176D test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE ≥ 10.00 volts ≥ 10.00 volts = FALSE = FALSE	fail time ≥ 0.050 seconds, update fail count 12.5 millisecond update rate fail count ≥ 40 counts 12.5 millisecond update rate run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intermediate Speed Sensor 1 Direction Error	P17D3	The diagnostic monitor determines if the direction transmission intermediate speed sensor value is coherent based on the on period time of the directional sensor and raw speed sensor value. When the on period time indicates a transitional state, the direction must also be transitional as measured by very slow raw signal RPM. When the on period time indicates a non-transitional state, forward or reverse, the direction must also be transition, not forward and not reverse.	intermediate speed sesnor raw direction when transitional period = FALSE AND intermediate speed sesnor raw direction when transitional period = FALSE OR intermediate speed sesnor raw when transitional period = TRUE update fail and sample time 6.26 millisecond update rate	≠ FORWARD ≠ REVERSE **P17C5 P17D3 intermediate speed ≥ sensor RPM**	service mode $04 active diagnostic monitor enable intermediate speed sesnor count sample period P17D3 fault active OR P17D3 test fail this key on senor type cailbration (senor type is directional) transitional period detected = FALSE when: on period OR on period when direction unknown OR on period on period when direction is reverse OR on period on period when direction is forward transitional period detected = TRUE when: on period on period when direction unknown	= FALSE = 1 Boolean ≠ 0 counts = FALSE = FALSE = CeTNSR_e_NSPD_SinglSpdSnsr ≥ 0.4434 seconds ≤ 0.2773 seconds < 0.2363 seconds > 0.1240 seconds < 0.0811 seconds > 0.0088 seconds < 0.4434 seconds > 0.2773 seconds	fail time ≥ 3.500 seconds out of sample time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Valve Position Sensor/ Switch A Circuit/Open	P17F5	The diagnostic monitor detects an illegal voltage on the park valve position sensor circuit.	raw sensor voltage raw sensor voltage	> 1.263 volts < 1.504 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS park sensor configuration type is hall sensor	= 1 Boolean ≥ 9.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS = CePSCR_e_HallSns	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Valve Position Sensor/ Switch A Circuit Low	P17F6	The diagnostic monitor detects a ground short or open circuit fault in the park valve position sensor circuit.	raw sensor voltage	< 0.414 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS park sensor configuration type is hall sensor	1 Boolean ≥ 9.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS = CePSCR_e_HallSns	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips
			sensor voltage direct proportion raw sensor % duty cycle sensor voltage indirect proportion raw sensor % duty cycle	= CePSCD_e_VoltDirctProp ≤ 9.998 % duty cycle = CePSCD_e_VoltDirctProp ≥ 9.998 % duty cycle	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS park sensor configuration type is PWM sensor	= 1 Boolean ≥ 9.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS = CePSCR_e_HallSns	1.000 seconds in 1.500 second sample 6.25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Valve Position Sensor/ Switch A Circuit High	P17F7	The diagnostic monitor detects a short to voltage circuit fault in the park valve position sensor circuit.	raw sensor voltage	> 2.538 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS park sensor configuration type is hall sensor	= 1 Boolean ≥ 9.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS = CePSCR_e_HallSns	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips
			sensor voltage direct proportion raw sensor % duty cycle sensor voltage indirect proportion raw sensor % duty cycle	= CePSCD_e_VoltDirctProp ≥ 91.998 % duty cycle = CePSCD_e_VoltDirctProp ≤ 91.998 % duty cycle	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS park sensor configuration type is PWMsensor	= 1 Boolean ≥ 9.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS = CePSCR_e_HallSns	1.000 seconds in 1.500 second sample 6.25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Valve Position Sensor/ Switch B Circuit/Open	P17FA	The diagnostic monitor detects an illegal voltage on the park valve position sensor circuit.	raw sensor voltage raw sensor voltage	> 1.263 volts < 1.504 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS park sensor configuration type is hall sensor	= 1 Boolean ≥ 9.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS = CePSCR_e_HallSns	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Valve Position Sensor/ Switch B Circuit Low	P17FB	The diagnostic monitor detects a ground short or open circuit fault in the park valve position sensor circuit.	raw sensor voltage	< 0.414 volts	diagnostic monitor enable battery voltage battey voltage time ETRS system configuration is internal ERTS park sensor configuration type is hall sensor	= 1 Boolean ≥ 9.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS = CePSCR_e_HallSns	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips
			sensor voltage direct proportion raw sensor % duty cycle sensor voltage indirect proportion raw sensor % duty cycle	= CePSCD_e_VoltDirctProp ≤ 9.998 % duty cycle = CePSCD_e_VoltDirctProp ≥ 9.998 % duty cycle	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS park sensor configuration type is PWM sensor	= 1 Boolean ≥ 9.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS = CePSCR_e_HallSns	1.000 seconds in 1.500 second sample 6.25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Valve Position Sensor/ Switch B Circuit High	P17FC	The diagnostic monitor detects a short to voltage circuit fault in the park valve position sensor circuit.	raw sensor voltage	> 2.538 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS park sensor configuration type is hall sensor	= 1 Boolean ≥ 9.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS = CePSCR_e_HallSns	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips
			sensor voltage direct proportion raw sensor % duty cycle sensor voltage indirect proportion raw sensor % duty cycle	= CePSCD_e_VoltDirctProp ≥ 91.998 % duty cycle = CePSCD_e_VoltDirctProp ≤ 91.998 % duty cycle	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS park sensor configuration type is PWMsensor	= 1 Boolean ≥ 9.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS = CePSCR_e_HallSns	1.000 seconds in 1.500 second sample 6.25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Valve Stuck On	P187D	This diagnostic monitor rationalizes the driver ETRS command direction of “out of PARK” against the actual park valve position, as the park valve position is measured by the park valve position sensor A or B.	when: (Park Valve Position Sensor A OR Park Valve Position Sensor B) AND (out of park state calculated OR out of park state calculated) update delay time when: delay time increment fail count	 = PARK = PARK = UNKNOWN = PARK ≥ **KtPSDR_t_ParkVlvStkOn_DlyLim**	park servo enable ETRS system type is internal ETRS battery voltage for battery voltage time diagnostic monitor enable park state transtion is TRUE when: (out of park state calculated OR out of park state calculated) AND P187D, P187E Test Fail This Key On AND ((ETRS command direction AND out of park state) OR (ETRS command direction AND out of park state)) otherwise park state transition is FALSE park state transition AND (P17F5, P17F6, P17F7 Fault Active OR P17FA, P17FB, P17FC Fault Active) AND P187D, P187E Fault Active park servo stuck on availabe is TRUE when: ETRS command direction ((ETRS command direction AND	= 1 Boolean = CeTRGR_e_InternalETRS update rate 6.25 milliseconds ≥ 9.00 volts ≥ 1.000 seconds = 1 Boolean = PARK = OUT OF PARK = FALSE = PARK ≠ PARK ≠ PARK ≠ OUT OF PARK = TRUE = FALSE = FALSE = FALSE ≠ PARK = DRIVE	fail count ≥ 2 counts	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P18AB Test Fail This Key On) OR (ETRS command direction AND P18A8 Test Fail This Key On) OR (ETRS command direction AND P18AD Test Fail This Key On) OR ((ETRS command direction AND (P18AB Test Fail This Key On OR P18AD Test Fail This Key On)) OR (ETRS command direction AND P18AB Test Fail This Key On)) otherwise park servo stuck on available is FALSE hydraulic pressure available = TRUE when: engine speed for engine speed time otherwise hydraulic pressure available = FALSE hydraulic pressure available park servo stuck on available (mode valve A state attained OR P18AA Test Fail This Key On OR P27EC Test Fail This Key	= FALSE = NEUTRAL LOW = FALSE = NEUTRAL HIGH = FALSE = NEUTRAL SHIFT = FALSE = FALSE = REVERSE = FALSE ≥ 400.0 RPM ≥ **KtTMDC_t_EngOnHydPresThrsh** = TRUE = TRUE = TRUE = TRUE = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					On OR P27EC Fault Pending) AND (mode valve B state attained OR P18AC Test Fail This Key On OR P27F0 Test Fail This Key On OR P27F0 Fault Pending)	 = TRUE = TRUE = TRUE = TRUE = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Valve Stuck Off	P187E	This diagnostic monitor rationalizes the driver ETRS command direction of “PARK” against the actual park valve position, as the park valve position is measured by the mode valve position sensor A and B.	when: ETRS command direction out of park state mode valve A position mode valve B position update delay time when: delay time increment fail time	 = PARK ≠ PARK = mode valve low = mode valve low ≥ **KtPSDR_t_ParkServo_EngOff_Lim**	park servo enable ETRS system type is internal ETRS battery voltage for battery voltage time engine mode run hydraulic pressure available is TRUE when: engine speed for engine speed time otherwise hydraulic pressure available is FALSE hydraulic pressure available surge accumulator on/off request engine off diagnostic enabled P187D, P187E Test Fail This Key On	= 1 Boolean = CeTRGR_e_InternalETRS ≥ 9.00 volts ≥ 1.000 seconds = FALSE ≥ 400.0 RPM ≥ **KtTMDC_t_EngOnHydPresThrsh** = FALSE = FALSE = 1 Boolean = FALSE	fail time ≥ **KtPSDR_t_ParkServo_EngOff_Lim** seconds update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			when: (Park Valve Position Sensor A OR Park Valve Position Sensor B) AND (out of park state calculated OR out of park state calculated) update delay time when: delay time increment fail count	 = OUT OF PARK = OUT OF PARK = UNKNOWN = OUT OF PARK ≥ **KtPSDR_t_ParkVlvStkOff_DlyLim**	park servo enable ETRS system type is internal ETRS battery voltage for battery voltage time diagnsotic monitor enable park state transtion is TRUE when: (out of park state calculated OR out of park state calculated) AND P187D, P187E Test Fail This Key On AND ((ETRS command direction AND out of park state) OR (ETRS command direction AND out of park state)) otherwise park state transition is FALSE park servo stuck off availabe is TRUE when: park state transtion ((P17F5, P17F6, P17F7 Fault Active OR P17FA, P17FB, P17FC Fault Active) AND (P187E, P187D Test Fail This Key On)) ((ETRS command direction AND (P182A Fault Active OR P182A Fault Active) AND calculated line pressure))	= 1 Boolean = CeTRGR_e_InternalETRS ≥ 9.00 volts ≥ 1.000 seconds = 1 Boolean = PARK = OUT OF PARK = FALSE = PARK ≠ PARK = PARK ≠ OUT OF PARK = TRUE = FALSE = FALSE = FALSE = PARK = FALSE = TRUE ≥ 1,000.0 kPa	fail count ≥ 2 counts update rate 6.25 milliseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(P18AA Test Fail This Key On P18AC Test Fail This Key On ETRS mode enable valve state) otherwise park servo stuck off availabe is FALSE (mode valve A state attained OR P18AA Test Fail This Key On OR P27EC Test Fail This Key On OR P27EC Fault Pending) AND (mode valve B state attained OR P18AC Test Fail This Key On OR P27F0 Test Fail This Key On OR P27F0 Fault Pending OR ETRS mode enable valve state)	= FALSE = FALSE = ETRS zero limit (hydraulic cicruit exhausted) = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE = TRUE = ETRS zero limit (hydraulic cicruit exhausted)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Inhibit Actuator Control Circuit Low	P18A2	Controller specific circuit diagnoses internal ETRS park solenoid for an ground short or open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit Increment fail time	≥ 200 K Ω impedance between signal and controller ground OR ≤ 0.5 Ω impedance between signal and controller ground	((battery voltage AND battery voltage AND for battery voltage time run crank voltage for run crank voltage time) OR accessory voltage active)) diagnostic monitor enable calibration	≥ 9.00 volts ≤ 32.00 volts ≥ 1.000 seconds ≥ 5.00 volts ≥ 25 milliseconds = TRUE for 12.5 milliseconds = 1 Boolean	fail time ≥ 0.100 seconds out of sample time ≥ 0.166 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Inhibit Actuator Control Circuit High	P18A4	Controller specific circuit diagnoses internal ETRS park solenoid for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage Increment fail time	≤ 0.5 Ω impedance between signal and controller voltage source	((battery voltage AND battery voltage AND for battery voltage time run crank voltage for run crank voltage time) OR accessory voltage active)) diagnostic monitor enable calibration	≥ 9.00 volts ≤ 32.00 volts ≥ 1.000 seconds ≥ 5.00 volts ≥ 25 milliseconds = TRUE for 12.5 milliseconds = 1 Boolean	fail time ≥ 0.100 seconds out of sample time ≥ 0.166 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Park Inhibit Solenoid Stuck Off	P18A8	This diagnostic monitor rationalizes the park inhibit solenoid based on the driver ETRS command direction and mode valve states.	when: P18A8 Test Fail This Key On out of park state mode valve A position mode valve B position update fail time	 = FALSE ≠ OUT OF PARK = mode valve low = mode valve low	park servo enable ETRS system type is internal ETRS battery voltage for battery voltage time ignition inputs power mode hydraulic pressure available = TRUE when: engine speed for engine speed time otherwise hydraulic pressure available = FALSE engine mode run AND engine off diagnostic enable AND [auto stop active OR (auto stop active AND hydraulic pressure available)] (ETRS command direction OR ETRS command direction OR ETRS command direction OR ETRS command direction OR ETRS command direction) AND ETRS range	= 1 Boolean = CeTRGR_e_InternalETRS ≥ 9.00 volts ≥ 1.000 seconds ≠ power mode off ≥ 400.0 RPM ≥ **KtTMDC_t_EngOnHydPresThrsh** = FALSE = 1 Boolean = TRUE = FALSE = FALSE = DRIVE = REVERSE = NEUTRAL LOW = NEUTRAL HIGH = NEUTRAL SHIFT ≠ PARK	fail time ≥ **KtPSDR_t_PISA_EngOff_Lim** update rate 6.25 milliseconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			when: ETRS command direction P18A8 Test Fail This Key On diagnostic park state mode valve A position mode valve B position out of park state update fail time	 = NEUTRAL LOW = FALSE = OUT OF PARK = mode valve low = mode valve low ≠ OUT OF PARK	park servo enable ETRS system type is internal ETRS battery voltage for battery voltage time ignition inputs power mode hydraulic pressure available = TRUE when: engine speed for engine speed time otherwise hydraulic pressure available = FALSE hydraulic pressure available ((out of park state OR out of park state) AND P187D, P187E Test Fail This Key On) ETRS command direction	= 1 Boolean = CeTRGR_e_InternalETRS ≥ 9.00 volts ≥ 1.000 seconds ≠ power mode off ≥ 400.0 RPM ≥ **KtTMDC_t_EngOnHydPresThrsh** = TRUE = PARK = OUT OF PARK = FALSE ≠ PARK	fail time ≥ **KtPSDR_t_PISA_EngOff_Lim** update rate 6.25 milliseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control A Position Sensor/ Switch Circuit Stuck On	P18AA	This diagnostic monitor detects a Mode Valve A Position Sensor State in the "on" or "high" state, which is in error, when hydraulic pressure in the circuit used to move the mode valve is not sufficient to overcome the mode valve return spring force, leaving the mode valve mechanically in the “off” or “low” state.	Mode Valve A Position Sensor State	≠ Mode Valve Low	park diagnostic monitor enable ETRS system configuration is internal ERTS battery voltage batyer voltage time engine run mode hydraulic system pressure available surge accumulator on/off request GF9 engine off diagnsotic enable P18AA Test Fail This Key On Mode Valve A Position Sensor State Mode Valve A delay time	= 1 Boolean = CeTRGR_e_InternalETRS ≥ 9.00 volts ≥ 1.00 seconds = FALSE = FALSE = FALSE = 1 Boolean = FALSE ≠ Mode Valve Low (updates Mode Valve A delay time) ≥ **KtPSDR_t_ModeVlvA_EngOff_Lim**	**KtPSDR_t_ModeVlvA_EngOff_Lim** update rate 6.25 milleseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control A Position Sensor/ Switch Circuit Stuck Off	P18AB	This diagnostic monitor detects a Mode Valve A Position Sensor State in the "off" or "low" state, which is in error, when hydraulic pressure in the circuit used to move the mode valve is sufficient to overcome the mode valve return spring force, leaving the mode valve mechanically in the “on” or “high” state. The diagnostic monitor also executes during transitions of the mode valve to verify Mode Valve A Position Sensor State changes correctly with mode valve state command.	during steady state control of the mode valve when mode valve A fault pending update mode valve A steady state remedial time	= TRUE	park diagnostic monitor enable ETRS system configuration is internal ERTS battery voltage batyer voltage time ignition inputs power mode (engine run mode OR hydraulic system pressure available) engine auto stop active position sensor diagnostic monitor enable ETRS diagnostic range P27EE fault active P27EB fault active P27ED fault active P0968 fault active P0970 fault active P0971 fault active P18AB test fail this key on P18AA test fail this key on P27EC test fail this key on mode valve A position hydraulic system pressure available when then following occur set	= 1 Boolean = CeTRGR_e_InternalETRS ≥ 9.00 volts ≥ 1.00 seconds ≠ power mode off = TRUE = TRUE = FALSE = 1 Boolean = ETRS command direction = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE ≠ **KaPSDR_e_GFX_ModeVlvA_StFnl** = TRUE	mode valve A steady state remedial time ≥ **KtPSDR_t_ModeVlvA_Rmdl_Lim** update rate 6.25 milleseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					initialize mode valve A steady state to TRUE otherwise set initialize mode valve A steady state to FALSE: (ETRS mode enable valve state OR C3 clutch pressure) AND drive oil latch present AND (ETRS command direction OR ETRS command direction) OR ((ETRS command direction OR ETRS command direction OR ETRS command direction OR ETRS command direction) AND C3 clutch pressure)) when initialize mode valve A steady state update mode valve A steady state delay time when initialize mode valve A steady state AND mode valve A steady state delay time update mode valve A steady state fail time	= ETRS zero limit (hydraulic cicruit exhausted) < 195.0 kPa = FALSE = DRIVE = NEUTRAL SHIFT = PARK = REVERSE = NEUTRAL LO = NEUTRAL HI > 25.0 kPa = FALSE = FALSE ≥ **KtPSDR_t_ParkStatDlyLim**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					[when ETRS command direction mode valve A steady state delay time out of park state set mode valve A fault pending = TRUE OR ETRS command direction mode valve A steady state delay time mode valve A steady state fail time out of park state turbine speed set mode valve A fault pending = TRUE OR ETRS command direction mode valve A steady state delay time out of park state set mode valve A fault pending = TRUE OR ETRS command direction mode valve A steady state delay time	 = PARK ≥ **KtPSDR_t_ParkStatDlyLim** ≠ OUT OF PARK = DRIVE ≥ **KtPSDR_t_ParkStatDlyLim** ≥ **KtPSDR_t_ModeVlvA_TurbDlyLim** = OUT OF PARK ≥ 400 RPM = DRIVE ≥ **KtPSDR_t_ParkStatDlyLim** ≠ OUT OF PARK = REVERSE ≥		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					out of park state mode valve A steady state fail time turbine speed mode valve A fault pending = TRUE OR ((ETRS command direction OR ETRS command direction OR ETRS command direction) AND mode valve A steady state delay time) mode valve A fault pending = TRUE]	**KtPSDR_t_ParkStatDlyLim** = OUT OF PARK ≥ **KtPSDR_t_ModeVlvA_TurbDlyLim** ≥ 400 RPM = NEUTRAL HI = NEUTRAL LO = NEUTRAL SHIFT ≥ **KtPSDR_t_ParkStatDlyLim**		
			during steady state control of the mode valve when: mode valve A garage shift delay time increment mode valve A fail count set mode valve A fault pending set mode valve A garage shift delay time = 0.0 AND ETRS command direction OR (ETRS command direction OR	≥ KaPSDR_t_GFX_ModeVlvA_FnlDly[ETRS attained range, ETRS command range] see supporting tables = PARK = DRIVE	park diagnostic monitor enable ETRS system configuration is internal ERTS battery voltage batyer voltage time ignition inputs power mode (engine run mode OR hydraulic system pressure available) engine auto stop active position sensor diagnostic monitor enable	= 1 Boolean = CeTRGR_e_InternalETRS ≥ 9.00 volts ≥ 1.00 seconds ≠ power mode off = TRUE = TRUE = FALSE = 1 Boolean	mode valve A fail count PARK ≥ 2 counts mode valve A fail count OUT OF PARK ≥ 2 counts update rate 6.25 milleseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			ETRS command direction OR ETRS command direction OR ETRS command direction OR ETRS command direction)	= NEUTRAL HI = NEUTRAL LO = NEUTRAL SHIFT = REVERSE	ETRS diagnostic range AND ((range commamnd actuator AND park not available) OR ((range commamnd actuator OR range commamnd actuator OR range commamnd actuator OR range commamnd actuator) AND out of park not available)) mode valve stuck on test P18AF test fail this key on P27EE fault active P27EB fault active P27ED fault active P0968 fault active P0970 fault active P0971 fault active P18AB test fail this key on P18AA test fail this key on P27EC test fail this key on mode valve A transition AND (mode valve B transition OR mode valve B state attained OR P27F0 fault active OR P18AD fault pending) mode valve A position	≠ ETRS command direction = PARK = FALSE = DRIVE = NEUTRAL = MANUAL = REVERSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = TRUE = TRUE = TRUE = TRUE = TRUE **≠ KaPSDR_e_GFX_ModeVlvA_StFnl**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					C3 clutch pressure when all of the above condtions are met: update mode valve A garage shift delay time AND update mode valve A fail count	< 195.0 kPa		
			during the actuation of the mode valve the transitional fail counter will increment when any one the following transitions occur but the sensor does not change state mode valve A transition fault pending set = TRUE when: ETRS diagnostic command direction (out of park state OR ETRS mode enable valve state) mode valve A garage shift fail time mode valve A transition fail count (mode valve A fault pending = TRUE) OR	 = PARK ≠ OUT OF PARK = ETRS zero limit (hydraulic cicruit exhausted) ≥ **KtPSDR_t_ModeVlvA_GS_TurbDlyLim** > 0 counts	park diagnostic monitor enable ETRS system configuration is internal ERTS battery voltage batyer voltage time ignition inputs power mode (engine run mode OR hydraulic system pressure available) engine auto stop active position sensor diagnostic monitor enable ETRS diagnostic range AND ((range commamnd actuator AND park not available) OR ((range commamnd actuator OR range commamnd actuator OR range commamnd actuator OR	= 1 Boolean = CeTRGR_e_InternalETRS ≥ 9.00 volts ≥ 1.00 seconds ≠ power mode off = TRUE = TRUE = FALSE = 1 Boolean ≠ ETRS command direction = PARK = FALSE = DRIVE = NEUTRAL SHIFT = MANUAL	mode valve A transition fail count PARK ≥ 2 counts mode valve A transition fail count OUT OF PARK ≥ 2 counts update rate 6.25 milleseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			ETRS diagnostic command direction	= DRIVE	range commamnd actuator) AND	= REVERSE		
			ETRS diagnostic range out of park state	= PARK ≠ OUT OF PARK	out of park not available))	= FALSE		
			mode valve A garage shift fail time	≥ **KtPSDR_t_ModeVlvA_GS_TurbDlyLim**	mode valve stuck on test P18AF test fail this key on	= FALSE = FALSE		
			mode valve A transition fail count (mode valve A fault pending = TRUE)	> 0 counts	P27EE fault active P27EB fault active P27ED fault active P0968 fault active P0970 fault active P0971 fault active	= FALSE = FALSE = FALSE = FALSE = FALSE = FALSE		
			OR		P18AB test fail this key on P18AA test fail this key on P27EC test fail this key on	= FALSE = FALSE = FALSE		
			ETRS diagnostic command direction	= DRIVE	hydraulic system pressure available AND	= TRUE		
			ETRS diagnostic range mode valve A garage shift fail time	≠ PARK ≥ **KtPSDR_t_ModeVlvA_GS_TurbDlyLim**	ETRS command direction AND mode valve A state attained AND	≠ ETRS command direction previous = FALSE		
			mode valve A transition fail count (mode valve A fault pending = TRUE)	> 0 counts	mode valve A transition AND ((ETRS diagnostic range OR mode valve B transition OR mode valve B attained OR ETRS mode enable valve state) AND	= FALSE = NEUTRAL SHIFT = TRUE = TRUE = ETRS zero limit (hydraulic cicruit exhausted)		
			OR					
			(ETRS diagnostic command direction OR ETRS diagnostic command direction OR ETRS diagnostic command direction OR ETRS diagnostic) mode valve A garage shift fail time	= REVERSE = NEUTRAL LO = NEUTRAL HI = NEUTRAL SHIFT ≥ **KtPSDR_t_ModeVlvA_GS_TurbDlyLim**	ETRS diagnostic range) ((mode valve A transition AND mode valve A transition delay time) OR	= DRIVE = FALSE ≥ KaPSDR_t_GFX_ModeVlvA_TrnstnDly[ETRS diagnostic range, ETRS command direction]		
			mode valve A transition					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			fail count (mode valve A fault pending = TRUE) when: mode valve A transition fault pending increment: mode valve A transition fail count AND set mode valve A transition fault pending = FALSE set mode valve A garage shift fail time = 0.0	> 0 counts = TRUE	mode valve A garage shift fail time) {}{}{mode valve A garage shift fail time increments when P18AB fault pending AND mode valve A transitional fail count AND intialize mode valve A transition}	see supporting tables > 0 seconds = TRUE = 0 counts = FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control B Position Sensor/ Switch Circuit Stuck On	P18AC	This diagnostic monitor detects a Mode Valve B Position Sensor State in the "on" or "high" state, which is in error, when hydraulic pressure in the circuit used to move the mode valve is not sufficient to overcome the mode valve return spring force, leaving the mode valve mechanically in the “off” or “low” state.	Mode Valve B Position Sensor State	≠ Mode Valve Low	park diagnostic monitor enable ETRS system configuration is internal ERTS battery voltage batyer voltage time engine run mode hydraulic system pressure available surge accumulator on/off request GF9 engine off diagnsotic enable P18A Test Fail This Key On Mode Valve A Position Sensor State Mode Valve A delay time	= 1 Boolean = CeTRGR_e_InternalETRS ≥ 9.00 volts ≥ 1.00 seconds = FALSE = FALSE = FALSE = 1 Boolean = FALSE ≠ Mode Valve Low (updates Mode Valve B delay time) ≥ **KtPSDR_t_ModeVlvB_EngOff_Lim**	**KtPSDR_t_ModeVlvB_EngOff_Lim** update rate 6.25 milleseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control B Position Sensor/ Switch Circuit Stuck Off	P18AD	This diagnostic monitor detects a Mode Valve B Position Sensor State in the "off" or "low" state, which is in error, when hydraulic pressure in the circuit used to move the mode valve is sufficient to overcome the mode valve return spring force, leaving the mode valve mechanically in the “on” or “high” state. The diagnostic monitor also executes during transitions of the mode valve to verify Mode Valve B Position Sensor State changes correctly with mode valve state command.	during steady state control of the mode valve when mode valve B fault pending update mode valve B steady state remedial time	= TRUE	park diagnostic monitor enable ETRS system configuration is internal ERTS battery voltage batyer voltage time ignition inputs power mode (engine run mode OR hydraulic system pressure available) engine auto stop active position sensor diagnostic monitor enable ETRS diagnostic range P27F2 fault active P27EF fault active P27F1 fault active P2718 fault active P2720 fault active P2721 fault active P18AD test fail this key on P18AC test fail this key on P27F0 test fail this key on mode valve B position hydraulic system pressure available when then following occur set	= 1 Boolean = CeTRGR_e_InternalETRS ≥ 9.00 volts ≥ 1.00 seconds ≠ power mode off = TRUE = TRUE = FALSE = 1 Boolean = ETRS command direction = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE ≠ **KaPSDR_e_GFX_ModeVlvB_StFnl** = TRUE	mode valve B steady state remedial time ≥ **KtPSDR_t_ModeVlvA_Rmdl_Lim** update rate 6.25 milleseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					initialize mode valve B steady state to TRUE otherwise set initialize mode valve B steady state to FALSE: ((ETRS mode enable valve state OR C4 clutch pressure) AND (ETRS command direction OR ETRS command direction OR ETRS command direction)) OR ((ETRS command direction OR ETRS command direction OR ETRS command direction) AND C4 clutch pressure) when initialize mode valve B steady state update mode valve B steady state delay time when initialize mode valve B steady state AND mode valve B steady state delay time update mode valve B steady state fail time [	= ETRS zero limit (hydraulic cicruit exhausted) < 295.0 kPa = REVERSE = NEUTRAL HI = NEUTRAL SHIFT = DRIVE = PARK = NEUTRAL LO > 25.0 kPa = FALSE = FALSE ≥ **KtPSDR_t_ParkStatDlyLim**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					when ETRS command direction mode valve B steady state delay time out of park state set mode valve B fault pending = TRUE OR ETRS command direction mode valve B steady state delay time mode valve B steady state fail time ((out of park state AND turbine speed) OR out of park state)) set mode valve B fault pending = TRUE OR ETRS command direction mode valve B steady state delay time mode valve B steady state fail time ((out of park state AND turbine speed) OR out of park state) set mode valve B fault pending = TRUE	= PARK ≥ **KtPSDR_t_ParkStatDlyLim** ≠ PARK = REVERSE ≥ **KtPSDR_t_ParkStatDlyLim** ≥ **KtPSDR_t_ModeVlvB_TurbDlyLim** = OUT OF PARK > 400 RPM ≠ OUT OF PARK = DRIVE ≥ **KtPSDR_t_ParkStatDlyLim** ≥ **KtPSDR_t_ModeVlvB_TurbDlyLim** = OUT OF PARK > 400 RPM ≠ OUT OF PARK		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR ETRS command direction mode valve B steady state delay time out of park state set mode valve B fault pending = TRUE OR ((ETRS command direction OR ETRS command direction) AND mode valve A steady state delay time) mode valve B fault pending = TRUE]	 = NEUTRAL LO ≥ **KtPSDR_t_ParkStatDlyLim** = OUT OF PARK = NEUTRAL HI = NEUTRAL SHIFT ≥ **KtPSDR_t_ParkStatDlyLim**		
			during steady state control of the mode valve when: mode valve B garage shift delay time increment mode valve B fail count set mode valve B fault pending set mode valve B garage shift delay time = 0.0 AND ETRS command direction OR (ETRS command	≥ KaPSDR_t_GFX_ModeVlvB_FnlDly[ETRS attained range, ETRS command range] see supporting tables = PARK = DRIVE	park diagnostic monitor enable ETRS system configuration is internal ERTS battery voltage batyer voltage time ignition inputs power mode (engine run mode OR hydraulic system pressure available) engine auto stop active position sensor diagnostic	= 1 Boolean = CeTRGR_e_InternalETRS ≥ 9.00 volts ≥ 1.00 seconds ≠ power mode off = TRUE = TRUE = FALSE = 1 Boolean	mode valve B fail count PARK ≥ 2 counts mode valve B fail count OUT OF PARK ≥ 2 counts update rate 6.25 milleseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			direction OR ETRS command direction OR ETRS command direction OR ETRS command direction OR ETRS command direction)	 = NEUTRAL HI = NEUTRAL LO = NEUTRAL SHIFT = REVERSE	monitor enable ETRS diagnostic range AND ((range commamnd actuator AND park not available) OR ((range commamnd actuator OR range commamnd actuator OR range commamnd actuator OR range commamnd actuator) AND out of park not available)) mode valve stuck on test P18AF test fail this key on P27F2 fault active P27EF fault active P27F1 fault active P2718 fault active P2720 fault active P2721 fault active P18AD test fail this key on P18AC test fail this key on P27F0 test fail this key on mode valve B transition AND (mode valve B transition OR mode valve B state attained OR P27EC fault active OR P18AB fault pending) mode valve B position	 ≠ ETRS command direction = PARK = FALSE = DRIVE = NEUTRAL = MANUAL = REVERSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = TRUE = TRUE = TRUE = TRUE = TRUE **≠ KaPSDR_e_GFX_ModeVlvB_StFnl**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					C4 clutch pressure when all of the above condtions are met: update mode valve B garage shift delay time AND update mode valve A fail count	< 295.0 kPa		
			during the actuation of the mode valve the transitional fail counter will increment when any one the following transitions occur but the sensor does not change state mode valve B transition fault pending set = TRUE when: ETRS diagnostic command direction (out of park state OR ETRS mode enable valve state) mode valve B garage shift fail time OR mode valve B transition fail count (mode valve B fault pending = TRUE) OR	 = PARK ≠ OUT OF PARK = ETRS zero limit (hydraulic cicruit exhausted) ≥ **KtPSDR_t_ModeVlvB_TurbDlyLim** > 0 counts	park diagnostic monitor enable ETRS system configuration is internal ERTS battery voltage batyer voltage time ignition inputs power mode (engine run mode OR hydraulic system pressure available) engine auto stop active position sensor diagnostic monitor enable ETRS diagnostic range AND ((range commamnd actuator AND park not available) OR ((range commamnd actuator OR range commamnd actuator OR range commamnd	= 1 Boolean = CeTRGR_e_InternalETRS ≥ 9.00 volts ≥ 1.00 seconds ≠ power mode off = TRUE = TRUE = FALSE = 1 Boolean ≠ ETRS command direction = PARK = FALSE = DRIVE = NEUTRAL = MANUAL	mode valve A transition fail count PARK ≥ 2 counts mode valve A transition fail count OUT OF PARK ≥ 2 counts update rate 6.25 milleseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					actuator OR			
			ETRS diagnostic command direction	= DRIVE	range commamnd actuator) AND	= REVERSE		
			mode valve B garage shift fail time OR	≥ **KtPSDR_t_ModeVlvB_TurbDlyLim**	out of park not available))	= FALSE		
			mode valve B transition fail count (mode valve B fault pending = TRUE)	> 0 counts	ETRS command direction prevoius	≠ ETRS command direction		
					mode valve stuck on test	= FALSE		
					P18AF test fail this key on	= FALSE		
			OR		P27F2 fault active	= FALSE		
					P27EF fault active	= FALSE		
					P27F1 fault active	= FALSE		
			(ETRS diagnostic command direction OR	= REVERSE	P2718 fault active	= FALSE		
			ETRS diagnostic command direction OR	= NUETRAL LO	P2720 fault active	= FALSE		
			ETRS diagnostic command direction OR	= NEUTRAL HI	P2721 fault active	= FALSE		
			ETRS diagnostic command direction)	= PARK	P18AD test fail this key on	= FALSE		
			ETRS diagnostic range out of park status	≠ OUT OF PARK	P18AC test fail this key on	= FALSE		
			(mode valve B garage shift fail time OR	≥ **KtPSDR_t_ModeVlvB_TurbDlyLim**	P27F0 test fail this key on	= FALSE		
					hydraulic system pressure available AND	= TRUE		
			mode valve B transition fail count) (mode valve B fault pending = TRUE)	> 0 counts	ETRS command direction AND	≠ ETRS command direction previous		
					mode valve B state attained AND	= FALSE		
					mode valve B transition AND	= FALSE		
			OR		(ETRS diagnostic range OR	= NEUTRAL SHIFT		
					mode valve A transition OR	= TRUE		
			(ETRS diagnostic command direction OR	= REVERSE	mode valve A attained)	= TRUE		
			ETRS diagnostic command direction OR	= NEUTRAL LO	((mode valve B transition AND	= FALSE		
			ETRS diagnostic command direction OR	= NEUTRAL HI	mode valve B transition delay time)	≥ KaPSDR_t_GFX_ModeVlvB_TrnstnDly[ETRS diagnostic range, ETRS command direction]		
			ETRS diagnostic command direction)	= NEUTRAL SHIFT	OR			
			ETRS diagnostic range	≠ PARK				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			(mode valve B garage shift fail time OR mode valve B transition fail count) (mode valve B fault pending = TRUE) when: mode valve B transition fault pending increment: mode valve B transition fail count AND set mode valve B transition fault pending = FALSE set mode valve B garage shift fail time = 0.0	≥ **KtPSDR_t_ModeVlvB_TurbDlyLim** > 0 counts = TRUE	mode valve B garage shift fail time) {}{}{mode valve B garage shift fail time increments when P18AD fault pending AND mode valve B transitional fail count AND intialize mode valve B transition}	see supporting tables > 0 seconds = TRUE = 0 counts = FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control Enable Valve Stuck On	P18AE	This diagnostic monitor detects the Mode Valve A Solenoid stuck in the hydraulic on state.	when mode valve A delay time increment mode valve A fail count	≥ **KtPSDR_t_ModeEnblTestLim**	park diagnostic monitor enable ETRS system configuration is internal ERTS battery voltage batyer voltage time ignition inputs power mode (engine run mode OR hydraulic system pressure available) engine auto stop active mode valve performance diagnostic monitor enable ETRS diagnostic command direction ETRS diagnostic range mode valve diagnostic enable transmssion fluid tempertaure transmssion fluid tempertaure mode valve A position when all the above criteria are met: increment mode valve A delay time	= 1 Boolean = CeTRGR_e_InternalETRS ≥ 9.00 volts ≥ 1.00 seconds ≠ power mode off = TRUE = TRUE = FALSE = 1 Boolean = PARK = DRIVE = 1 Boolean ≥ 0.00 °C ≤ 256.0 °C ≠ mode valve low	mode valve A fail count ≥ 2 counts update rate 6.25 milleseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Valve Position Sensor/ Switch "A" Performance	P18E7	This diagnostic monitor detects park valve position sensor A performance faults, the sensor is indicating not park when command is park, or sensor does not transition when park is not commanded.	when: park valve position sensor A delay time increment park valve position sensor A fail count	≥ 0.2500 seconds	PARK diagnostic monitor enable ETRS system configuration is internal ERTS battery voltage batyer voltage time ignition inputs power mode (engine run mode OR hydraulic system pressure available) engine auto stop active park valve position sensor performance diagnostic monitor enable park state transtion P17E7 fault active P17F5 fault active P17F6 fault active P17FC fault active P17FA fault active P17FB fault active (ETRS diagnostic command direction diagnostic park state) OR ((ETRS diagnostic command direction OR ETRS diagnostic command direction OR ETRS diagnostic command direction OR ETRS diagnostic command direction OR	= 1 Boolean = CeTRGR_e_InternalETRS ≥ 9.00 volts ≥ 1.00 seconds ≠ power mode off = TRUE = TRUE = FALSE = 1 Boolean = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = PARK = PARK = DRIVE = REVERSE = NEUTRAL LO = NEUTRAL HI	park valve position sensor A fail count ≥ 2 counts update rate 6.25 milleseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					ETRS diagnostic command direction) AND diagnostic park state)) P18E7 test fail this key on P18E7 fault pending park state sensor A when the above condtions are met: park valve position sensor A delay time	= NEUTRAL SHIFT = OUT OF PARK = FALSE = FALSE ≠ PARK		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Park Valve Position Sensor/ Switch "B" Performance	P18E8	This diagnostic monitor detects park valve position sensor B performance faults, the sensor is indicating not park when command is park, or sensor does not transition when park is not commanded.	when: park valve position sensor B delay time increment park valve position sensor B fail count	≥ 0.2500 seconds	PARK diagnostic monitor enable ETRS system configuration is internal ERTS battery voltage batyer voltage time ignition inputs power mode (engine run mode OR hydraulic system pressure available) engine auto stop active park valve position sensor performance diagnostic monitor enable park state transtion P17E7 fault active P17F5 fault active P17F6 fault active P17FC fault active P17FA fault active P17FB fault active (ETRS diagnostic command direction diagnostic park state) OR ((ETRS diagnostic command direction OR ETRS diagnostic command direction OR ETRS diagnostic command direction OR ETRS diagnostic command direction OR	= 1 Boolean = CeTRGR_e_InternalETRS ≥ 9.00 volts ≥ 1.00 seconds ≠ power mode off = TRUE = TRUE = FALSE = 1 Boolean = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = PARK = PARK = DRIVE = REVERSE = NEUTRAL LO = NEUTRAL HI	park valve position sensor B fail count ≥ 2 counts update rate 6.25 milleseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					ETRS diagnostic command direction) AND diagnostic park state)) P18E7 test fail this key on P18E7 fault pending park state sensor B when the above condtions are met: park valve position sensor B delay time	= NEUTRAL SHIFT = OUT OF PARK = FALSE = FALSE ≠ PARK		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Switch Run/ Start Position Circuit Low	P2534	Detects a low ignition switch run/start position curcuit. This diagnostic reports the DTC when this circut is low. Monitoring occurs when the ECM run/ crank is active.	Ignition switch Run/Start position circuit low	Run / Crank = FALSE	Ignition switch Run/Start position circuit low diag enable and Run / Crank active ECM	= 1.00 = TRUE	280 failures out of 280 samples 25 ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Switch Run/ Start Position Circuit High	P2535	Detects a high ignition switch run/start position curcuit. This diagnostic reports the DTC when this circut is high. Monitoring occurs when the ECM run/ crank is NOT active.	Ignition switch Run/Start position circuit high	Run / Crank = TRUE	Ignition switch Run/Start position circuit low diag enable and Run / Crank active ECM	= 1.00 = FALSE	280 failures out of 280 samples 25 ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Switch Accessory Position Circuit Low	P2537	Detects a low ignition switch accessory position curcuit. This diagnostic reports the DTC when this circut is low. Monitoring occurs when the propulsion system has been active for a calibrated duration.	The ECM detects that the state of the accessory line is low when it should be high. The diagnostic is evaluated when Propulsion System Active time is > 32.0 seconds. Diagnostic fails when pass counts are	< 1 counts.			12.5 ms / sample Once per trip	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Actuator Supply Voltage B Circuit Low	P2670	Controller specific output driver circuit diagnoses the high sided driver circuit for a short to ground failure 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 Ω impedance between signal and controller ground	diagnostic monitor enable high side drive 2 ON P2670 fault active P2670 test fail this key on	= 1 Boolean = TRUE = FALSE = FALSE	fail count ≥ 6 counts out of sample count ≥ 2,400 counts 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid D Stuck Off	P2714	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C1 clutch slip speed, update fail time 6.25 milliscond update	≥ 200.0 RPM			fail time ≥ 3.00 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update	Type A, 1 Trips
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					use run crank voltage calibration is FALSE	= 0 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 0 Boolean		
					AND			
					run crank voltage	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	
					TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure			

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			available: engine speed enable C4 clutch slip speed fail compare when: diagnostic clutch test C4 ((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 FASLE (startle mitigation) clutch steady state adaptive active transmission output shaft speed C4 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation accelerator pedal position engine speed diagnostic clutch test C4 set to HOLDING CLUTCH when: clutch solenoid test state	≥ 400.0 RPM = HOLDING CLUTCH = FALSE = TRUE ≠ initial startle mitigation gear = FALSE = 0 Boolean = FALSE ≥ 89.0 RPM = TRUE ≥ 2.00 % ≥ 1,500.0 RPM = NEUTRAL TEST	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

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 a clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to the GF9 C4 C4, or, GR10 C4 C123467810R, clutch pressure control solenoid.			((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) C4 clutch pressured map clutch solenoid test state set to NEUTRAL TEST when: test trigger initialize range shift complete time, when range shift state, range shift complete time must time down to zero when range shift complete test trigger set to TRUE: enable forward gear AND direction request OR enable reverse gear AND direction request current loop test trigger clutch control solenoid test state range shift state NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on	= FALSE = TRUE ≠ initial startle mitigation gear = mapped to line pressure, C4 clutch pressure has transtioned from off-applying-applied = TRUE ≠ range shift completed = 1 Boolean = forward gear = 0 Boolean = reverse gear = FALSE ≠ NEUTRAL TEST = range shift completed	initialize range shift complete time = 1.000 seconds, range shift complete time must time down to zero when range shift complete	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			
					DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		
					DTCs not test fail this key on	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821		
					DTCs not fault active	AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

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 not power down shift, C4 clutch slip speed update fail time 6.25 milliscond update	< 50.0 RPM < 50.0 RPM	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	= 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean	shift type is power down shift, fail time ≥ 0.800 seconds, OR shift type is not power down shift, fail time ≥ 0.150 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 a clutch pressure control solenoid stuck			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: engine speed transmission output shaft speed set solenoid stuck on test trigger to TRUE when: clutch pressure control solenoid stuck off stuck intrusive shift request startle mitigation active (see startle mitigation active NOTE below) clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) initialize active clutch controller (clutch control processing in process of sequencing clutches on	= TRUE Boolean = FALSE Boolean = FALSE Boolean ≥ 400.0 RPM ≥ 89.0 RPM = FALSE = FALSE ≠ TIE UP TEST TEST STATE ≠ TIE UP TEST HOLD = TRUE	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		on test is disabled. This diagnostic monitor is relative to the GF9 C4 C4, or, GR10 C4 C123467810R, clutch pressure control solenoid.			and off for auto trans shift) (shift type enable for staged steady state shift - shift in process when new shift type occurs - interrupted shift OR shift type enable for garage shift OR shift type enable for negative torque up shift OR shift type enable for open throttle power on up shift OR shift type enable for closed throttle down shift OR shift type enable for open throttle power down shift OR shift type enable for closed throttle lift foot up shift) OR clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) transition clutch controller active clutch controller (staged steady sate shift - shift not in process, no new shift type occuring, no interrupted shift) set clutch control solenoid test state to TIE UP TEST	= 0 Boolean = 0 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = TIE UP TEST TEST STATE = TIE UP TEST HOLD = TRUE ≠ staged steady state		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					TEST STATE when: solenoid stuck on test trigger current loop clutch control solenoid test state OR current loop clutch control solenoid test state (see clutch control solenoid test state NOTE below) range shift state solenoid stuck on test trigger additional off going clutch occured (clutch control solenoid test state OR clutch control solenoid test state) (see clutch control solenoid test state NOTE below) diagnostic clutch test (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 pressure	= TRUE = TEST WAITING = TIE UP TEST HOLD ≠ range shift complete = TRUE = TRUE = TIE UP TEST TEST STATE = TIE UP TEST HOLD = OFF GOING CLUTCH TEST = TRUE = 1 Boolean ≤ 350.0 kPa	for C4 off going clutch pressure time ≥ **P2715 C4 clutch exhaust delay time closed throttle lift foot up shift** OR	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							P2715 C4 clutch exhaust delay time open throttle power on up shift OR **P2715 C4 clutch exhaust delay time garage shift** OR **P2715 C4 clutch exhaust delay time closed throttle down shift** OR **P2715 C4 clutch exhaust delay time negative torque up shift** OR **P2715 C4 clutch exhaust delay time open throttle power down shift** see supporting tables	
					engine torque primary on coming clutch active primary on coming control state closed throttle lift foot up shift primary on coming clutch pressure OR open throttle power on up shift primary on coming clutch pressure OR garage shift primary on	≥ 8,191.8 Nm = TRUE ≠ clutch fill phase ≥ 850.0 kPa ≥ 850.0 kPA ≥ 750.0 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					coming clutch pressure OR negative torque up shift primary on coming clutch pressure OR open throttle power down shift primary on coming clutch pressure OR closed throttle down shift primary on coming clutch pressure C4 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an automatic transmission shift due to two conditions: Current value of clutch control solenoid test state is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND	 ≥ 850.0 kPa ≥ 850.0 kPa ≥ 850.0 kPa = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed ≥ clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift state = range shift complete. NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821. DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		

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 DTCs not fault active	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821 AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

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 or 10 speed C123467810R 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 Increment fail time	≥ 200 K Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid D Control Circuit Low	P2720	Controller specific circuit diagnoses 9 speed C4 or 10 speed C123467810R 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ s 0.500 econds	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 or 10 speed C123467810R 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller voltage source	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid E Stuck Off	P2723	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C1 clutch slip speed, update fail time 6.25 milliscond update	≥ 200.0 RPM	use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled service fast learn active service solenoid cleaning procedure active hydraulic pressure	= 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean	fail time ≥ 3.00 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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			available: engine speed enable C5 clutch slip speed fail compare when: diagnostic clutch test C5 ((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 FASLE (startle mitigation) clutch steady state adaptive active transmission output shaft speed C5 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation accelerator pedal position engine speed diagnostic clutch test C5 set to HOLDING CLUTCH when: clutch solenoid test state	≥ 400.0 RPM = HOLDING CLUTCH = FALSE = TRUE ≠ initial startle mitigation gear = FALSE = 0 Boolean = FALSE ≥ 89.0 RPM = TRUE ≥ 2.00 % ≥ 1,500.0 RPM = NEUTRAL TEST	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

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 a clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to the GF9 C5 C57R, or, GR10 C5 C1356789, clutch pressure control solenoid.			((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) C5 clutch pressured map clutch solenoid test state set to NEUTRAL TEST when: test trigger initialize range shift complete time, when range shift state, range shift complete time must time down to zero when range shift complete test trigger set to TRUE: enable forward gear AND direction request OR enable reverse gear AND direction request current loop test trigger clutch control solenoid test state range shift state NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on	= FALSE = TRUE ≠ initial startle mitigation gear = mapped to line pressure, C5 clutch pressure has transtioned from off-applying-applied = TRUE ≠ range shift completed = 1 Boolean = forward gear = 0 Boolean = reverse gear = FALSE ≠ NEUTRAL TEST = range shift completed	 initialize range shift complete time = 1.000 seconds, range shift complete time must time down to zero when range shift complete	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			
					DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		
					DTCs not test fail this key on	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821		
					DTCs not fault active	AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

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 not power down shift, C5 clutch slip speed update fail time 6.25 milliscond update	< 50.0 RPM < 50.0 RPM	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	= 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean	shift type is power down shift, fail time ≥ 0.400 seconds, OR shift type is not power down shift, fail time ≥ 0.150 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 a clutch pressure control solenoid stuck			TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure available: engine speed	≥ 400.0 RPM	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	
					transmission output shaft speed	≥ 89.0 RPM		
					set solenoid stuck on test trigger to TRUE when:			
					clutch pressure control solenoid stuck off stuck intrusive shift request	= FALSE		
					startle mitigation active (see startle mitigation active NOTE below)	= FALSE		
					clutch control solenoid test state	≠ TIE UP TEST TEST STATE		
					clutch control solenoid test state (see clutch control solenoid test state NOTE below)	≠ TIE UP TEST HOLD		
					initialize active clutch controller (clutch control processing in process of sequencing clutches on	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		on test is disabled. This diagnostic monitor is relative to the GF9 C5 C57R, or, GR10 C5 C1356789, clutch pressure control solenoid.			and off for auto trans shift) (shift type enable for staged steady state shift - shift in process when new shift type occurs - interrupted shift OR shift type enable for garage shift OR shift type enable for negative torque up shift OR shift type enable for open throttle power on up shift OR shift type enable for closed throttle down shift OR shift type enable for open throttle power down shift OR shift type enable for closed throttle lift foot up shift) OR clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) transition clutch controller active clutch controller (staged steady sate shift - shift not in process, no new shift type occuring, no interrupted shift) set clutch control solenoid test state to TIE UP TEST	= 0 Boolean = 0 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = TIE UP TEST TEST STATE = TIE UP TEST HOLD = TRUE ≠ staged steady state		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					TEST STATE when: solenoid stuck on test trigger current loop clutch control solenoid test state OR current loop clutch control solenoid test state (see clutch control solenoid test state NOTE below) range shift state solenoid stuck on test trigger additional off going clutch occured (clutch control solenoid test state OR clutch control solenoid test state) (see clutch control solenoid test state NOTE below) diagnostic clutch test (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 pressure	= TRUE = TEST WAITING = TIE UP TEST HOLD ≠ range shift complete = TRUE = TRUE = TIE UP TEST TEST STATE = TIE UP TEST HOLD = OFF GOING CLUTCH TEST = TRUE = 1 Boolean ≤ 350.0 kPa	for C5 off going clutch pressure time ≥ **P2724 C5 clutch exhaust delay time closed throttle lift foot up shift** OR	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							P2724 C5 clutch exhaust delay time open throttle power on up shift OR **P2724 C5 clutch exhaust delay time garage shift** OR **P2724 C5 clutch exhaust delay time closed throttle down shift** OR **P2724 C5 clutch exhaust delay time negative torque up shift** OR **P2724 C5 clutch exhaust delay time open throttle power down shift** see supporting tables	
					engine torque primary on coming clutch active primary on coming control state closed throttle lift foot up shift primary on coming clutch pressure OR open throttle power on up shift primary on coming clutch pressure OR garage shift primary on	≥ 8,191.8 Nm = TRUE ≠ clutch fill phase ≥ 703.0 kPa ≥ 703.0 kPA ≥ 750.0 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					coming clutch pressure OR negative torque up shift primary on coming clutch pressure OR open throttle power down shift primary on coming clutch pressure OR closed throttle down shift primary on coming clutch pressure C5 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an automatic transmission shift due to two conditions: Current value of clutch control solenoid test state is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND	 ≥ 703.0 kPa ≥ 703.0 kPa ≥ 703.0 kPa = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed ≥ clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift state = range shift complete. NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821. DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		

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 DTCs not fault active	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821 AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

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 or 10 speed C1356789 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 Increment fail time	≥ 200 K Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid E Control Circuit Low	P2729	Controller specific circuit diagnoses 9 speed C57R or 10 speed C1356789 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid E Control Circuit High	P2730	Controller specific circuit diagnoses 9 speed C57R or 10 speed C1356789 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller voltage source	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid F Stuck On	P2731	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring	shift type is power down shift, C6 clutch slip speed OR shift type is not power down shift, C6 clutch slip speed GF9 specific: Selectable One Way Clutch (SOWC) CBR1 is multiplexed to C6 clutch pressure AND (attained gear OR attained gear) update fail time 6.25 milliscond update	< 50.0 RPM < 50.0 RPM = 1st lock = first free wheel	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	= 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean	shift type is power down shift, fail time ≥ 0.800 seconds, OR shift type is not power down shift, fail time ≥ 0.150 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 a clutch pressure control solenoid stuck			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: engine speed transmission output shaft speed set solenoid stuck on test trigger to TRUE when: clutch pressure control solenoid stuck off stuck intrusive shift request startle mitigation active (see startle mitigation active NOTE below) clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) initialize active clutch controller (clutch control processing in process of sequencing clutches on	= TRUE Boolean = FALSE Boolean = FALSE Boolean ≥ 400.0 RPM ≥ 89.0 RPM = FALSE = FALSE ≠ TIE UP TEST TEST STATE ≠ TIE UP TEST HOLD = TRUE	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		on test is disabled. This diagnostic monitor is relative to the GF9 C6 C6789/Selectable One Way Clutch (SOWC) CBR1, or, GR10 C6 C45678910R, clutch pressure control solenoid.			and off for auto trans shift) (shift type enable for staged steady state shift - shift in process when new shift type occurs - interrupted shift OR shift type enable for garage shift OR shift type enable for negative torque up shift OR shift type enable for open throttle power on up shift OR shift type enable for closed throttle down shift OR shift type enable for open throttle power down shift OR shift type enable for closed throttle lift foot up shift) OR clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) transition clutch controller active clutch controller (staged steady sate shift - shift not in process, no new shift type occuring, no interrupted shift) set clutch control solenoid test state to TIE UP TEST	= 0 Boolean = 0 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = TIE UP TEST TEST STATE = TIE UP TEST HOLD = TRUE ≠ staged steady state		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					TEST STATE when: solenoid stuck on test trigger current loop clutch control solenoid test state OR current loop clutch control solenoid test state (see clutch control solenoid test state NOTE below) range shift state solenoid stuck on test trigger additional off going clutch occured (clutch control solenoid test state OR clutch control solenoid test state) (see clutch control solenoid test state NOTE below) diagnostic clutch test (C6 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable) OR C6 off going clutch pressure	= TRUE = TEST WAITING = TIE UP TEST HOLD ≠ range shift complete = TRUE = TRUE = TIE UP TEST TEST STATE = TIE UP TEST HOLD = OFF GOING CLUTCH TEST = TRUE = 1 Boolean ≤ 350.0 kPa	for C6 off going clutch pressure time ≥ **P2733 C6 clutch exhaust delay time closed throttle lift foot up shift** OR	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							P2733 C6 clutch exhaust delay time open throttle power on up shift OR **P2733 C6 clutch exhaust delay time garage shift** OR **P2733 C6 clutch exhaust delay time closed throttle down shift** OR **P2733 C6 clutch exhaust delay time negative torque up shift** OR **P2733 C6 clutch exhaust delay time open throttle power down shift** see supporting tables	
					engine torque primary on coming clutch active primary on coming control state closed throttle lift foot up shift primary on coming clutch pressure OR open throttle power on up shift primary on coming clutch pressure OR garage shift primary on	≥ 8,191.8 Nm = TRUE ≠ clutch fill phase ≥ 655.0 kPa ≥ 655.0 kPA ≥ 750.0 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					coming clutch pressure OR negative torque up shift primary on coming clutch pressure OR open throttle power down shift primary on coming clutch pressure OR closed throttle down shift primary on coming clutch pressure C6 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an automatic transmission shift due to two conditions: Current value of clutch control solenoid test state is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND	 ≥ 655.0 kPa ≥ 655.0 kPa ≥ 655.0 kPa = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed ≥ clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift state = range shift complete. NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821. DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		

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 DTCs not fault active	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821 AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid F Stuck Off	P2732	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C1 clutch slip speed, update fail time 6.25 milliscond update	≥ 200.0 RPM			fail time ≥ 3.00 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update	Type A, 1 Trips
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					use run crank voltage calibration is FALSE	= 0 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 0 Boolean		
					AND			
					run crank voltage	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	
					TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure			

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			available: engine speed enable C6 clutch slip speed fail compare when: diagnostic clutch test C6 ((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 FASLE (startle mitigation) clutch steady state adaptive active transmission output shaft speed C6 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation accelerator pedal position engine speed diagnostic clutch test C6 set to HOLDING CLUTCH when: clutch solenoid test state	≥ 400.0 RPM = HOLDING CLUTCH = FALSE = TRUE ≠ initial startle mitigation gear = FALSE = 0 Boolean = FALSE ≥ 89.0 RPM = TRUE ≥ 2.00 % ≥ 1,500.0 RPM = NEUTRAL TEST	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

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 a clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to the GF9 C6 C6789/Selectable One Way Clutch (SOWC) CBR1, or, GR10 C6 C45678910R, clutch pressure control solenoid.			((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) C6 clutch pressured map clutch solenoid test state set to NEUTRAL TEST when: test trigger initialize range shift complete time, when range shift state, range shift complete time must time down to zero when range shift complete test trigger set to TRUE: enable forward gear AND direction request OR enable reverse gear AND direction request current loop test trigger clutch control solenoid test state range shift state NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on	= FALSE = TRUE ≠ initial startle mitigation gear = mapped to line pressure, C6 clutch pressure has transtioned from off-applying-applied = TRUE ≠ range shift completed = 1 Boolean = forward gear = 0 Boolean = reverse gear = FALSE ≠ NEUTRAL TEST = range shift completed	initialize range shift complete time = 1.000 seconds, range shift complete time must time down to zero when range shift complete	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			
					DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		
					DTCs not test fail this key on	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821		
					DTCs not fault active	AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid F Stuck On	P2733	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring	shift type is power down shift, C6 clutch slip speed OR shift type is not power down shift, C6 clutch slip speed update fail time 6.25 milliscond update	< 50.0 RPM < 50.0 RPM	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	= 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean	shift type is power down shift, fail time ≥ 0.800 seconds, OR shift type is not power down shift, fail time ≥ 0.150 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 a clutch pressure control solenoid stuck			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: engine speed transmission output shaft speed set solenoid stuck on test trigger to TRUE when: clutch pressure control solenoid stuck off stuck intrusive shift request startle mitigation active (see startle mitigation active NOTE below) clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) initialize active clutch controller (clutch control processing in process of sequencing clutches on	= TRUE Boolean = FALSE Boolean = FALSE Boolean ≥ 400.0 RPM ≥ 89.0 RPM = FALSE = FALSE ≠ TIE UP TEST TEST STATE ≠ TIE UP TEST HOLD = TRUE	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		on test is disabled. This diagnostic monitor is relative to the GF9 C6 C6789, or, GR10 C6 C45678910R, clutch pressure control solenoid.			and off for auto trans shift) (shift type enable for staged steady state shift - shift in process when new shift type occurs - interrupted shift OR shift type enable for garage shift OR shift type enable for negative torque up shift OR shift type enable for open throttle power on up shift OR shift type enable for closed throttle down shift OR shift type enable for open throttle power down shift OR shift type enable for closed throttle lift foot up shift) OR clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) transition clutch controller active clutch controller (staged steady sate shift - shift not in process, no new shift type occuring, no interrupted shift) set clutch control solenoid test state to TIE UP TEST	= 0 Boolean = 0 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = TIE UP TEST TEST STATE = TIE UP TEST HOLD = TRUE ≠ staged steady state		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					TEST STATE when:			
					solenoid stuck on test trigger	= TRUE		
					current loop clutch control solenoid test state OR	= TEST WAITING		
					current loop clutch control solenoid test state (see clutch control solenoid test state NOTE below)	= TIE UP TEST HOLD		
					range shift state	≠ range shift complete		
					solenoid stuck on test trigger	= TRUE		
					additional off going clutch occured	= TRUE		
					(clutch control solenoid test state OR	= TIE UP TEST TEST STATE		
					clutch control solenoid test state) (see clutch control solenoid test state NOTE below)	= TIE UP TEST HOLD		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					(C6 off going clutch pressure control ramp time out complete AND	= TRUE		
					off going clutch pressure ramp control ramp time out enable) OR	= 1 Boolean		
					C6 off going clutch pressure	≤ 350.0 kPa	for C6 off going clutch pressure time ≥ **P2733 C6 clutch exhaust delay time closed throttle lift foot up shift** OR	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							P2733 C6 clutch exhaust delay time open throttle power on up shift OR **P2733 C6 clutch exhaust delay time garage shift** OR **P2733 C6 clutch exhaust delay time closed throttle down shift** OR **P2733 C6 clutch exhaust delay time negative torque up shift** OR **P2733 C6 clutch exhaust delay time open throttle power down shift** see supporting tables	
					engine torque primary on coming clutch active primary on coming control state closed throttle lift foot up shift primary on coming clutch pressure OR open throttle power on up shift primary on coming clutch pressure OR garage shift primary on	≥ 8,191.8 Nm = TRUE ≠ clutch fill phase ≥ 655.0 kPa ≥ 655.0 kPA ≥ 750.0 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					coming clutch pressure OR negative torque up shift primary on coming clutch pressure OR open throttle power down shift primary on coming clutch pressure OR closed throttle down shift primary on coming clutch pressure C6 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an automatic transmission shift due to two conditions: Current value of clutch control solenoid test state is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND	 ≥ 655.0 kPa ≥ 655.0 kPa ≥ 655.0 kPa = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed ≥ clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift state = range shift complete. NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821. DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		

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 DTCs not fault active	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821 AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

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 or 10 speed C45678910R 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 Increment fail time	≥ 200 K Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid F Control Circuit Low	P2738	Controller specific circuit diagnoses 9 speed C6789 or 10 speed C45678910R 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid F Control Circuit High	P2739	Controller specific circuit diagnoses 9 speed C6789 or 10 speed C45678910R 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller voltage source	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid A Calibration Incorrect	P27A7	The diagnostic monitor verifies that the pressure control solenoid A (GF9 line pressure or GR10 C1 C123456R clutch) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid A electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch – the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault – pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Calibration Incorrect	P27A8	The diagnostic monitor verifies that the pressure control solenoid B (GF9 TCC pressure or GR10 C2 C128910R clutch) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid B electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch – the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault – pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power event during the controller initialization before normal time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid C Calibration Incorrect	P27A9	The diagnostic monitor verifies that the pressure control solenoid C (GF9 C1 CB123456 clutch or GR10 C3 C23457910 clutch) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid C electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch – the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault – pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid D Calibration Incorrect	P27AA	The diagnostic monitor verifies that the pressure control solenoid D (GF9 C2 CB29 clutch or GR10 C5 C1356789 clutch) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid D electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch – the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault – pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid E Calibration Incorrect	P27AB	The diagnostic monitor verifies that the pressure control solenoid E (GF9 C3 CB38 clutch or GR10 C4 C23467810R clutch) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid E electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch – the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault – pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid F Calibration Incorrect	P27AC	The diagnostic monitor verifies that the pressure control solenoid F (GF9 C4 C4 clutch or GR10 C6 C45678910R clutch) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid F electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch – the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault – pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid G Calibration Incorrect	P27AD	The diagnostic monitor verifies that the pressure control solenoid G (GF9 C5 C57R clutch or GR10 line pressure) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid G electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch – the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault – pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid H Calibration Incorrect	P27AE	The diagnostic monitor verifies that the pressure control solenoid H (GF9 C6 C6789 clutch or GR10 TCC) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid H electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch – the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault – pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control A Position Sensor/ Switch Circuit/Open	P27EB	The diagnostic monitor detects an illegal voltage on the mode valve A position sensor circuit.	raw sensor voltage raw sensor voltage	> 1.263 volts < 1.504 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS park sensor configuration type is hall sensor	= 1 Boolean ≥ 9.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS = CePSCR_e_HallSns	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control A Position Sensor/ Switch Circuit Range/ Performance	P27EC	Sensor signal fails to transition when solenoid mode valve control commands to PARK, DRIVE or REVERSE occur.	when: (ETRS command direction mode valve delay time out of park state) OR (ETRS command direction mode valve delay time out of park state turbine speed) OR (ETRS command direction mode valve delay time out of park state turbine speed) OR (ETRS command direction mode valve delay time out of park state) set sensor fault to TRUE	 = PARK ≥ **KtPSDR_t_ParkStatDlyLim** = PARK = DRIVE ≥ **KtPSDR_t_ParkStatDlyLim** = OUT OF PARK ≤ 400 RPM = REVERSE ≥ **KtPSDR_t_ParkStatDlyLim** = OUT OF PARK ≤ 400 RPM = REVERSE ≥ **KtPSDR_t_ParkStatDlyLim** ≠ OUT OF PARK	park servo enable ETRS system type is internal ETRS battery voltage for battery voltage time (engine mode run OR hydraulic pressure available) auto stop active diagnostic monitor enable hydraulic pressure available = TRUE when: engine speed for engine speed time otherwise hydraulic pressure available = FALSE hydraulic pressure available ETRS diagnostic range P27EE fault active P27EB fault active P27ED fault active P0968 fault active P0970 fault active P0971 fault active P18AB test fail this key on P18AA test fail this key on P27EC test fail this key on mode valve A state hydraulic pressure available	= 1 Boolean = CeTRGR_e_InternalETRS ≥ 9.00 volts ≥ 1.000 seconds = TRUE = TRUE = FALSE = 1 Boolean ≥ 400.0 RPM ≥ **KtTMDC_t_EngOnHydPresThrsh** = TRUE = ETRS command direction = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE ≠ **KaPSDR_e_GFX_ModeVlvA_StFnl** = TRUE	set sensor fault = TRUE, set DTC fault active update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			otherwise set sensor fault to FALSE		set mode valve delay time enable = TRUE when none of the following occur: [ETRS mode enable valve state OR (C3 clutch pressure AND ETRS drive latch present) AND (ETRS command direction OR ETRS command direction)] OR [(ETRS command direction OR ETRS command direction OR ETRS command direction OR ETRS command direction) AND C3 clutch pressure] update mode valve delay time when mode valve delay time enable update mode valve steady state fail when: mode valve delay time enable mode valve delay time	 = ETRS zero limit (hydraulic cicruit exhausted) < 195.0 kPa = FALSE = DRIVE = NEUTRAL SHIFT = PARK = REVERSE = NEUTRAL LO = NEUTRAL HI > 25.0 kPa = FALSE = FALSE ≥ **KtPSDR_t_ParkStatDlyLim**		
			when: (ETRS command direction ETRS mode enable valve	 = PARK ≠ ETRS zero limit	park servo enable ETRS system type is internal ETRS	= 1 Boolean = CeTRGR_e_InternalETRS	set sensor fault = TRUE, set DTC fault active	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			state out of park state) OR (ETRS command direction ETRS diagnostic range out of park state) set sensor fault to TRUE otherwise set sensor fault to FALSE	(hydraulic cicruit exhausted) = PARK = DRIVE = PARK = OUT OF PARK	 battery voltage for battery voltage time (engine mode run OR hydraulic pressure available) auto stop active diagnostic monitor enable hydraulic pressure available = TRUE when: engine speed for engine speed time otherwise hydraulic pressure available = FALSE ETRS diagnostic range (range command actuator AND park not available) OR (range command actuator OR range command actuator OR range command actuator OR range command actuator) out of park not avaliable ETRS command direction previous set mode valve stuck on test to TRUE when: ETRS command direction ETRS diagnostic range diagnostic monitor enable transmission fluid temperature	 ≥ 9.00 volts ≥ 1.000 seconds = TRUE = TRUE = FALSE = 1 Boolean ≥ 400.0 RPM ≥ **KtTMDC_t_EngOnHydPresThrsh** ≠ ETRS command direction = PARK = FALSE = DRIVE = NEUTRAL = MANUAL = REVERSE = FALSE ≠ ETRS command direction = PARK = DRIVE = 1 boolean ≥ 0.00 °C	update rate 6.25 milliseconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					transmission fluid temperature	≤ 255.99 °C		
					P0962, P0968, P0970, P0971, P2718, P2720, P2721, P2812, P2815, P2738 Fault Active	= FALSE		
					P27EC, P27F0 Fault Pending	= FALSE		
					P18AA, P18AB, P18AE, P27EC Test Fail This Key On	= FALSE		
					P27EB, P27ED, P27EE Fault Active	= FALSE		
					otherwise set mode valve stuck on test to FALSE			
					(mode valve stuck on test	= FALSE		
					P18AF test fail this key on	= FALSE		
					P27EE fault active	= FALSE		
					P27EB fault active	= FALSE		
					P27ED fault active	= FALSE		
					P0968 fault active	= FALSE		
					P0970 fault active	= FALSE		
					P0971 fault active	= FALSE		
					P18AB test fail this key on	= FALSE		
					P18AA test fail this key on	= FALSE		
					P27EC test fail this key on)	= FALSE		
					hydraulic pressure available	= TRUE		
					ETRS command direction	= ETRS command direction previous		
					mode valve A state attained	= FALSE		
					mode valve A transition	= FALSE		
					((ETRS diagnostic range	= NEUTRAL SHIFT		
					OR mode valve B transition	= TRUE		
					OR mode valve B state	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					attained) OR (ETRS mode enable valve state AND ETRS diagnostic range)) [(mode valve A transition mode valve A garage shift transition delay) OR mode valve A garage shift transition delay]	= ETRS zero limit (hydraulic cicruit exhausted) = DRIVE = FALSE ≥ KaPSDR_t_GFX_ModeVlvA_TrnstnDly[ETRS attained range, ETRS command range] see supporting tables > 0.0 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control A Position Sensor/ Switch Circuit Low	P27ED	The diagnostic monitor detects a ground short or open circuit fault on the mode valve A position sensor circuit.	raw sensor voltage	< 0.414 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS park sensor configuration type is hall sensor	= 1 Boolean ≥ 9.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS = CePSCR_e_HallSns	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control A Position Sensor/ Switch Circuit High	P27EE	The diagnostic monitor detects a short to voltage on the mode valve A position sensor circuit.	raw sensor voltage	> 2.538 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS park sensor configuration type is hall sensor	= 1 Boolean ≥ 9.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS = CePSCR_e_HallSns	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control B Position Sensor/ Switch Circuit/Open	P27EF	The diagnostic monitor detects an illegal voltage on the mode valve B position sensor circuit.	raw sensor voltage raw sensor voltage	> 1.263 volts < 1.504 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS park sensor configuration type is hall sensor	= 1 Boolean ≥ 9.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS = CePSCR_e_HallSns	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control B Position Sensor/ Switch Circuit Range/ Performance	P27F0	Sensor signal fails to transition when solenoid mode valve control commands to PARK, REVERSE, NEUTRAL HI, NEUTRAL LO, NEUTRAL SHIFT or DRIVE occur.	when: (ETRS command direction mode valve delay time out of park state) OR (ETRS command direction mode valve delay time out of park state turbine speed) OR (ETRS command direction mode valve delay time out of park state turbine speed) OR (ETRS command direction mode valve delay time out of park state) set sensor fault to TRUE	 = PARK ≥ **KtPSDR_t_ParkStatDlyLim** = PARK = REVERSE ≥ **KtPSDR_t_ParkStatDlyLim** = OUT OF PARK ≤ 400 RPM = DRIVE ≥ **KtPSDR_t_ParkStatDlyLim** = OUT OF PARK ≤ 400 RPM = NEUTRAL LO ≥ **KtPSDR_t_ParkStatDlyLim** ≠ OUT OF PARK	park servo enable ETRS system type is internal ETRS battery voltage for battery voltage time (engine mode run OR hydraulic pressure available) auto stop active diagnostic monitor enable hydraulic pressure available = TRUE when: engine speed for engine speed time otherwise hydraulic pressure available = FALSE ETRS diagnostic range P27F2 fault active P27EF fault active P27F1 fault active P2718 fault active P2720 fault active P2721 fault active P18AD test fail this key on P18AC test fail this key on P27F0 test fail this key on mode valve A state hydraulic pressure available set mode valve delay time enable = TRUE when any	= 1 Boolean = CeTRGR_e_InternalETRS ≥ 9.00 volts ≥ 1.000 seconds = TRUE = TRUE = FALSE = 1 Boolean ≥ 400.0 RPM ≥ **KtTMDC_t_EngOnHydPresThrsh** = ETRS command direction = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE ≠ **KaPSDR_e_GFX_ModeVlvA_StFnl** = TRUE	set sensor fault = TRUE, set DTC fault active update rate 6.25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			otherwise set sensor fault to FALSE		of the following occur: [(ETRS command direction OR ETRS command direction OR ETRS command direction) AND (ETRS mode enable valve state OR C4 clutch pressure)] OR [(ETRS command direction OR ETRS command direction OR ETRS command direction) AND C4 clutch pressure] otherwise set mode valve delay time enable = FALSE update mode valve delay time when mode valve delay time enable update mode valve steady state fail when: mode valve delay time enable mode valve delay time	= REVERSE = NEUTRAL HI = NEUTRAL LO = ETRS zero limit (hydraulic cicruit exhausted) < 295.0 kPa = DRIVE = PARK = NEUTRAL LO > 25.0 kPa = FALSE = FALSE ≥ **KtPSDR_t_ParkStatDlyLim**		
			when: (ETRS command direction ETRS mode enable valve state	= PARK ≠ ETRS zero limit (hydraulic cicruit	park servo enable ETRS system type is internal ETRS	= 1 Boolean = CeTRGR_e_InternalETRS	set sensor fault = TRUE, set DTC fault active update rate 6.25	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				exhausted)	battery voltage	≥ 9.00 volts	milliseconds	
			out of park state)	= PARK	for battery voltage time	≥ 1.000 seconds		
					(engine mode run OR	= TRUE		
			OR		hydraulic pressure available)	= TRUE		
			(ETRS command direction	= REVERSE	auto stop active	= FALSE		
			ETRS diagnostic range	= PARK	diagnostic monitor enable	= 1 Boolean		
			out of park state)	= OUT OF PARK	hydraulic pressure available = TRUE when:			
			OR		engine speed	≥ 400.0 RPM		
					for engine speed time	≥ **KtTMDC_t_EngOnHydPresThrsh**		
			[(ETRS command direction OR	= NEUTRAL LO	otherwise hydraulic pressure available = FALSE			
			ETRS command direction OR	= NEUTRAL HI				
			ETRS command direction) AND	= NEUTRAL SHIFT	ETRS diagnostic range	≠ ETRS command direction		
			(ETRS diagnostic range AND	= PARK	(range command actuator AND	= PARK		
			out of park state)	= OUT OF PARK	park not available)	= FALSE		
					OR			
					(range command actuator	= DRIVE		
					OR			
			set sensor fault to TRUE		range command actuator	= NEUTRAL		
					OR			
			otherwise set sensor fault to FALSE		range command actuator	= MANUAL		
					OR			
					range command actuator)	= REVERSE		
					out of park not avaliable	= FALSE		
					set mode valve stuck on test to TRUE when:			
					ETRS command direction	= PARK		
					ETRS diagnostic range	= DRIVE		
					diagnostic monitor enable	= 1 boolean		
					transmission fluid temperature	≥ 0.00 °C		
					transmission fluid temperature	≤ 255.99 °C		
					P0962, P0968, P0970, P0971, P2718, P2720,	= FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P2721, P2812, P2815, P2738 Fault Active			
					P27EC, P27F0 Fault Pending	= FALSE		
					P18AA, P18AB, P18AE, P27EC Test Fail This Key On	= FALSE		
					P27EB, P27ED, P27EE Fault Active	= FALSE		
					otherwise set mode valve stuck on test to FALSE			
					(mode valve stuck on test	= FALSE		
					P18AF test fail this key on	= FALSE		
					P27F2 fault active	= FALSE		
					P27EF fault active	= FALSE		
					P27F1 fault active	= FALSE		
					P2718 fault active	= FALSE		
					P2720 fault active	= FALSE		
					P2721 fault active	= FALSE		
					P18AD test fail this key on	= FALSE		
					P18AC test fail this key on	= FALSE		
					P27F0 test fail this key on)	= FALSE		
					hydraulic pressure available	= TRUE		
					ETRS command direction	= ETRS command direction previous		
					mode valve B state attained	= FALSE		
					mode valve B transition	= FALSE		
					((ETRS diagnostic range	≠ NEUTRAL SHIFT		
					OR mode valve A transition	= TRUE		
					OR mode valve B state attained)	= TRUE		
					delete			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR (ETRS mode enable valve state AND ETRS diagnostic range)) delete when: (ETRS command direction AND ETRS command direction) AND mode valve B sensor performance fault pending mode valve B transition fail count update mode valve B garage shift fail time when: mode valve B garage shift fail time AND mode valve B garage shift transition update mode valve B garage shift transition delay [(mode valve B transition mode valve B garage shift transition delay) OR mode valve B garage shift fail time]	= ETRS zero limit (hydraulic cicruit exhausted) = DRIVE ≠ PARK ≠ NEUTRAL LO = TRUE = 0 counts > 0.0 seconds = FALSE = FALSE ≥ KaPSDR_t_GFX_ModeVlvB_TrnstnDly[ETRS attained range, ETRS command range] see supporting tables > 0.0 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control B Position Sensor/ Switch Circuit Low	P27F1	The diagnostic monitor detects a ground short or open circuit fault on the mode valve B position sensor circuit.	raw sensor voltage	> 0.414 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS park sensor configuration type is hall sensor	= 1 Boolean ≥ 9.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS = CePSCR_e_HallSns	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range Control B Position Sensor/ Switch Circuit High	P27F2	The diagnostic monitor detects a short to voltage on the mode valve B position sensor circuit.	raw sensor voltage	> 2.538 volts	diagnostic monitor enable battery voltage battery voltage time ETRS system configuration is internal ERTS park sensor configuration type is hall sensor	= 1 Boolean ≥ 9.00 volts ≥ 1.00 seconds = CeTRGR_e_InternalETRS = CePSCR_e_HallSns	0.100 seconds in 0.163 second sample 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid G Control Circuit Open	P2812	Controller specific circuit diagnoses 9 speed Line Pressure Control Circuit or 10 speed Line Pressure 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 Increment fail time	≥ 200 K Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid G Control Circuit Low	P2814	Controller specific circuit diagnoses 9 speed Line Pressure Circuit or 10 speed Line Pressure 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid G Control Circuit High	P2815	Controller specific circuit diagnoses 9 speed Line Pressure Circuit or 10 speed Line Pressure 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller voltage source	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid H Performance /Stuck Off	P2817	The diagnostic monitor detects the transmission torque converter control valve solenoid failed hydraulically off. The monitor executes when the transmission torque converter is commanded to a “lock” mode during which the torque converter will be controlled to near zero (0.0) RPM slip speed, or, an “on” mode during which the torque converter will be controlled to target slip speed using slip speed error. The transmission torque converter control valve solenoid is considered failed hydraulically off when the “lock” mode slip speed is excessive, or, when the ‘on” mode slip speed error is excessive.	if use TCC slip speed error OR TCC control mode TCC slip speed error = TCC slip speed - TCC comand slip speed else if TCC control mode torque convert slip = engine speed - transmission input shaft speed then update fail time 25 millisecond update rate	= 0 Boolean = ON mode (controlled slip mode) ≥ **P2817 TCC stuck off fail TCC slip speed** see supporting table = LOCK ≥ 130.0 RPM	diagnostic monitor enable TCC command capacity TCC command pressure (TCC control mode previous TCC control mode previous TCC control mode previous) AND (TCC control mode current OR TCC control mode current) (TCC stuck off enable OR TCC stuck on enable) hydraulic pressure available: engine speed	= 1 Boolean ≥ 0.00 % ≥ 800.0 kPa ≠ TCC control mode current ≠ ON mode (controlled slip mode) ≠ LOCK = ON mode (controlled slip mode) = LOCK = 1 Boolean = 1 Boolean ≥ 400.0 RPM	fail time ≥ 2.500 seconds increment fail count fail count ≥ 3 counts 25 millisecond update rate TCC command capacity time ≥ 0.00 seconds TCC command pressure time ≥ 2.00 seconds engine speed time ≥ **engine speed time for transmission hydraulic pressure available**	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							see supporting table	
					service fast learn active	= FALSE		
					battery voltage	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					run crank voltage	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	
					P281B falut active	= FALSE		
					P281D falut active	= FALSE		
					P281E falut active	= FALSE		
					P0722 fault pending	= FALSE		
					P0723 fault pending	= FALSE		
					P0716 fault pending	= FALSE		
					P0717 fault pending	= FALSE		
					P07BF fault pending	= FALSE		
					P07C0 fault pending	= FALSE		
					(PTO active OR	= FALSE		
					PTO disable calibration)	= 1 Boolean		
					accelerator pedal position	≥ 8.0 %		
					accelerator pedal position	≤ 100.0 %		
					range shift state	= range shift complete		
					transmission fluid temperature	≥ -6.66 °C		
					transmission fluid temperature	≤ 130.0 °C		
					engine torque	≥ 50.0 Nm		
					engine torque	≤ 8,191.8 Nm		
					P2817 test fail this key on	= FALSE		
					(TCC control mode OR	= ON mode (controlled slip mode)		
					TCC control mode)	= LOCK		
					break latch state (clutch select valve solenoid)	= disabled (clutch select valve not transitioning)		
					attained gear	≥ CeCGSR_e_CR_Third		
					attained gear slip	≤ 25 RPM		
					DTCs not fault active	AcceleratorPedalFailure EngineTorqueEstInaccurate		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P0716, P0717, P07BF, P07C0 P0722, P0723, P077C, P077D		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid H Stuck On - GF9 specific	P2818	The diagnostic monitor detects the transmission torque converter control valve solenoid failed hydraulically on. The torque converter hydraulic control circuit is multiplexed with the transmission clutch select valve hydraulic control circuit, allowing for the torque converter control valve solenoid stuck on test to execute when the clutch select valve solenoid is commanded ON. When the clutch select valve solenoid is commanded ON as the vehicle speed decreases toward zero KPH, and, if the torque converter control valve solenoid is stuck on, the torque converter slip speed rate of change will have a large slope while decreasing toward zero RPM, and the torque converter slip speed will remain low near zero RPM.	while control valve test time timing down: rate of change of torque convert slip speed = (ABS (current loop value torque convert slip speed - previous loop value torque convert slip speed) / 25 milliseconds) when clutch select valve soleniod multiplexed to TCC hydraulic AND torque convert slip speed = ABS(engine speed - transmission input shaft speed) AND torque convert slip speed = engine speed - transmission input shaft speed torque convert slip speed torque convert slip speed THEN increment fail time 25 millisecond update rate	≥ **P2818 torque convert derivative slip speed fail threshold** see supporting table ≤ **P0741 (GF9 specific) TCC slip speed crash RPM** ≥ -50.0 RPM ≤ 30.0 RPM	diagnostic monitor enable (TCC stuck off enable OR TCC stuck on enable) hydraulic pressure available: engine speed service fast learn active battery voltage run crank voltage P281B falut active P281D falut active P281E falut active PRNDL PRNDL transmission fluid temperature transmission fluid	= 1 Boolean = 1 Boolean = 1 Boolean ≥ 400.0 RPM = FALSE ≥ 9.00 volts ≥ 9.00 volts = FALSE = FALSE = FALSE ≠ NEUTRAL ≠ REVERSE ≥ -6.66 °C ≤ 130.00 °C	fail time ≥ 1.500 seconds increment fail count fail count ≥ 4 counts 25 millisecond update rate engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supportinf table battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					temperature			
					accelerator pedal position	≥ 0.00 %		
					accelerator pedal position	≤ 1.00 %		
					vehicle speed	≥ 3.0 KPH		
					vehicle speed	≤ 9.5 KPH		
					TCC command mode	= OFF		
					break latch state (clutch select valve solenoid)	≠ disabled (clutch select valve transitioning)		
					P0722 fault pending	= FALSE		
					P0723 fault pending	= FALSE		
					P0716 fault pending	= FALSE		
					P0717 fault pending	= FALSE		
					P07BF fault pending	= FALSE		
					P07C0 fault pending	= FALSE		
					(PTO active OR	= FALSE		
					PTO disable calibration)	= 1 Boolean		
					transmission fluid temperature	≥ -6.66 °C		
					transmission fluid temperature	≤ 130.00 °C		
					engine torque	≥ 55.0 Nm		
					engine torque	≤ 800.0 Nm		
					P2818 test fail this key on	= FALSE		
					vehicle speed	≤ 45.0 KPH		
					engine speed	≥ 400.0 RPM		
					engine speed	≤ 5,500.0 RPM		
					accelerator pedal position	≤ 95.0 %		
					4WD low state	= FALSE		
					(driver shift mode active OR	= FALSE		
					driver shift mode calibration)	= 0 Boolean		
					(misfire requests TCC off OR	= FALSE		
					misfire TCC off calibration)	= 0 Boolean		
					(clucth control solenoid stuck on OR stuck OFF intrusive shift active)	= FALSE		
					P0746 fault pending	= FALSE		
					P0747 fault pending	= FALSE		
					P0776 fault pending	= FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 hysteresis when: break latch state (clutch select valve solenoid) previous break latch state (clutch select valve solenoid) set stuck on test time and begin time down, stuck on test time must time down from calibration value to zero (0.0) seconds break latch state (clutch select valve solenoid) AND previous break latch state (clutch select valve solenoid) THEN initialize control valve test time, control valve test time must time down from calibration value to zero (0.0) seconds	= FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE ≤ 8.0 KPH ≥ 4.0 % > 1.0 % = disabled (clutch select valve not transitioning) = complete (clutch select valve transition complete) = **P2818 stuck on test time** see supporting tables = clutch select valve solenoid mutliplexed to TCC hydraulic = disabled (clutch select valve not transitioning) = **P2818 (GF9 specific) control valve test time** see supporting tables		

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 P0716, P0717, P07BF, P07C0 P0722, P0723, P077C, P077D		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid H Control Circuit/Open	P281B	Controller specific circuit diagnoses 9 speed TCC Control Circuit or 10 speed TCC Control Circuit for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit Increment fail time	≥ 200 K Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid H Control Circuit Low	P281D	Controller specific circuit diagnoses 9 speed TCC Pressure Control Circuit or 10 speed TCC Control Circuit for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short Increment fail time	≤ 0.5 Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid H Control Circuit High	P281E	Controller specific circuit diagnoses 9 speed TCC Pressure Control Circuit or 10 speed TCC Control Circuit for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage Increment fail time	≤ 0.5 Ω impedance between signal and controller voltage source	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid J Stuck Off	P2820	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 clutch select valve solenoid failed hydraulically off. The clutch select valve is used to route hydraulic fluid to, either, the selectable one way clutch hydraulic circuit used to attain transmission 1st gear lock state, or, to the C6 - C6789 clutch hydraulic circuit necessary for transmission higher gear states. When the clutch select valve is failed hydraulically off, and transmission is in 1st gear lock state, it is possible to measure low C6 - C6789 clutch slip speed as hydraulic fluid is routed to the clutch C6 - C6789, or, 6th gear transmission gear ratio, based on transmission lever node design, the	gear ratio gear ratio OR C6 clutch slip speed, update fail time 6.25 milliscond update	≤ 1.700 ≥ 1.200 ≤ 20.0 RPM	use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled service fast learn active service solenoid cleaning procedure active hydraulic pressure	= 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean	fail time ≥ 0.250 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		transmission input shaft speed, the transmission output shaft speed, and one transmission intermediate shaft speed, while not commanding 6th-9th gear, as the indication of the failure mode. This diagnostic monitor is relative to the GF9 clutch select valve pressure control solenoid.			available: engine speed diagnostic monitor enabled transmission output shaft speed transmission fluid temperature transmission fluid temperature P2820 test fail this key on (command gear OR attained gear) DTCs not fault pending DTCs not test fail this key on DTCs not fault active	≥ 400.0 RPM = 1 Booelan ≥ 35 RPM ≥ -256.00 °C ≤ 130.0 °C = FALSE = 1st lock = 1st lock P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0 P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821 AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P17CE P17D3 P17D6 P2805		

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	P2821	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch select pressure control solenoid must be hydraulically off and the clutch select valve in the off state, to allow hydraulic fluid supply to the C3 (CB38) or C4 (C4) or C5 (C57R) clutches, such that when activated, commanded gear 3rd or 4th or 5th can be attained. With the clutch select valve pressure control solenoid failed hydraulically on, commanded gear 3rd or 4th or 5th cannot be attained. In the failure mode, the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM, when commanding 3rd or 4th or 5th gear, but due to the clutch select pressure control solenoid failed hydraulically on and not	Cx clutch slip speed fail compare C3 (CB38) OR C4 (C4) OR C5 (C57R) update Cx clutch slip speed fail time 6.25 milliscond update once intrusive gear is commanded and clutch select stuck on test active remains and Cx clutch fail count limit occurs, increment clutch select valve solenoid stuck on fail count and time up clutch select stuck on test gear time 6.25 milliscond update	 ≥ 200.0 RPM ≥ 200.0 RPM ≥ 200.0 RPM = TRUE			Cx clutch slip speed fail time ≥ C3 (CB38) 3.00 seconds OR C4 (C4) 3.00 seconds OR C5 (C57R) 3.00 seconds update Cx fail count, Cx fail count ≥ C3 (CB38) 3 counts OR C4 (C4) 3 counts OR C5 (C57R) 3 counts, Cx clutch fail count limit occurs 6.25 milliscond update clutch select valve solenoid stuck on fail count ≥ 2 counts OR clutch select stuck on test gear time ≥ 9.00 seconds 6.25 milliscond update	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		individual clutch control faults. It is thus necessary, when individual clutch slip occurs in 3rd or 4th or 5th gear and counted toward the clutch pressure control solenoid stuck on failure, for an intrusive gear commanded from 3rd or 4th or 5th to verify the clutch slip in the remaining gear states. The individual clutch slip that occurs in those intrusive gears, 3rd or 4th or 5th, is also counted toward the clutch pressure control solenoid stuck on failure. As individual clutch slip is accumulated in each commanded gear 3rd or 4th or 5th, that failure time is the verification of the clutch pressure control solenoid failed hydraulically on. 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			use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled service fast learn active service solenoid cleaning procedure active hydraulic pressure available: engine speed	= 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean ≥ 400.0 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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line pressure control, which normally allows the clutch to maintain full torque holding capacity at the given engine crankshaft torque, to maintain true gear ratio. When the clutch select pressure control solenoid is failed hydraulically on, C3 (CB38) or C4 (C4) or C5 (C57R) clutches cannot maintain holding capacity at any engine crankshaft torque, and the clutch slip speed is uncontrollable. The clutch pressure control solenoid test is suspended if the higher level safety startle mitigation function is			diagnostic monitor enable P2821 test fail this key on test trigger set to TRUE: enable forward gear AND direction request OR enable reverse gear AND direction request current loop test trigger clutch control solenoid test state range shift state clutch solenoid test state set to NEUTRAL TEST when: test trigger initialize range shift complete time, when range shift state, range shift complete time must time down to zero when range shift complete Cx indicates any one of the 4 clutches: C3 (CB38) OR C4 (C4) OR C5 (C57R) enable Cx clutch slip speed fail compare when: diagnostic clutch test Cx ((startle mitigation active	= 1 Boolean = FALSE = 1 Boolean = forward gear = 0 Boolean = reverse gear = FALSE ≠ NEUTRAL TEST = range shift completed = TRUE ≠ range shift completed = HOLDING CLUTCH = FALSE	table initialize range shift complete time = 1.000 seconds, range shift complete time must time down to zero when range shift complete	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		active. The safety startle mitigation function is triggered when a sudden vehicle deceleration occurs due to a clutch pressure control solenoid that has failed hydraulically on, while the solenoid is electrically functional, which, must take priority over this clutch select pressure control solenoid stuck off diagnostic monitor. All clutch pressure control solenoid stuck on/off diagnostic monitors are emission MIL DTCs. System voltage must be normal, all clutch pressure control solenoid driver circuits must be functional, no clutch pressure control solenoid electrical or performance faults can be present, and no speed sensor electrical or performance faults can be present, or the a clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to the GF9 clutch select valve pressure control solenoid.			OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) unintended deceleration fault pending OR unintended deceleration fault pending enable FASLE (startle mitigation) clutch steady state adaptive active transmission output shaft speed Cx clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation accelerator pedal position engine speed diagnostic clutch test Cx set to HOLDING CLUTCH when: clutch solenoid test state ((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) Cx clutch pressured map clutch select stuck on test	= TRUE ≠ initial startle mitigation gear = FALSE = 0 Boolean = FALSE ≥ 89.0 RPM ≥ 2.00 % ≥ 1,500.0 RPM = NEUTRAL TEST = FALSE = TRUE ≠ initial startle mitigation gear = mapped to line pressure, Cx clutch pressure has transtioned from off-applying-applied		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					active set to TRUE when: command gear clutch control solenoid test state any Cx clutch fail count limit occurs break latch state, clutch select valve hydraulic latch fluid is applied, hydraulic latch fluid force balance acts with clutch select valve return spring, to force the clutch select valve to the off postion in normal operation, allowing hydraulic fluid to C3 (CB38) C4 (C4) and C5 (C57R) clutches clutch select stuck on test active driver direction (PRNDL) change request, select intrusive gear to verify clutch select valve solenoid when HOLDING CLUTCH: C3 (CB38) C4 (C4) C5 (C57R) enable clutch select stuck on test gear time 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	≠ REVERSE = NEUTRAL TEST = complete = TRUE = FALSE = CeCGSR_e_Fifth = CeCGSR_e_Fifth = CeCGSR_e_Third		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P0747 P0777 P0797 P2715 P2724 P2733 P2821			
					DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		
					DTCs not test fail this key on	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821		
					DTCs not fault active	AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

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 or 10 speed PISA Valve Control Circuit for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short Increment fail time	≤ 0.5 Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid J Control Circuit High	P2827	Controller specific circuit diagnoses 9 speed Clutch Valve Control Circuit or 10 speed PISA 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller voltage source	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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.	rolling count value received from ECM and expected TCM calculated value not equal 50 millisecond update rate	= TRUE	10 millisecond update rate of enable conditions service mode $04 active battery voltage battery voltage time engine stall protection ECM frame recieved	 = FALSE ≥ 11.00 volts ≥ 300.000 seconds = TRUE	alive rolling count errors ≥ 10 out of 10 sample counts 50 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.
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures exceeds before the sample time of is reached	5 counts (equivalent to 0.06 seconds) 0.81 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds CAN hardware is bus OFF for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts > 0.1625 seconds	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.
Lost Communication With ECM	U0100	This DTC monitors for a loss of communication with the engine control module	Message is not received from controller for		General Enable Criteria:		Diagnostic runs in 12.5 ms loop	Type A, 1 Trips
			Message $0BE	≥ 0.50 seconds	U0073	Not Active on Current Key Cycle		
			Message $0C9	≥ 0.50 seconds	Normal CAN transmission on Bus A	Enabled		
			Message $18E	≥ 0.50 seconds	Device Control	Not Active		
			Message $1A1	≥ 0.50 seconds	High Voltage Virtual Network Management	Not Active		
			Message $1A3	≥ 12.00 seconds	Ignition Voltage Criteria:			
			Message $1AA	≥ 12.00 seconds	Run/Crank Ignition voltage	> 6.41 Volts		
			Message $1BA	≥ 12.00 seconds				
			Message $287	≥ 12.00 seconds	Power Mode	= run		
			Message $3D1	≥ 12.00 seconds	Off Cycle Enable Criteria:			
			Message $3E9	≥ 12.00 seconds	KeCAND_b_OffKeyCycle DiagEnbl	= 1 (1 indicates enabled)		
			Message $4C1	≥ 12.00 seconds	Ignition Accessory Line and Battery Voltage	= Active > 11.00 Volts		
			Message $4C7	≥ 12.00 seconds	General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds			
			Message $4D1	≥ 12.00 seconds	Power Mode is in accessory or run or crank and High Voltage Virtual			
			Message $4F1	≥ 12.00 seconds				
			Message $589	≥ 12.00 seconds				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Network Management is not active for U0100 ECM	> 0.4000 seconds Not Active on Current Key Cycle is present on the bus		

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lateral Acceleration Sensor Performance	C1251	Controller specific analog circuit diagnoses the raw lateral acceleration signal for a signal value that is stuck in a valid range by comparing raw signal value to fail thresholds.	ABS(raw lateral acceleration signal) AND ABS(raw lateral acceleration signal) update raw lateral acceleration signal fail, 50 millisecond update rate	≥ 0.5300 g ≤ 3.8500 g	battery voltage run crank voltage diagnostic monitor enable update raw lateral acceleration signal stablity time: TOSS vehicle speed automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnsotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear attained gear slip ABS(raw lateral acceleration signal) update sample time U0073 fault active U0073 test fail this key on DTCs not fault active	≥ 11.00 volts ≥ 11.00 volts = 1 Boolean ≥ 15.0 KPH = TRUE = TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th ≤ 100.0 RPM < 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA	raw lateral acceleration signal stability time ≥ 30.0 seconds, fail time ≥ 75.0 seconds out of sample time ≥ 120.0 seconds, 50 millisecond update rate	Emissions Neutral Diagnostic – Type C

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Longitudinal Acceleration Sensor Performance	C1254	Controller specific analog circuit diagnoses the raw longitudinal acceleration signal rationalized against the TOSS vehicle speed acceleration. The diagnostic monitor can be designed to detect an invalid longitudinal acceleration signal based on the TOSS vehicle speed windows and TOSS vehicle speed acceleration, 4 windows can be enabled. The delta between the TOSS vehicle speed acceleration and longitudinal acceleration signal is taken within each window to verify the delta is small, no failure indicated, or the delta is large indicating the longitudinal acceleration signal is in error.	ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) update raw longitudinal acceleration signal region 1 fail time, 50 millisecond update rate	≥ 0.5300 g	battery voltage run crank voltage diagnostic monitor enable region 1 specific enable update raw lateral longitudinal acceleration signal stablity time: TOSS vehicle speed TOSS vehicle speed acceleration automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnsotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear attained gear slip ABS(raw longitudinal acceleration signal) AND ABS(raw longitudinal acceleration signal) update region 1 sample time: brake pedal position engine torque TOSS vehicle speed acceleration TOSS vehicle speed TOSS vehicle speed	≥ 11.00 volts ≥ 11.00 volts = 1 Boolean = 0 Boolean ≥ 15.0 KPH ≤ 0.5300 g = TRUE = TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th ≤ 100.0 RPM ≥ 0.5300 g ≤ 3.8500 g ≤ 0.70 % ≥ 80.0 Nm ≥ 0.1500 g ≥ 15.0 KPH ≤ 200.0 KPH	raw lateral longitudinal acceleration signal stability time ≥ 30.0 seconds, fail time ≥ 75.0 seconds out of sample time ≥ 120.0 seconds, 50 millisecond update rate region 1 fail time ≥ 75.0 seconds out of region 1 sample time ≥ 120.0 seconds, 50 millisecond update rate	Emissions Neutral Diagnostic – Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					ABS(raw longitudinal acceleration signal) update sample time U0073 fault active U0073 test fail this key on DTCs not fault active	< 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError		
			ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) update raw longitudinal acceleration signal region 2 fail time, 50 millisecond update rate	≥ 0.0000 g	battery voltage run crank voltage diagnostic monitor enable region 2 specific enable update raw lateral longitudinal acceleration signal stablity time: TOSS vehicle speed TOSS vehicle speed acceleration automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnsotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear attained gear slip ABS(raw longitudinal acceleration signal) AND ABS(raw longitudinal	≥ 11.00 volts ≥ 11.00 volts = 1 Boolean = 0 Boolean ≥ 15.0 KPH ≤ 0.5300 g = TRUE = TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th ≤ 100.0 RPM ≥ 0.5300 g ≤ 3.8500 g	raw lateral longitudinal acceleration signal stability time ≥ 30.0 seconds, fail time ≥ 75.0 seconds out of sample time ≥ 120.0 seconds, 50 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					acceleration signal) update region 2 sample time: brake pedal position engine torque TOSS vehicle speed acceleration TOSS vehicle speed TOSS vehicle speed ABS(raw longitudinal acceleration signal) update sample time U0073 fault active U0073 test fail this key on DTCs not fault active	 ≤ 0.70 % ≥ 80.0 Nm ≥ 0.1500 g ≥ 0.0 KPH ≤ 0.0 KPH < 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError	 region 2 fail time ≥ 75.0 seconds out of region 2 sample time ≥ 120.0 seconds, 50 millisecond update rate	
			ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) update raw longitudinal acceleration signal region 3 fail time, 50 millisecond update rate	≥ 0.0000 g	battery voltage run crank voltage diagnostic monitor enable region 3 specific enable update raw lateral longitudinal acceleration signal stablity time: TOSS vehicle speed TOSS vehicle speed acceleration automatic transmission is clutch to clutch OR dual clutch high side drive 1 enable high side drive 2 enable diagnsotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on	≥ 11.00 volts ≥ 11.00 volts = 1 Boolean = 0 Boolean ≥ 15.0 KPH ≤ 0.5300 g = TRUE = TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE	raw lateral longitudinal acceleration signal stability time ≥ 30.0 seconds, fail time ≥ 75.0 seconds out of sample time ≥ 120.0 seconds, 50 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear attained gear slip ABS(raw longitudinal acceleration signal) AND ABS(raw longitudinal acceleration signal) update region 3 sample time: brake pedal position engine torque ABS(TOSS vehicle speed acceleration) TOSS vehicle speed ABS(raw longitudinal acceleration signal) update sample time U0073 fault active U0073 test fail this key on DTCs not fault active	= FALSE = FALSE = FALSE = FALSE = 1st thru 10th ≤ 100.0 RPM ≥ 0.5300 g ≤ 3.8500 g ≤ 0.70 % ≥ 80.0 Nm ≤ 0.1000 g ≥ 0.0 KPH < 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError	region 3 fail time ≥ 75.0 seconds out of region 3 sample time ≥ 120.0 seconds, 50 millisecond update rate	
			ABS(TOSS vehicle speed acceleration - raw longitudinal acceleration signal) update raw longitudinal acceleration signal region 4 fail time, 50 millisecond update rate	≥ 0.0000 g	battery voltage run crank voltage diagnostic monitor enable region 3 specific enable update raw lateral longitudinal acceleration signal stablity time: TOSS vehicle speed TOSS vehicle speed acceleration automatic transmission is clutch to clutch OR dual	≥ 11.00 volts ≥ 11.00 volts = 1 Boolean = 0 Boolean ≥ 15.0 KPH ≤ 0.5300 g = TRUE	raw lateral longitudinal acceleration signal stability time ≥ 30.0 seconds, fail time ≥ 75.0 seconds out of sample time ≥ 120.0 seconds, 50 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					clutch high side drive 1 enable high side drive 2 enable diagnsotic fault sequence gear active P0716 fault active P0716 test fail this key on P0717 fault active P0717 test fail this key on P07BF fault active P07BF test fail this key on P07C0 fault active P07C0test fail this key on attained gear attained gear slip ABS(raw longitudinal acceleration signal) AND ABS(raw longitudinal acceleration signal) update region 4 sample time: brake pedal position engine torque TOSS vehicle speed acceleration TOSS vehicle speed TOSS vehicle speed ABS(raw longitudinal acceleration signal) update sample time U0073 fault active U0073 test fail this key on DTCs not fault active	= TRUE = TRUE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = 1st thru 10th ≤ 100.0 RPM ≥ 0.5300 g ≤ 3.8500 g ≤ 0.70 % ≤ 80.0 Nm ≤ 0.1500 g ≥ 0.0 KPH ≤ 0.0 KPH < 0.5300 g = FALSE = FALSE VehicleSpeedSensor_FA VehicleSpeedSensorError	region 4 fail time ≥ 75.0 seconds out of region 4 sample time ≥ 120.0 seconds, 50 millisecond update rate	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if the calibration check sum is incorrect or the flash memory detects an uncorrectable error via the Error Correcting Code.	The Primary Processor's calculated checksum does not match the stored checksum value. Covers all software and calibrations.	1 failure if the fault is detected during the first pass. 5.00 failures if the fault occurs after the first pass is complete.			Diagnostic runs continuously in the background.	Type A, 1 Trips
			The Primary Processor's Error Correcting Code hardware in the flash memory detects an error. Covers all software and calibrations.	254 failures detected via Error Correcting Code			Diagnostic runs continuously via the flash hardware.	
			The Primary Processor's calculated checksum does not match the stored checksum value for a selected subset of the calibrations.	2 consecutive failures detected or 5 total failures detected.			Diagnostic runs continuously. Will report a detected fault within 200 ms.	
			The Secondary Processor's calculated checksum does not match the stored checksum value. Covers all software and calibrations.	1 failure if the fault is detected during the first pass. 5 failures if the fault occurs after the first pass is complete.			Diagnostic runs continuously in the background.	
				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.
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.	
			ECC ROM fault detected in NVM Flash region ECC ROM Error Count >	 3			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 >=	3 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
			Indicates that the primary processor is unable to correctly read data from or write data to TPU RAM. Detects data read does not match data written >=	5 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
			Indicates that the primary processor detects a mismatch between the data and dual data is found during RAM updates. Detects a mismatch in data and dual data updates >	0.40000 s			When dual store updates occur.	

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

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 processsors.	Loss or invalid message of SPI communication from the Secondary Processor at initialization detected by the Primary Processor or loss or invalid message of SPI communication from the Secondary Processor after a valid message was received by the Primary Processor	Loss or invalid message at initialization detected or loss or invalid message after a valid message was recieved	Run/Crank voltage Run/Crank voltage	>= 8.00 Volts or >= 11.00 Volts, else the failure will be reported for all conditions	In the primary processor, 8 / 16 counts intermittent or 10 counts continuous; 100 counts continuous @ initialization. 12.5 ms /count in the ECM main processor	Type A, 1 Trips
			Loss or invalid message of SPI communication from the Primary Processor at initialization detected by the Secondary Processor or loss or invalid message of SPI communication from the Primary Processor after a valid message was received by the Secondary Processor	Loss or invalid message at initialization detected or loss or invalid message after a valid message was recieved			In the secondary processor, 20 / 200 counts intermittent or 0.1875 s continuous; 0.4750 s continuous @ initialization. 12.5 ms /count in the ECM secondary processor	
			Checks for stack over or underflow in secondary processor by looking for corruption of known pattern at stack boundaries. Checks number of stack over/ under flow 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	
			MAIN processor is verified by responding to a seed sent from the secondary with a key response to secondary. Checks number of incorrect keys	2 incorrect seeds within 8 messages, 0.2000 seconds		ignition in Run or Crank	150 ms for one seed continually failing	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			received > or Secondary processor has not received a new within time limit					
			Time new seed not received exceeded			always running	0.450 seconds	
			MAIN processor receives seed in wrong order			always running	3 / 17 counts intermittent. 50 ms/count in the ECM main processor	
			2 fails in a row in the Secondary processor's ALU check			KePISD_b_ALU_TestEnbld == 1 Value of KePISD_b_ALU_TestEnbld 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_ConfigRegTestEnbld == 1 Value of KePISD_b_ConfigRegTestEnbld is: 1 . (If 0, this test is disabled)	12.5 to 25 ms	
			Secondary processor detects an error in the toggling of a hardware discrete line controlled by the MAIN processor: number of discrete changes > = or < = over time window(50ms)	7 17		KePISD_b_MainCPU_SOH_FltEnbld == 1 Value of KePISD_b_MainCPU_SOH_FltEnbld is: 0 . (If 0, this test is disabled) time from initialization >= 0.4875 seconds	50 ms	
			Software background task first pass time to complete exceeds			Run/Crank voltage > 6.41	35.000 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			2 fails in a row in the MAIN processor's ALU check			KePISD_b_ALU_TestEnbld == 1 Value of KePISD_b_ALU_TestEnbld is: 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			KePISD_b_ConfigRegTestEnbld == 1 Value of KePISD_b_ConfigRegTestEnbld is: 1 . (If 0, this test is disabled)	12.5 to 25 ms	
			Checks number of stack over/under flow 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	
			Voltage deviation >	0.4950		KePISD_b_A2D_CnvrtrTestEnbld == 1 Value of KePISD_b_A2D_CnvrtrTestEnbld is: 1 . (If 0, this test is disabled)	5 / 10 counts or 0.150 seconds continuous; 50 ms/count in the ECM main processor	
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		KeMEMD_b_FlashECC_CktTestEnbl == 1 Value of KeMEMD_b_FlashECC_CktTestEnbl is: 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.
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		KeMEMD_b_RAM_ECC_CktTestEnbl == 1 Value of KeMEMD_b_RAM_ECC_CktTestEnbl is: 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			KePISD_b_DMA_XferTestEnbld == 1 Value of KePISD_b_DMA_XferTestEnbld is: 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.		Table, f(Core, Loop Time). See supporting tables: **P0606_Program Sequence Watch Enable f(Core, Loop Time)** (If 0, this Loop Time 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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							processor	
			MAIN processor determines a seed has not changed within a specified time period within the 50ms task.	Previous seed value equals current seed value.		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.
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 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 Ω impedance between signal and controller ground	diagnostic monitor enable high side drive ON service mode $04 not active service fast learn not active P0658 fault active P0658 test fail this key on	= 1 Boolean = TRUE = FALSE = FALSE	fail count ≥ 6 counts out of sample count ≥ 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.	when PWM sensor type and PWM voltage direct conditional internal range sensor A PWM duty cycle when PWM sensor type and PWM voltage inverse conditional internal range sensor A PWM duty cycle Increment fail and sample time, update rate 25 milliseconds Controller specific PWM duty cycle thresholds are set to meet the following controller specification for a short to ground.	≤ 7.281 % duty cycle ≥ 7.281 % duty cycle ≤ 0.5 Ω impedance between signal and controller ground	diagnostic monitor enable battery voltage when sensor type is PWM duty cycle direct or inverse conditional for fail threshold is used conditional type check calibration	= 1 Boolean ≥ 0.00 volts = CeTRGD_e_VoltDirctProp	fail time ≥ 0.500 seconds out of sample time ≥ 1.500 seconds battery voltage time ≥ 1.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.	when PWM sensor type and PWM voltage direct conditional internal range sensor A PWM duty cycle when PWM sensor type and PWM voltage inverse conditional internal range sensor A PWM duty cycle Increment fail and sample time, update rate 25 milliseconds Controller specific PWM duty cycle thresholds are set to meet the following controller specification for a short to power.	≥ 92.719 % duty cycle ≤ 92.719 % duty cycle ≤ 0.5 Ω impedance between signal and controller power	diagnostic monitor enable battery voltage when sensor type is PWM duty cycle direct or inverse conditional for fail threshold is used conditional type check calibration	= 1 Boolean ≥ 0.00 volts = CeTRGD_e_VoltDirctProp	fail time ≥ 0.900 seconds out of sample time ≥ 1.100 seconds battery voltage time ≥ 1.000 seconds	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						EngineTorqueEstInaccurate AcceleratorPedalFailure CrankSensor_FA ECT_Sensor_FA VehicleSpeedSensor_FA		
			current transmission fluid temperature string length = previous transmission fluid temperature transmission temperature string length + (raw transmission fluid temperature - previous raw transmission fluid temperature, update rate 100 milliseconds, increment sample count	≥ 80.0 °C			sample count ≥ 10 counts evaluate fail temperature threshold, 100 millisecond update rate, if transmission fluid temperature string length above fail threshold increment fail time fail time ≥ 8.0 seconds out of sample time ≥ 12.0 seconds	
					diagnsotic monitor enable P0712 NOT fault active P0713 NOT fault active	= 1 Boolean		
					battery voltage	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					run crank voltage	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	
					intermittent test enable propulsion system active	= 1 Boolean = TRUE		
			raw transmission fluid temperature - previous	≤ 0.0000 °C			fail time ≥ 300.0 seconds	

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Fluid Temperature Sensor Circuit Low Voltage	P0713	Controller specific analog circuit diagnoses the transmission fluid temperature sensor and wiring for an open circuit or short to voltage failure by comparing a voltage measurement to controller specific voltage thresholds, converted to a resistance value.	circuit resistance update fail time 1 seconds update rate	≥ 49,411,396.0 Ω	diagnostic monitor enable battery voltage run crank voltage run crank voltage in range time	= 1 Boolean ≥ 9.00 volts ≥ 9.00 volts	fail time ≥ 5.00 seconds out of fail time ≥ 6.00 seconds 1 seconds update rate battery voltage in range time ≥ 0.100 seconds run crank voltage in range time ≥ 0.100 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Input Speed Sensor Performance	P0716	Detects unrealistic drop in raw transmission input speed signal RPM. Drop events are counted up to fail threshold. A drop event is defined by a sudden delta change in RPM from one value to a lower value. The raw transmission input speed must achieve a value high enough to record an unrealistic drop sample to sample. Once the drop threshold is met, fail time is accumualted indicating the raw transmission input speed has not recovered above a threshold, allowing the fail event count to increment. Multiple fail event counts must occur, but if the signal remains low, no further deltas occur, the "Input Speed Sensor Circuit Low Voltage" DTC will set before P0716, as P0716 is designed to set based on an intermittent raw transmission input speed signal RPM.	delta raw transmission input speed delta raw transmission input speed = raw transmission input speed - last valid raw transmission input speed, 25 millisecond update rate	≥ 2,000.0 RPM	service mode $04 active diagnostic monitor enable P0717 test fail this key on P07BF test fail this key on P07C0 test fail this key on last valid raw transmission input speed OR valid raw transmission input speed (before drop event) last valid raw transmission input speed updates very 25 milliseconds when stablity time complete as long as (delta delta raw transmission input speed AND raw transmission input speed) raw transmission output speed accelerator pedal position engine torque engine torque transmission hydraulic pressure available: engine speed	= FALSE = 1 Boolean = FALSE = FALSE = FALSE ≥ 240.0 RPM ≥ 240.0 RPM ≤ 320.0 RPM > 200.0 RPM ≥ 377.0 RPM ≥ 5.0 % ≤ 8,191.9 Nm ≥ 30.0 Nm ≥ 500.0 RPM	fail time ≥ 1.500 seconds updated fail event count, fail event count ≥ 5 counts, 25 millisecond update rate raw transmission input speed time ≥ 2.000 seconds stability time ≥ 0.100 seconds engine speed time ≥	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 ciruit electrical failure mode or sensor internal faults, or, controller internal failure modes. The raw transmission input speed signal RPM is rationalized against vehicle conditions in which the the powertrain is producing torque available at the drive wheels, but raw transmission input speed signal RPM remains low. After a sudden drop in raw transmission input speed signal RPM, a race condition can occur between P0717 and "Input Speed Sensor Performance" depending on the true nature of the failure.	raw transmission input speed OR TISS/TOSS fault (single power supply to TISS and TOSS) = TRUE, update fail time 25 millisecond update rate	≤ 168.0 RPM < 175.0 RPM	service mode $04 active diagnostic monitor enable run crank voltage service fast learn active run crank voltage P0722 fault active P0723 fault active P077C fault active P077D fault active brake pedal position sesnor must be OBDII to use brake pedal conditional brake pedal position sesnor type brake pedal position P0716 test fail this key on P07BF test fail this key on P07C0 test fail this key on accelerator pedal position engine torque engine torque (transmission current attained gear transmission current attained gear raw transmission output speed OR transmission current attained gear transmission current attained gear raw transmission output speed) P0717 fault active P0717 test fail this key on	= FALSE = 1 Boolean ≥ 5.00 volts = FALSE ≥ 9.00 volts = FALSE = FALSE = FALSE = FALSE = CeBRKR_e_OBD < 70.0 % = FALSE = FALSE = FALSE ≥ 5.0 % ≥ 30.0 Nm ≤ 8,191.9 Nm ≤ CeCGSR_e_CR_Fourth ≥ CeCGSR_e_CR_First ≥ 250.0 RPM ≤ CeCGSR_e_CR_Tenth ≥ CeCGSR_e_CR_Fourth ≥ 377.0 RPM	fail time ≥ 4.00 seconds run crank voltage time ≥ 25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						= FALSE = FALSE		
					TISS/TOSS fault (single power supply to TISS and TOSS) = TRUE occurs when: (P0722 fail time high gear exceeds fail threshold OR P0722 fail time low gear exceeds fail threshold) TISS/TOSS has single power supply calibration TISS/TOSS single power supply test enabled transmission hydraulic pressure available: engine speed DTCs not fault active	= 0 Boolean = 1 Boolean ≥ 500.0 RPM EngineTorqueEstInaccurate	engine speed time ≥ **engine speed time for transmission hydraulic pressure available**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 cailbration	= FALSE = 1 Boolean ≠ 0 counts = FALSE = FALSE ≥ 0.4434 seconds ≤ 0.2773 seconds < 0.2363 seconds > 0.1240 seconds < 0.0811 seconds > 0.0088 seconds < 0.4434 seconds > 0.2773 seconds = CeTOSR_e_Directional	fail time ≥ 3.500 seconds out of sample time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Output Speed Sensor Circuit Low Voltage	P0722	Detects no activity in raw transmission output speed signal RPM due to open ciruit electrical failure mode or sensor internal faults, or, controller internal failure modes. The raw transmission output speed signal RPM is rationalized against vehicle conditions in which the the powertrain is producing torque, but raw transmission output speed signal RPM remains low. After a sudden drop in raw transmission output speed signal RPM, a race condition can occur between P0722 and "Output Speed Sensor Circuit Intermittent" depending on the true nature of the failure.	raw transmission output speed, update fail time 6.25 millisecond update rate when: attained gear attained gear AND attained gear use high gear fail time threshold ELSE use low gear fail time threshold	≤ 30.0 RPM ≥ CeCGSR_e_CR_First ≤ CeCGSR_e_CR_Tenth > CeCGSR_e_CR_Fourth	service mode $04 active diagnostic monitor enable when neutral range occurs: (garage shift OR PRNDL OR PRNDL OR range inhibit state) AND (engine torque accelerator pedal position) when not neutral range occurs: attained gear attained gear (attained gear engine torque hysteresis high engine torque hysteresis low accelerator pedal position hysteresis high accelerator pedal position hysteresis low) when not neutral range occurs: (attained gear engine torque hysteresis high engine torque hysteresis low	= FALSE = 1 Boolean ≠ COMPLETE = PARK = NEUTRAL ≠ no inhibt active ≥ 8,192.0 Nm ≥ 100.0 % ≥ CeCGSR_e_CR_First ≤ CeCGSR_e_CR_Tenth > CeCGSR_e_CR_Fourth ≥ 30.0 Nm > 20.0 Nm ≥ 3.0 % > 1.5 % ≤ CeCGSR_e_CR_Fourth ≥ 50.0 Nm > 30.0 Nm	fail time ≥ 4.00 seconds high gear OR fail time ≥ 3.00 seconds low gear	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					accelerator pedal position hysteresis high	≥ 3.5 %		
					accelerator pedal position hysteresis low)	> 2.0 %		
					TISS enable occurs when:			
					(TISS speed select	= 1 Boolean		
					OR			
					TISS/TOSS has single power supply calibration	= 0 Boolean		
					AND			
					TISS	≤ 8,191.9 RPM		
					AND			
					TISS)	≥ 175.0 RPM		
					OR			
					(TISS speed select	≠ 1 Boolean		
					OR			
					TISS/TOSS has single power supply calibration	= 0 Boolean		
					AND			
					TISS	≤ 8,191.9 RPM		
					AND			
					TISS)	≥ 3,500.0 RPM		
					P0716 test fail this key on	= FALSE		
					P0717 test fail this key on	= FALSE		
					P07BF test fail this key on	= FALSE		
					P07C0 test fail this key on	= FALSE		
					PTO check:			
					PTO enable calibration is FALSE	≠ 1 Boolean		
					OR			
					(PTO enable calibration is TRUE	= 1 Boolean		
					AND			
					PTO active)	= TRUE		
					run crank voltage	≥ 5.00 volts	run crank voltage time ≥ 25 milliseconds	
					service fast learn active	= FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					run crank voltage transmission 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	≥ 9.00 volts ≥ -40.00 °C = FALSE = FALSE = FALSE = FALSE = FALSE ≥ 500.0 RPM AcceleratorPedalFailure EngineTorqueEstInaccurate	engine speed time ≥ **engine speed time for transmission hydraulic pressure available**	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Output Speed Sensor Circuit Intermittent	P0723	Detects unrealistic drop in raw transmission output speed signal RPM. Drop events are counted up to fail threshold. A drop event is defined by a sudden delta change in RPM from one value to a lower value. The raw transmission output speed must achieve a value high enough to record an unrealistic drop sample to sample. Once the drop threshold is met, fail time is accumualted indicating the raw transmission output speed has not recovered above a threshold, allowing the fail event count to increment. Multiple fail event counts must occur, but if the signal remains low, no further deltas occur, the "Output Speed Sensor Circuit Low Voltage" DTC will set before P0723, as P0723 is designed to set based on an intermittent raw transmission output speed signal RPM.	4WD low fail threshold: delta raw transmission output speed OR NOT 4WD low fail threshold, update fail time, delta raw transmission output speed = raw transmission output speed previous loop - raw transmission output speed, 25 millisecond update rate	≥ 1,755.0 RPM ≥ 650.0 RPM	service mode $04 active diagnostic monitor enable transmission engaged state 4WD low state PTO check: PTO enable calibration is FALSE OR (PTO enable calibration is TRUE AND PTO active) run crank voltage service fast learn active run crank voltage P077C test fail this key on P077D test fail this key on when PRNDL is moved to	= FALSE = 1 Boolean ≠ not engaged = 4WD low state previous loop, 25 millisecond update rate ≠ 1 Boolean = 1 Boolean = TRUE ≥ 5.00 volts = FALSE ≥ 9.00 volts = FALSE = FALSE	fail time ≥ 1.500 seconds updated fail event count, fail event count ≥ 5 counts, 25 millisecond update rate transmission engaged state time ≥ **P0723 transmission engaged state time threshold** 4WD low change time ≥ 3.0 seconds run crank voltage time ≥ 25 milliseconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 (TISS/TOSS has single power supply calibration AND raw transmission input speed)	= CeTRGR_e_PRNDL_Neutral = CeTRGR_e_PRNDL_Transitional1 N-D transitional = CeTRGR_e_PRNDL_Transitional4 R-N transitional ≥ 250.0 RPM ≥ 250.0 RPM ≤ 4,095.9 RPM ≥ 200.0 RPM = 0 Boolean = 0.0 RPM	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.
					select delta RPM fail theshold: (4WD low state AND $WD low valid) select P0723 4WD TOSS delta fail threshold otherwise use P0723 TOSS delta fail threshold	 = TRUE = TRUE		
					last valid raw transmission output speed OR valid raw transmission output speed (before drop event)	> 36.0 RPM > 36.0 RPM	raw transmission output speed time ≥ 2.00 seconds	
					last valid raw transmission output speed updates very 25 milliseconds when stablity time complete as long as (delta delta raw transmission output speed AND raw transmission output speed)	≤ 140.0 RPM ≥ 36.0 RPM	stability time ≥ 0.100 seconds	
					transmission hydraulic pressure available: engine speed	≥ 500.0 RPM	engine speed time ≥ **engine speed time for transmission hydraulic pressure available**	
					DTCs not fault active	Accelerator PedalFailure EngineTorqueEstInaccurate		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Torque Converter Clutch (TCC) System Performance - GR10 specific	P0741	The GR10 diagnostic monitor detects the transmission torque converter control valve failed hydraulically on. The torque converter hydraulic control circuit is multiplexed with the transmission clutch select valve hydraulic control circuit, allowing for the torque converter control valve stuck on test to execute when the clutch select valve solenoid is commanded ON. When the clutch select valve solenoid is commanded ON as the vehicle speed decreases toward zero KPH, and, if the torque converter control valve is stuck on, the torque converter slip speed rate of change will have a large slope while decreasing toward zero RPM, and the torque converter slip speed will remain low near zero RPM.	calculated transmission torque converter K factor = engine speed / SQR (engine torque) increment fail count 25 millisecond update rate	> **P0741 GR10 torque converter K factor fail limit** see supporting table	diagnostic monitor enable (TCC stuck off enable OR TCC stuck on enable) hydraulic pressure available: engine speed battery voltage run crank voltage P281B falut active P281D falut active P281E falut active P0722 fault pending P0723 fault pending PRNDL PRNDL transmission fluid temperature transmission fluid temperature	= 1 Boolean = 1 Boolean = 1 Boolean ≥ 500.0 RPM ≥ 9.00 volts ≥ 9.00 volts = FALSE = FALSE = FALSE = FALSE = FALSE ≠ PARK ≠ NEUTRAL ≥ -6.66 °C ≤ 130.0 °C	fail count ≥ 4 counts in 100 count sample 25 millisecond update rate engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					engine speed intrusive shift active (intrusive shift due to fault maturing for clutch pressure control solenoid stuck off/on P0746, P0747, P0776, P0777, P0796, P0797, P2714, P2715, P2723, P2724, P2732, P2733, P2820, P2821) P0741 test fail this key on range shift state attained gear slip engine torque accelerator pedal position accelerator pedal position transmission torque converter speed ratio (transmission turbine shaft speed / engine speed) DTCs not fault active	≥ 1,500.0 RPM = FALSE = FALSE = range shift complete (steagy state gear) ≤ 75.0 RPM ≥ 5.00 Nm ≥ 0.00 % ≤ 100.0 % ≤ 0.950 AcceleratorPedalFailure EngineTorqueEstInaccurate CrankSensor_FA P0716, P0717, P07BF, P07C0 P0722, P0723, P077C, P077D		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid A Stuck Off	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	use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled service fast learn active service solenoid cleaning procedure active hydraulic pressure	= 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean	fail time ≥ 1.00 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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			available: engine speed enable C1 clutch slip speed fail compare when: diagnostic clutch test C1 ((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 FASLE (startle mitigation) clutch steady state adaptive active transmission output shaft speed C1 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation accelerator pedal position engine speed diagnostic clutch test C1 set to HOLDING CLUTCH when: clutch solenoid test state	≥ 500.0 RPM = HOLDING CLUTCH = FALSE = TRUE ≠ initial startle mitigation gear = FALSE = 0 Boolean = FALSE ≥ 36.0 RPM = TRUE ≥ 0.50 % ≥ 1,000.0 RPM = NEUTRAL TEST	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

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 a clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to the GF9 C1 CB123456, or, GR10 C1 CB123456R, clutch pressure control solenoid.			((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) C1 clutch pressured map clutch solenoid test state set to NEUTRAL TEST when: test trigger initialize range shift complete time, when range shift state, range shift complete time must time down to zero when range shift complete test trigger set to TRUE: enable forward gear AND direction request OR enable reverse gear AND direction request current loop test trigger clutch control solenoid test state range shift state NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on	= FALSE = TRUE ≠ initial startle mitigation gear = mapped to line pressure, C1 clutch pressure has transtioned from off-applying-applied = TRUE ≠ range shift completed = 1 Boolean = forward gear = 0 Boolean = reverse gear = FALSE ≠ NEUTRAL TEST = range shift completed	initialize range shift complete time = 1.000 seconds, range shift complete time must time down to zero when range shift complete	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			
					DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		
					DTCs not test fail this key on	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821		
					DTCs not fault active	AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

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 not power down shift, C1 clutch slip speed update fail time 6.25 milliscond update	< 50.0 RPM < 50.0 RPM	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	= 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean	shift type is power down shift, fail time ≥ 0.600 seconds, OR shift type is not power down shift, fail time ≥ 0.150 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 a clutch pressure control solenoid stuck			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: engine speed transmission output shaft speed set solenoid stuck on test trigger to TRUE when: clutch pressure control solenoid stuck off stuck intrusive shift request startle mitigation active (see startle mitigation active NOTE below) clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) initialize active clutch controller (clutch control processing in process of sequencing clutches on	= TRUE Boolean = FALSE Boolean = FALSE Boolean ≥ 500.0 RPM ≥ 36.0 RPM = FALSE = FALSE ≠ TIE UP TEST TEST STATE ≠ TIE UP TEST HOLD = TRUE	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		on test is disabled. This diagnostic monitor is relative to the GF9 C1 CB123456, or, GR10 C1 CB123456R, clutch pressure control solenoid.			and off for auto trans shift) (shift type enable for staged steady state shift - shift in process when new shift type occurs - interrupted shift OR shift type enable for garage shift OR shift type enable for negative torque up shift OR shift type enable for open throttle power on up shift OR shift type enable for closed throttle down shift OR shift type enable for open throttle power down shift OR shift type enable for closed throttle lift foot up shift) OR clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) transition clutch controller active clutch controller (staged steady sate shift - shift not in process, no new shift type occuring, no interrupted shift) set clutch control solenoid test state to TIE UP TEST	= 0 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = TIE UP TEST TEST STATE = TIE UP TEST HOLD = TRUE ≠ staged steady state		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					TEST STATE when: solenoid stuck on test trigger current loop clutch control solenoid test state OR current loop clutch control solenoid test state (see clutch control solenoid test state NOTE below) range shift state solenoid stuck on test trigger additional off going clutch occured (clutch control solenoid test state OR clutch control solenoid test state) (see clutch control solenoid test state NOTE below) diagnostic clutch test (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 pressure	= TRUE = TEST WAITING = TIE UP TEST HOLD ≠ range shift complete = TRUE = TRUE = TIE UP TEST TEST STATE = TIE UP TEST HOLD = OFF GOING CLUTCH TEST = TRUE = 1 Boolean ≤ 350.0 kPa	for C1 off going clutch pressure time ≥ **P0747 C1 clutch exhaust delay time closed throttle lift foot up shift** OR	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							P0747 C1 clutch exhaust delay time open throttle power on up shift OR **P0747 C1 clutch exhaust delay time garage shift** OR **P0747 C1 clutch exhaust delay time closed throttle down shift** OR **P0747 C1 clutch exhaust delay time negative torque up shift** OR **P0747 C1 clutch exhaust delay time open throttle power down shift** see supporting tables	
					engine torque primary on coming clutch active primary on coming control state closed throttle down shift primary on coming clutch pressure OR	≥ 8,191.8 Nm = TRUE ≠ clutch fill phase ≥ **on coming clutch minimum command pressure, closed throttle down shift**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					garage shift primary on coming clutch pressure OR negative torque up shift primary on coming clutch pressure OR power down shift primary on coming clutch pressure OR power on up shift C2 on coming clutch pressure OR power on up shift C3 on coming clutch pressure OR power on up shift C4 on coming clutch pressure OR power on up shift C5 on coming clutch pressure OR power on up shift C6 on coming clutch pressure OR garage shift primary on	**on coming clutch minimum command pressure, garage shift ≥** **on coming clutch minimum command pressure, negative torque up shift ≥** **on coming clutch minimum command pressure, power down shift ≥** **C2 on coming clutch minimum command pressure, power on up shift ≥** **C3 on coming clutch minimum command pressure, power on up shift ≥** **C4 on coming clutch minimum command pressure, power on up shift ≥** **C5 on coming clutch minimum command pressure, power on up shift ≥** **C6 on coming clutch minimum command pressure, power on up shift ≥**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					coming clutch pressure OR negative torque up shift primary on coming clutch pressure OR open throttle power down shift primary on coming clutch pressure OR closed throttle down shift primary on coming clutch pressure C1 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an automatic transmission shift due to two conditions: Current value of clutch control solenoid test state is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND	≥ 450.0 kPa ≥ 450.0 kPa ≥ 450.0 kPa ≥ 400.0 kPa = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed ≥ clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift state = range shift complete. NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821. DTCs not fault pending	P0716 P0717 P0722		

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 DTCs not fault active	P0723 P077C P077D P07BF P07C0 P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821 AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Stuck Off	P0776	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C1 clutch slip speed, update fail time 6.25 milliscond update	≥ 200.0 RPM			fail time ≥ 1.00 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update	Type A, 1 Trips
					use battery voltage calibration is FALSE	= 1 Boolean		
					OR			
					(use battery voltage calibration is TRUE	= 1 Boolean		
					AND			
					battery voltage	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					use run crank voltage calibration is FALSE	= 0 Boolean		
					OR			
					(use run crank voltage calibration is TRUE	= 0 Boolean		
					AND			
					run crank voltage	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	
					TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled	= TRUE Boolean		
					service fast learn active	= FALSE Boolean		
					service solenoid cleaning procedure active	= FALSE Boolean		
					hydraulic pressure			

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			available: engine speed enable C2 clutch slip speed fail compare when: diagnostic clutch test C2 ((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 FASLE (startle mitigation) clutch steady state adaptive active transmission output shaft speed C2 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation accelerator pedal position engine speed diagnostic clutch test C2 set to HOLDING CLUTCH when: clutch solenoid test state	≥ 500.0 RPM = HOLDING CLUTCH = FALSE = TRUE ≠ initial startle mitigation gear = FALSE = 0 Boolean = FALSE ≥ 36.0 RPM = TRUE ≥ 0.50 % ≥ 1,000.0 RPM = NEUTRAL TEST	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

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 a clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to the GF9 C2 CB29 or GR10 C2 CB128910R, clutch pressure control solenoid.			((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) C2 clutch pressured map clutch solenoid test state set to NEUTRAL TEST when: test trigger initialize range shift complete time, when range shift state, range shift complete time must time down to zero when range shift complete test trigger set to TRUE: enable forward gear AND direction request OR enable reverse gear AND direction request current loop test trigger clutch control solenoid test state range shift state NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on	= FALSE = TRUE ≠ initial startle mitigation gear = mapped to line pressure, C2 clutch pressure has transtioned from off-applying-applied = TRUE ≠ range shift completed = 1 Boolean = forward gear = 0 Boolean = reverse gear = FALSE ≠ NEUTRAL TEST = range shift completed	initialize range shift complete time = 1.000 seconds, range shift complete time must time down to zero when range shift complete	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			
					DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		
					DTCs not test fail this key on	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821		
					DTCs not fault active	AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

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 not power down shift, C2 clutch slip speed update fail time 6.25 milliscond update	< 50.0 RPM < 50.0 RPM	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	= 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean	shift type is power down shift, fail time ≥ 0.600 seconds, OR shift type is not power down shift, fail time ≥ 0.150 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 a clutch pressure control solenoid stuck			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: engine speed transmission output shaft speed set solenoid stuck on test trigger to TRUE when: clutch pressure control solenoid stuck off stuck intrusive shift request startle mitigation active (see startle mitigation active NOTE below) clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) initialize active clutch controller (clutch control processing in process of sequencing clutches on	= TRUE Boolean = FALSE Boolean = FALSE Boolean ≥ 500.0 RPM ≥ 36.0 RPM = FALSE = FALSE ≠ TIE UP TEST TEST STATE ≠ TIE UP TEST HOLD = TRUE	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		on test is disabled. This diagnostic monitor is relative to the GF9 C2 CB29 or GR10 C2 CB128910R, clutch pressure control solenoid.			and off for auto trans shift) (shift type enable for staged steady state shift - shift in process when new shift type occurs - interrupted shift OR shift type enable for garage shift OR shift type enable for negative torque up shift OR shift type enable for open throttle power on up shift OR shift type enable for closed throttle down shift OR shift type enable for open throttle power down shift OR shift type enable for closed throttle lift foot up shift) OR clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) transition clutch controller active clutch controller (staged steady sate shift - shift not in process, no new shift type occuring, no interrupted shift) set clutch control solenoid test state to TIE UP TEST	= 0 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = TIE UP TEST TEST STATE = TIE UP TEST HOLD = TRUE ≠ staged steady state		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					TEST STATE when: solenoid stuck on test trigger current loop clutch control solenoid test state OR current loop clutch control solenoid test state (see clutch control solenoid test state NOTE below) range shift state solenoid stuck on test trigger additional off going clutch occured (clutch control solenoid test state OR clutch control solenoid test state) (see clutch control solenoid test state NOTE below) diagnostic clutch test (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 pressure	= TRUE = TEST WAITING = TIE UP TEST HOLD ≠ range shift complete = TRUE = TRUE = TIE UP TEST TEST STATE = TIE UP TEST HOLD = OFF GOING CLUTCH TEST = TRUE = 1 Boolean ≤ 350.0 kPa	for C2 off going clutch pressure time ≥ **P0777 C2 clutch exhaust delay time closed throttle lift foot up shift** OR	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							P0777 C2 clutch exhaust delay time open throttle power on up shift OR **P0777 C2 clutch exhaust delay time garage shift** OR **P0777 C2 clutch exhaust delay time closed throttle down shift** OR **P0777 C2 clutch exhaust delay time negative torque up shift** OR **P0777 C2 clutch exhaust delay time open throttle power down shift** see supporting tables	
					engine torque primary on coming clutch active primary on coming control state closed throttle down shift primary on coming clutch pressure OR	≥ 8,191.8 Nm = TRUE ≠ clutch fill phase ≥ **on coming clutch minimum command pressure, closed throttle down shift**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					garage shift primary on coming clutch pressure OR negative torque up shift primary on coming clutch pressure OR power down shift primary on coming clutch pressure OR power on up shift C1 on coming clutch pressure OR power on up shift C3 on coming clutch pressure OR power on up shift C4 on coming clutch pressure OR power on up shift C5 on coming clutch pressure OR power on up shift C6 on coming clutch pressure OR garage shift primary on coming clutch pressure OR	**on coming clutch minimum command pressure, garage shift** ≥ **on coming clutch minimum command pressure, negative torque up shift** ≥ **on coming clutch minimum command pressure, power down shift** ≥ **C1 on coming clutch minimum command pressure, power on up shift** ≥ **C3 on coming clutch minimum command pressure, power on up shift** ≥ **C4 on coming clutch minimum command pressure, power on up shift** ≥ **C5 on coming clutch minimum command pressure, power on up shift** ≥ **C6 on coming clutch minimum command pressure, power on up shift** ≥ ≥ 750.0 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					negative torque up shift primary on coming clutch pressure OR open throttle power down shift primary on coming clutch pressure OR closed throttle down shift primary on coming clutch pressure C2 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an automatic transmission shift due to two conditions: Current value of clutch control solenoid test state is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND That off going clutch pressure control solenoid	≥ 450.0 kPa ≥ 500.0 kPa ≥ 400.0 kPa = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed ≥ clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift state = range shift complete. NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821. DTCs not fault pending DTCs not test fail this key	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					on DTCs not fault active	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821 AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Output Speed Sensor Circuit Low	P077C	Controller specific analog circuit diagnoses the transmission output speed sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission output speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	≤ 0.2500 volts (≤ 0.5 Ω impedance between signal and controller ground)	service mode $04 active diagnostic monitor enable P077D fault active service fast learn run crank voltage battery voltage P077C fault active P077C test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE ≥ 10.00 volts ≥ 10.00 volts = FALSE = FALSE	fail time ≥ 0.050 seconds, update fail count 12.5 millisecond update rate fail count ≥ 16 counts 12.5 millisecond update rate run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Output Speed Sensor Circuit High	P077D	Controller specific analog circuit diagnoses the transmission output speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission output speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	≥ 4.7500 volts (≤ 0.5 Ω impedance between signal and controller power)	service mode $04 active diagnostic monitor enable P077C fault active service fast learn run crank voltage battery voltage P077D fault active P077D test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE ≥ 10.00 volts ≥ 10.00 volts = FALSE = FALSE	fail time ≥ 0.050 seconds, update fail count 12.5 millisecond update rate fail count ≥ 16 counts 12.5 millisecond update rate run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid C Stuck Off	P0796	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C1 clutch slip speed, update fail time 6.25 milliscond update	≥ 200.0 RPM	use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled service fast learn active service solenoid cleaning procedure active hydraulic pressure	= 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean	fail time ≥ 1.00 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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			available: engine speed enable C3 clutch slip speed fail compare when: diagnostic clutch test C3 ((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 FASLE (startle mitigation) clutch steady state adaptive active transmission output shaft speed C3 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation accelerator pedal position engine speed diagnostic clutch test C3 set to HOLDING CLUTCH when: clutch solenoid test state	≥ 500.0 RPM = HOLDING CLUTCH = FALSE = TRUE ≠ initial startle mitigation gear = FALSE = 0 Boolean = FALSE ≥ 36.0 RPM = TRUE ≥ 0.50 % ≥ 1,000.0 RPM = NEUTRAL TEST	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

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 a clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to the GF9 C3 CB38, or, GR10 C3 CB123456R, clutch pressure control solenoid.			((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) C3 clutch pressured map clutch solenoid test state set to NEUTRAL TEST when: test trigger initialize range shift complete time, when range shift state, range shift complete time must time down to zero when range shift complete test trigger set to TRUE: enable forward gear AND direction request OR enable reverse gear AND direction request current loop test trigger clutch control solenoid test state range shift state NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on	= FALSE = TRUE ≠ initial startle mitigation gear = mapped to line pressure, C3 clutch pressure has transtioned from off-applying-applied = TRUE ≠ range shift completed = 1 Boolean = forward gear = 0 Boolean = reverse gear = FALSE ≠ NEUTRAL TEST = range shift completed	initialize range shift complete time = 1.000 seconds, range shift complete time must time down to zero when range shift complete	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			
					DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		
					DTCs not test fail this key on	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821		
					DTCs not fault active	AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

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 not power down shift, C3 clutch slip speed update fail time 6.25 milliscond update	< 50.0 RPM < 50.0 RPM	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	= 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean	shift type is power down shift, fail time ≥ 0.600 seconds, OR shift type is not power down shift, fail time ≥ 0.150 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 a clutch pressure control solenoid stuck			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: engine speed transmission output shaft speed set solenoid stuck on test trigger to TRUE when: clutch pressure control solenoid stuck off stuck intrusive shift request startle mitigation active (see startle mitigation active NOTE below) clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) initialize active clutch controller (clutch control processing in process of sequencing clutches on	= TRUE Boolean = FALSE Boolean = FALSE Boolean ≥ 500.0 RPM ≥ 36.0 RPM = FALSE = FALSE ≠ TIE UP TEST TEST STATE ≠ TIE UP TEST HOLD = TRUE	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		on test is disabled. This diagnostic monitor is relative to the GF9 C3 CB38, or, GR10 C3 CB123456R, clutch pressure control solenoid.			and off for auto trans shift) (shift type enable for staged steady state shift - shift in process when new shift type occurs - interrupted shift OR shift type enable for garage shift OR shift type enable for negative torque up shift OR shift type enable for open throttle power on up shift OR shift type enable for closed throttle down shift OR shift type enable for open throttle power down shift OR shift type enable for closed throttle lift foot up shift) OR clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) transition clutch controller active clutch controller (staged steady sate shift - shift not in process, no new shift type occuring, no interrupted shift) set clutch control solenoid test state to TIE UP TEST	= 0 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = TIE UP TEST TEST STATE = TIE UP TEST HOLD = TRUE ≠ staged steady state		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					TEST STATE when:			
					solenoid stuck on test trigger	= TRUE		
					current loop clutch control solenoid test state	= TEST WAITING		
					OR			
					current loop clutch control solenoid test state (see clutch control solenoid test state NOTE below)	= TIE UP TEST HOLD		
					range shift state	≠ range shift complete		
					solenoid stuck on test trigger	= TRUE		
					additional off going clutch occured	= TRUE		
					(clutch control solenoid test state OR	= TIE UP TEST TEST STATE		
					clutch control solenoid test state) (see clutch control solenoid test state NOTE below)	= TIE UP TEST HOLD		
					diagnostic clutch test	= OFF GOING CLUTCH TEST		
					(C3 off going clutch pressure control ramp time out complete AND	= TRUE		
					off going clutch pressure ramp control ramp time out enable)	= 1 Boolean		
					OR			
					C3 off going clutch pressure	≤ 350.0 kPa	for C3 off going clutch pressure time ≥ **P0797 C3 clutch exhaust delay time closed throttle lift foot up shift** OR	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							P0797 C3 clutch exhaust delay time open throttle power on up shift OR **P0797 C3clutch exhaust delay time garage shift** OR **P0797 C3 clutch exhaust delay time closed throttle down shift** OR **P0797 C3 clutch exhaust delay time negative torque up shift** OR **P0797 C3 clutch exhaust delay time open throttle power down shift** see supporting tables	
					engine torque primary on coming clutch active primary on coming control state closed throttle down shift primary on coming clutch pressure OR	≥ 8,191.8 Nm = TRUE ≠ clutch fill phase ≥ **on coming clutch minimum command pressure, closed throttle down shift**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					garage shift primary on coming clutch pressure OR negative torque up shift primary on coming clutch pressure OR power down shift primary on coming clutch pressure OR power on up shift C1 on coming clutch pressure OR power on up shift C2 on coming clutch pressure OR power on up shift C4 on coming clutch pressure OR power on up shift C5 on coming clutch pressure OR power on up shift C6 on coming clutch pressure OR garage shift primary on coming clutch pressure OR	**on coming clutch minimum command pressure, garage shift** ≥ **on coming clutch minimum command pressure, negative torque up shift** ≥ **on coming clutch minimum command pressure, power down shift** ≥ **C1 on coming clutch minimum command pressure, power on up shift** ≥ **C2 on coming clutch minimum command pressure, power on up shift** ≥ **C4 on coming clutch minimum command pressure, power on up shift** ≥ **C5 on coming clutch minimum command pressure, power on up shift** ≥ **C6 on coming clutch minimum command pressure, power on up shift** ≥ ≥ 850.0 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					negative torque up shift primary on coming clutch pressure OR open throttle power down shift primary on coming clutch pressure OR closed throttle down shift primary on coming clutch pressure C3 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an automatic transmission shift due to two conditions: Current value of clutch control solenoid test state is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND That off going clutch pressure control solenoid	≥ 450.0 kPa ≥ 600.0 kPa ≥ 400.0 kPa = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed ≥ clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift state = range shift complete. NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821. DTCs not fault pending DTCs not test fail this key	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					on DTCs not fault active	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821 AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Input/Turbine Speed Sensor A Circuit Low	P07BF	Controller specific analog circuit diagnoses the transmission input/ turbine speed sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission intput/turbine speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	≤ 0.2500 volts (≤ 0.5 Ω impedance between signal and controller ground)	service mode $04 active diagnostic monitor enable P07C0 fault active service fast learn run crank voltage battery voltage P07BF fault active P07BF test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE ≥ 10.00 volts ≥ 10.00 volts = FALSE = FALSE	fail time ≥ 0.050 seconds, update fail count 12.5 millisecond update rate fail count ≥ 16 counts 12.5 millisecond update rate run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Input/Turbine Speed Sensor A Circuit High	P07C0	Controller specific analog circuit diagnoses the transmission input/ turbine speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission input/turbine speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	≥ 4.7500 volts (≤ 0.5 Ω impedance between signal and controller power)	service mode $04 active diagnostic monitor enable P07BF fault active service fast learn run crank voltage battery voltage P07C0 fault active P07C0 test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE ≥ 10.00 volts ≥ 10.00 volts = FALSE = FALSE	fail time ≥ 0.050 seconds, update fail count 12.5 millisecond update rate fail count ≥ 16 counts 12.5 millisecond update rate run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Upshift Switch Circuit	P0815	Diagnoses the state of the upshift switch circuit, stuck in the state "tap up" (upshift) active.	switch state update fail time 1 100 millisecond update rate	= tap up (upshift) state active	service mode $04 active diagnostic monitor enable run crank voltage run crank voltage time run crank voltage P1761 fault active P0826 fault active P0826 test fail this key on P0826 fault pending (P0815 fault active OR P0815 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10 OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = 1 Boolean ≥ 5.00 volts ≥ 25 milliseconds ≥ 9.00 volts = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE ≥ 1.00 seconds = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity	fail time 1 ≥ 1.00 seconds	Emissions Neutral Diagnostic – Type C
			switch state update fail time 2 100 millisecond update rate	= tap up (upshift) state active	service mode $04 active diagnostic monitor enable run crank voltage run crank voltage time run crank voltage P1761 fault active	= FALSE = 1 Boolean ≥ 5.00 volts ≥ 25 milliseconds ≥ 9.00 volts = FALSE	fail time 2 ≥ 120.00 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P0826 fault active P0826 test fail this key on P0826 fault pending (P0815 fault active OR P0815 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10 OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = FALSE = FALSE = FALSE = FALSE ≥ 1.00 seconds = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Downshift Switch Circuit	P0816	Diagnoses the state of the downshift switch circuit, stuck in the state "tap down" (downshift) active.	switch state update fail time 1 100 millisecond update rate	= tap down (downshift) state active	service mode $04 active diagnostic monitor enable run crank voltage run crank voltage time run crank voltage P1761 fault active P0826 fault active P0826 test fail this key on P0826 fault pending (P0816 fault active OR P0816 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10 OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = 1 Boolean ≥ 5.00 volts ≥ 25 milliseconds ≥ 9.00 volts = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE ≥ 1.00 seconds = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity	fail time 1 ≥ 1.00 seconds	Emissions Neutral Diagnostic – Type C
			switch state update fail time 2 100 millisecond update rate	= tap down (downshift) state active	service mode $04 active diagnostic monitor enable run crank voltage run crank voltage time run crank voltage P1761 fault active	= FALSE = 1 Boolean ≥ 5.00 volts ≥ 25 milliseconds ≥ 9.00 volts = FALSE	fail time 2 ≥ 120.00 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P0826 fault active P0826 test fail this key on P0826 fault pending (P0816 fault active OR P0816 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10 OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = FALSE = FALSE = FALSE = FALSE ≥ 1.00 seconds = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Up and Down Shift Switch Circuit	P0826	Diagnoses the state of the upshift/downshift switch circuit at an illegal voltage, voltage out of range.	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 Diagnostic – Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid A Control Circuit Open	P0960	Controller specific circuit diagnoses 9 speed CB123456 or 10 speed CB123456R 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 Increment fail time	≥ 200 K Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid A Control Circuit Low Voltage	P0962	Controller specific circuit diagnoses 9 speed CB123456 or 10 speed CB123456R 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.100 seconds out of sample time ≥ 0.167 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 A Control Circuit High Voltage	P0963	Controller specific circuit diagnoses 9 speed CB123456 or 10 speed CB123456R 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller voltage source	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Control Circuit Open	P0964	Controller specific circuit diagnoses 9 speed CB29 or 10 speed CB128910R 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 Increment fail time	≥ 200 K Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Control Circuit Low Voltage	P0966	Controller specific circuit diagnoses 9 speed CB123456 or 10 speed CB123456R 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.100 seconds out of sample time ≥ 0.167 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 B Control Circuit High Voltage	P0967	Controller specific circuit diagnoses 9 speed CB123456 or 10 speed CB123456R 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller voltage source	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid C Control Circuit Open	P0968	Controller specific circuit diagnoses 9 speed CB38 or 10 speed C23457910 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 Increment fail time	≥ 200 K Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid C Control Circuit Low Voltage	P0970	Controller specific circuit diagnoses 9 speed CB38 or 10 speed C23457910 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.100 seconds out of sample time ≥ 0.167 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 Control Circuit High Voltage	P0971	Controller specific circuit diagnoses 9 speed CB38 or 10 speed C23457910 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller voltage source	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Serial Peripheral Interface Bus 1	P16F0	This DTC detects intermitent and continuous invalid SPI messages. This is based on the detection of missing or invalid receive message within the main processor before receiving a valid message.	This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor before receiving a valid message.		Run/Crank voltage	> 6.41 Volts	100 / 16 counts continuous; 12.5 ms /count in the ECM main processor	Type A, 1 Trips
			This function detects a serial communications fault based upon the detection of missing or invalid (receive) message within the main processor after receiving a valid message.		Run/Crank voltage	> 6.41 Volts	8 / 16 counts continuous; 12.5 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 Redundant Memory Performance	P16F3	The diagnostic monitor is a rationalization of command values: command clutch pressures and command gear. The monitor is broken up into two fault detection routines, command pressure (tie up) fault detection and command gear/shift fault detection. The command pressure (tie up) fault detection is designed to verify the number of clutches applied in a given gear state is limited, in order to prevent a transmission internal mechanical tie-up condition. A condition which could lead to a vehicle deceleration above the design safety metric. If commanded clutch pressures are above a threshold which would allow multiple clutches to carry torque, the clutch is considered applied, otherwise the clutch is considered released. If there are more clutches applied, via the commanded clutch pressures, in a given gear state than is rational, one or more of	command pressure (tie up) fault detection minimum # of clutches ON by attained gear and by comanded gear, take lower of the 2 values, where attained gear is the current operating gear and command gear is the targetted value to transtion toward see **9 speed transmission clutch definition and gear state to clutch map** and **10 speed transmission clutch definition and gear state to clutch map** attached supporting tables for clutch 1 through clutch 7 definition and gear state to clutch map	≤ **NumClchTieUp** See Attached Supporting Tables	Reduandant Memory Command Pressure Enable Calibraiton Not Reduandant Memory Command Pressure Enable Calibraiton No traction event in progress: ABS((driven wheel speed - non-drive wheel speed) / driven wheel speed) 25 millisecond derivative TOSS RPM, (TOSS delta 25 millisecond loop to 25 milsecond loop) / 25 millisecond for time Clutch 1 hydraulic volume fill factor Clutch 2 hydraulic volume fill factor Clutch 3 hydraulic volume fill factor Clutch 4 hydraulic volume fill factor Clutch 5 hydraulic volume fill factor Clutch 6 hydraulic volume fill factor Clutch 7 hydraulic volume fill factor when clutch is off going (releasing) clutch the commanded clutch pressure equation = ((pressure control solenoid command	= 0 Boolean = 1 Boolean ≥ 0.00 % < 0.750 * **P2D2 Cltch Slip Sum** see attached supporting Table ≥ 0.0500 seconds ≥ 1.000 unitless ≥ 1.000 unitless ≥ 1.000 unitless ≥ 1.000 unitless ≥ 1.000 unitless ≥ 1.000 unitless ≥ 1.000 unitless	single event 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		the clutch pressure command values are in error. Given rate of change of transmission output shaft speed, command gear state clutches and clutch hydraulic fill volumes, those clutches in transition from the hydraulic released state to the hydraulic applied state and from the hydraulic applied state to the hydraulic released state, the rationality detects any number of command clutch pressures above a threshold, that are simultaneously active to cause a vehicle deceleration above the design safety metric. The command gear/ shift fault detection is designed to verify the commanded gear will not induce a downshift resulting in a gear state that is erroneous given vehicle operating conditions. The detection rationalizes the command gear against a minimum gear, highest gear ratio, for given vehicle speed and driver accelerator position.			pressure - pressure offset) * regulator valve gain) - regulator valve return spring pressure adaptive when clutch 1 is off going clutch: clutch 1 command pressure clutch 1 state is OFF when: clutch 1 command pressure, else clutch is ON and count clutch 1 toward minimum # of clutches ON when clutch 2 is off going clutch: clutch 2 command pressure clutch 2 state is OFF when: clutch 2 command pressure, else clutch is ON and count clutch 2 toward minimum # of clutches ON when clutch 3 is off going clutch: clutch 3 command pressure	 = ((clutch 1 pressure control solenoid command pressure - 0.00) * 1.00) - regulator valve return spring pressure adaptive, kPa **P2D2 Decel Pressure - ≤ C1** see attached supporting tables = ((clutch 2 pressure control solenoid command pressure - 0.00) * 1.00) - regulator valve return spring pressure adaptive, kPa **P2D2 Decel Pressure - ≤ C2** see attached supporting tables = ((clutch 3 pressure		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						control solenoid command pressure - 0.00) * 1.00) - regulator valve return spring pressure adaptive, kPa		
					clutch 3 state is OFF when: clutch 3 command pressure, else clutch is ON and count clutch 3 toward minimum # of clutches ON	**P2D2 Decel Pressure - ≤ C3** see attached supporting tables		
					when clutch 4 is off going clutch: clutch 4 command pressure	= ((clutch 4 pressure control solenoid command pressure - 0.00) * 1.00) - regulator valve return spring pressure adaptive, kPa		
					clutch 4 state is OFF when: clutch 4 command pressure, else clutch is ON and count clutch 4 toward minimum # of clutches ON	**P2D2 Decel Pressure - ≤ C4** see attached supporting tables		
					when clutch 5 is off going clutch: clutch 5 command pressure	= ((clutch 5 pressure control solenoid command pressure - 0.00) * 1.00) - regulator valve return spring pressure adaptive, kPa		
					clutch 5 state is OFF when: clutch 5 command pressure,			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					else clutch is ON and count clutch 5 toward minimum # of clutches ON when clutch 6 is off going clutch: clutch 6 command pressure clutch 6 state is OFF when: clutch 6 command pressure, else clutch is ON and count clutch 6 toward minimum # of clutches ON when clutch 7 is off going clutch: clutch 7 command pressure clutch 7 state is OFF when: clutch 7 command pressure, else clutch is ON and count clutch 7 toward minimum # of clutches ON service fast learn not active	**P2D2 Decel Pressure - ≤ C5** see attached supporting tables = ((clutch 6 pressure control solenoid command pressure - 0.00) * 1.00) - regulator valve return spring pressure adaptive, kPa **P2D2 Decel Pressure - ≤ C6** see attached supporting tables = ((clutch 7 pressure control solenoid command pressure - 0.00) * 1.00) - regulator valve return spring pressure adaptive, kPa **P2D2 Decel Pressure - ≤ C7** see attached supporting tables		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					no speed sensor DTCs fault active: P0716, P0717, P0721, P0722, P0723, P077C, P077D, P07BF, P07C0, P172A, P172B, P176B, P176C, P176D, P1783, P178F, P17C4, P17C5, P17C6, P17CC, P17CD, P17CE, P17D3, P17D6 no high side driver DTCs fault active: P0658, P2670			
			command gear/shift fault detection 1st gear commanded and vehicle seed OR 2nd gear commanded and vehicle seed OR 3rd gear commanded and vehicle seed OR 4th gear commanded and vehicle seed OR 5th gear commanded and vehicle seed OR 6th gear commanded and vehicle seed OR 7th gear commanded and vehicle seed OR 8th gear commanded and	 > 69.14 KPH > 108.77 KPH > 151.29 KPH > 183.54 KPH > 213.60 KPH > 254.65 KPH > 324.68 KPH	Reduandant Memory Command Gear Enable Calibraiton Not Reduandant Memory Command Gear Enable Calibraiton service fast learn not active no speed sensor DTCs fault active: P0716, P0717, P0721, P0722, P0723, P077C, P077D, P07BF, P07C0, P172A, P172B, P176B, P176C, P176D, P1783, P178F, P17C4, P17C5, P17C6, P17CC, P17CD, P17CE, P17D3, P17D6 no high side driver DTCs fault active:	= 0 Boolean = 1 Boolean	command gear fail event count ≥ 3 counts 6.25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			vehicle seed OR 9th gear commanded and vehicle seed OR 10th gear commanded and vehicle seed THEN increment command gear fail event count and abort commanded gear and delay for time before next fail evaluation	> 380.35 KPH > 471.11 KPH > 510.73 KPH > 5.00 seconds	P0658, P2670			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Speed Signal Analog to Digital Converter Performance	P16FB	The diagnostic monitor validates the controller calculated transmission output speed sensor data parameters, calculated in multiple paths/subroutines and at different rates. There are multiple transmission output speed sensor data parameters, calculated at rates of 6.25 milliseconds, 12.5 milliseconds and 25 milliseconds. While the same subroutine, a generic “calculate TOSS” is called from different time loops, each call stores that current value of the calculated TOSS to a different memory location. For example, a 12.5 millisecond loop calling “calculate TOSS” stores the calculated TOSS value to a “12.5 millisecond TOSS calculated” data parameter in memory, while a 25 millisecond loop calling “calculate TOSS” stores the calculated TOSS value to a “25 millisecond TOSS calculated” data parameter in memory. The raw transmission output speed sensor	ABS(raw transmission output speed, 6.25 millisecond data parameter - raw transmission output speed, 25 millisecond data parameter) update fail and sample time 25 millisecond update rate	≥ 60.0 RPM	service mode $04 active diagnsotic monitor enable raw transmission output speed, 25 millisecond data parameter raw transmission output speed, 6.25 millisecond data parameter run crank voltage battery voltage	= FALSE = 1 Boolean ≥ 150.0 RPM ≥ 150.0 RPM ≥ 10.00 volts ≥ 10.00 volts	fail time ≥ 8.000 seconds out of sample time ≥ 10.000 seconds 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.
		signal is diagnosed independently electrically and for performance of this DTC. The transmission output speed sensor data parameters that are calculated at different rates must always be within a negligible difference of each other.						

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

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					for time (attained gear AND attained gear) P0721 Fault Active range shift state (auto trans shift complete) enable time	≤ 10th gear = FALSE = 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	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Output Speed Sensor Circuit Reverse Direction Error	P172B	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 reverse but attained gear is reverse, and, TISS and intermediate speed sensors confirm consistent direction, the raw TOS direction is in error.	raw TOS direction AND (raw TIS direction OR intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear	≠ REVERSE ≠ forward **intermediate speed sensor 1 or 2** **≠ predicted direction** **intermediate speed sensor 1 or 2** **≠ predicted direction** = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time 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 = REVERSE = FALSE = range shift complete ≥ 1.00 seconds	2.50 seconds	Type A, 1 Trips
			raw TOS direction AND (intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear	≠ REVERSE **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 ≥ **engine speed time for transmission hydraulic pressure available** ≥ 9.00 volts	2.50 seconds	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			raw TOS direction AND (raw TIS direction OR intermediate speed sensor 1 direction raw) AND attained gear	≠ REVERSE ≠ forward **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** ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds	2.50 seconds	
			(raw TOS direction OR intermediate speed sensor 2 direction raw) AND attained gear	≠ REVERSE **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 ≥ **engine speed time for transmission hydraulic pressure available** ≥ 9.00 volts	2.50 seconds	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			(raw TOS direction OR raw TIS direction) AND attained gear	≠ REVERSE ≠ 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** ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds	2.50 seconds	
			raw TOS direction AND attained gear	≠ REVERSE = 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 ≥ **engine speed time for transmission hydraulic pressure available** ≥ 9.00 volts	2.50 seconds	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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	≥ 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.
Transmission Control System - Shift Limiting Active	P175E	The latent fault diagnostic monitors detects when the vehicle has been driven excessively with an emission MIL request. The DTCs requesting the emission MIL are all due to a safety critical system or component fault present in which a DTC is set fault active, test fail this key on or fault pending (fault pending is fail time ≠ 0). The safety critical systems or safety critical components include: transmission input, output and intermediate speed sensors, transmission range sensors, clutch pressure control solenoids including unintended deceleration detected due to clutch pressure control solenoids, driver accelerator pedal position, engine crankshaft position and engine torque. The DTCs for these safety critical systems or safety critical components include both electrical fault DTCs and performance fault DTCs. The latent fault diagnostic monitor	P0747 OR P0777 OR P0797 OR P2715 OR P2724 OR P2731 OR P2733 fault active due to unintended deceleration detection, increment unintended deceleration latent fault fail count		transmission default gear active (emission MIL active) calibration CeTRDR_e_DSG_DfltGr Opt5_Action any non-zero (0) option	> CeTRDR_e_DSG_DfltGr OptNone, zero (0) element in default gear array	unintended deceleration latent fault fail count ≥ 100 counts 25 millisecond update rate	Type A, 1 Trips
			P0747 OR P0777 OR P0797 OR P2715 OR P2724 OR P2731 OR P2733 clutch pressure control solenoid fault active due to clutch stuck on during shift, increment clutch pressure control solenoid latent fault fail count		transmission default gear active (emission MIL active) calibration CeTRDR_e_DSG_DfltGr Opt5_Action any non-zero (0) option	> CeTRDR_e_DSG_DfltGr OptNone, zero (0) element in default gear array	clutch pressure control solenoid latent fault fail count ≥ 100 counts 25 millisecond update rate	
			P2802 OR P2803 fault active, increment transmission range sensor latent fault fail count		transmission default gear active (emission MIL active) calibration CeTRDR_e_DSG_DfltGr Opt5_Action any non-zero (0) option	> CeTRDR_e_DSG_DfltGr OptNone, zero (0) element in default gear array	transmission range sensor latent fault fail count ≥ 100 counts 25 millisecond update rate	
			P0721 OR P0722 OR P0723 OR P077C OR P077D or P172A fault active, increment transmission output speed sensor latent fault fail count		transmission default gear active (emission MIL active) calibration CeTRDR_e_DSG_DfltGr Opt5_Action any non-zero (0) option	> CeTRDR_e_DSG_DfltGr OptNone, zero (0) element in default gear array	transmission output speed sensor latent fault fail count ≥ 100 counts 25 millisecond update rate	
			P0716 OR P0717 OR P0721 OR P07BF OR P07C0 fault active OR		transmission default gear active (emission MIL active) calibration	>	transmission input output speed sensor latent fault fail	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		counts the run/crank ignition cycles before the latent fault DTC is set fault active.	P077D OR P077D OR P1783 OR P17CE fault active OR P0722 OR P0723 OR P172A test fail this key on OR P0716 OR P0717 OR P0721 OR P0722 OR P0723 OR P077C OR P077D OR P07BF OR P07C0 Or P172A OR P172B OR P1783 OR P17CE fault pending (fail time ≠ 0) increment transmission input output speed sensor latent fault fail count		CeTRDR_e_DSG_DfltGr Opt5_Action any non-zero (0) option	CeTRDR_e_DSG_DfltGr OptNone, zero (0) element in default gear array	count ≥ 200 counts 25 millisecond update rate	
			AcceleratorPedalFailure OR EngineTorqueEstInaccurate OR P2534 fault active OR CrankSensor_FA OR P0707 OR P0708 fault active OR test fail this key on OR P2805 fault active OR P0716 OR P0717 OR P07BF OR P07C0 fault active OR P0722 OR P0723 test fail this key on OR P077C OR P077D fault active OR P176C OR P176D OR	= TRUE = TRUE = TRUE	transmission default gear active (emission MIL active) calibration CeTRDR_e_DSG_DfltGr Opt5_Action any non-zero (0) option ignition run crank voltage for time	> CeTRDR_e_DSG_DfltGr OptNone, zero (0) element in default gear array > 5.00 volts ≥ 12.5 milliseconds	system latent fault fail count ≥ 100 counts 6.25 millisecond update rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			P17CC OR P17CD OR P176B OR P17D6 fault active OR test fail this key on OR P0747 OR P0777 OR P0797 OR P2715 OR P2724 OR P2733 OR P0746 OR P0776 OR P0796 OR P2714 OR P2723 OR P2732 OR P178F OR P17C4 OR P17C6 OR P172A OR P172B test fail this key on OR P0960 OR P0962 OR P0963 OR P0964 OR P0966 OR P0967 OR P0968 OR P0970 OR P0971 OR P2718 OR P2720 OR P2721 OR P2727 OR P2729 OR P2730 OR P2736 OR P2738 OR P2739 OR P17C5 OR P17D3OR P0721 fault active OR P0716 OR P0717 OR P0721 OR P0722 OR P0723 OR P077C OR P077D OR P07BF OR P07C0 fault pending (fail time ≠ 0) OR P176B OR P176C OR P176D OR P17CC OR P17CD OR P17D6 OR P1783 OR P178F OR P17C4 OR P17C5 OR P17C6 OR P17CE OR P17D3 OR P172A or P172B fault pending (fail					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			time ≠ 0) OR P1783 fault active OR P1783 fault pending (fail time ≠ 0) update system fault time when system fault time increment system latent fault fail count	≥ 10.0 seconds				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Acceleration Sensor Signal Message Counter Incorrect	P175F	The diagnostic monitor detects an alive rolling count error or checksum error in the CAN frame containing the lateral acceleration signal value and longitudinal acceleration sensor signal value.	rolling count value received from EBCM and expected TCM calculated value not equal OR checksum lateral and longitudinal acceleration CAN frame message value error 50 millisecond update rate	= TRUE = TRUE	enable alive rolling count error detection: diagnostic monitor enable lateral and longitudinal acceleration CAN frame message received battery voltage run crank voltage enable checksum error detection: diagnostic monitor enable lateral and longitudinal acceleration CAN frame message received normal CAN battery voltage run crank voltage communication enabled DTCs not fault active	 = 1 Boolean = TRUE ≥ 11.0 volts ≥ 11.0 volts = 1 Boolean = TRUE ≥ 11.0 volts ≥ 11.0 volts = TRUE U0073	alive rolling count errors ≥ 54 out of 9 sample counts 50 millisecond update rate checksum error time ≥ 54.00 seconds	Emissions Neutral Diagnostic – Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Up and Down Shift Switch Signal Circuit	P1761	The alive rolling count normally cycles 0, 1, 2, and 3 as a serial data periodic frame is processed normally. The diagnostic monitor counts the number of times an alive rolling count error occurs over a period of time. The TCM receives a serial data frame at a periodic rate, during which, the receive data is processed the comparing the current value of the alive rolling count in the frame date to the incremented value of the diagnostic alive rolling count. When the two values of the alive rolling count do not agree, an alive rolling count error has occurred. The error indicator is saved in an array buffer, and when the number of error indicators in the buffer exceed the fail threshold the fail time is allowed to time up.	alive rolling count error counter update fail time 100 millisecond update rate	≥ 3 counts	service mode $04 active diagnostic monitor enable run crank voltage run crank voltage time up and down shift serial data frame receive occurred when up and down shift serial data frame receive occurred: increment the diagnsotic alive rolling count data value, if the diagnsotic alive rolling count data value, set alive rolling count error to TRUE, when alive rolling count error AND previous alive rolling count error in 10 element arrary buffer, increment alive rolling count error counter	= FALSE = 1 Boolean ≥ 9.00 volts ≥ 0.100 seconds = TRUE ≠ frame alive rolling count data value = TRUE = FALSE	fail time ≥ 10.00 seconds	Emissions Neutral Diagnostic – Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Upshift Switch Circuit 2	P1765	Diagnoses the state of the upshift switch circuit, stuck in the state "tap up" (upshift) active.	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 P1767 fault active P1767 test fail this key on P1767 fault pending (P1765 fault active OR P1765 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10 OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = 1 Boolean ≥ 5.00 volts ≥ 25 milliseconds ≥ 9.00 volts = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE ≥ 1.00 seconds = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity	fail time 1 ≥ 1.00 seconds	Emissions Neutral Diagnostic – 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.
					P1767 fault active P1767 test fail this key on P1767 fault pending (P1765 fault active OR P1765 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10 OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = FALSE = FALSE = FALSE = FALSE ≥ 1.00 seconds = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Downshift Switch Circuit 2	P1766	Diagnoses the state of the downshift switch circuit, stuck in the state "tap down" (downshift) active.	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 P1767 fault active P1767 test fail this key on P1767 fault pending (P1766 fault active OR P1766 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10 OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = 1 Boolean ≥ 5.00 volts ≥ 25 milliseconds ≥ 9.00 volts = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE ≥ 1.00 seconds = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity	fail time 1 ≥ 1.00 seconds	Emissions Neutral Diagnostic – 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.
					P1767 fault active P1767 test fail this key on P1767 fault pending (P1766 fault active OR P1766 fault active test fail this key on) PRNDL range change time PRNDL in range: D1 OR D2 OR D3 OR D4 OR D5 OR D6 OR D7 OR D8 OR D9 OR D10 OR NEUTRAL OR PARK OR REVERSE DTCs not fault pending	= FALSE = FALSE = FALSE = FALSE = FALSE ≥ 1.00 seconds = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = 0 Boolean = 0 Boolean Transmission Shift Lever Position Validity		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Up and Down Shift Switch Circuit 2	P1767	Diagnoses the state of the upshift/downshift switch circuit at an illegal voltage, voltage out of range.	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 time run crank voltage P1761 fault active P1767 fault active	= FALSE = 1 Boolean ≥ 5.00 volts ≥ 25 milliseconds ≥ 9.00 volts = FALSE = FALSE	fail time ≥ 60.00 seconds	Emissions Neutral Diagnostic – Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Planetary Gearset Ring Gear Speed Sensor Circuit Range/ Performance	P176B	The diagnostic monitor rationalizes the transmission intermediate shaft speed sensor by using the transmission output shaft output speed sensor and the known ratio between the transmission intermediate shaft speed and the transmission output shaft output speed based on the commanded gear and the transmission lever node design. The estimated transmission intermediate shaft speed is equal to the gear ratio times the transmission output shaft output speed. The absolute value of the delta between the measured transmission intermediate shaft speed and the estimated transmission intermediate shaft speed is used to determine if the measured transmission intermediate shaft speed is rational.	delta1 = ABS (transmission input speed - (transmission output speed * gear ratio commanded)) update faiil time 25 millisecond update rate	> 10.0 RPM	diagnostic monitor enable speed sesnor configuration calibration is single OR dual ratio calibration is function of command gear and intermediate speed sesnor when not REVERSE ratio calibration is function of command gear and intermediate speed sesnor when REVERSE ********** delay time updates when: estimated transmission intermediate speed (transmission input speed / ratio calibration)	= 1 Boolean = CeTNSR_e_NSPD_DualSpdSnsr **P176B ratio calibration = when not REVERSE** see supporting tables **P176B ratio calibration = when REVERSE** see supporting tables ********** ≥ **P176B minimum estimated transmission intermediate speed to enable fail evaluation** see supporting tables	fail time ≥ **P176B intermediate speed sensor fail time threshold** see supporting tables fail time threshold met increments fail count, fail count ≥ **P176B intermediate speed sensor fail count threshold** see supporting tables ********** delay time ≥	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					with 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	**P176B minimum transmission input speed to enable fail ≥ evaluation** see supporting tables **P176B holding clutch = states** see supporting tables = REVERSE OR = 1st thru 10th ********** ≥ 240.0 RPM ≥ 36.0 RPM = nuetral idle mode ON = range shift complete = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE ≥ 9.00 volts = FALSE ≥ 9.00 volts	**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	 ≥ 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 sesnor raw voltage, update fail time, 12.5 millisecond update rate	≤ 0.2500 volts (≤ 0.5 Ω impedance between signal and controller ground)	service mode $04 active diagnostic monitor enable P176D fault active service fast learn run crank voltage battery voltage P176C fault active P176C 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 12.5 millisecond update rate fail count ≥ 40 counts 12.5 millisecond update rate run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Planetary Gearset Ring Gear Speed Sensor Circuit High	P176D	Controller specific analog circuit diagnoses the transmission intermediate speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission intermediate speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	≥ 4.7500 volts (≤ 0.5 Ω impedance between signal and controller power)	service mode $04 active diagnostic monitor enable P176C fault active service fast learn run crank voltage battery voltage P176D fault active P176D test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE ≥ 10.00 volts ≥ 10.00 volts = FALSE = FALSE	fail time ≥ 0.050 seconds, update fail count 12.5 millisecond update rate fail count ≥ 40 counts 12.5 millisecond update rate run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						engine speed time for transmission hydraulic pressure available seconds		
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active	≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE		
					range shift state (auto trans shift complete)	= range shift complete		
					enable time	≥ 1.00 seconds		
			intermediate speed sensor 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: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete)	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds	2.50 seconds	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						engine speed time for transmission hydraulic pressure available seconds		
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active	≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE		
					range shift state (auto trans shift complete)	= range shift complete		
					enable time	≥ 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 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	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds	2.50 seconds	
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active	≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete		

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intermediate Speed Sensor 2 Performance	P17C5	The diagnostic monitor determines if the direction transmission intermediate speed sensor value is coherent based on the on period time of the directional sensor and raw speed sensor value. When the on period time indicates a transitional state, the direction must also be transitional as measured by very slow raw signal RPM. When the on period time indicates a non-transitional state, forward or reverse, the direction must also be transition, not forward and not reverse.	when: (intermediate speed sensor raw direction when transitional period = FALSE AND intermediate speed sensor raw direction when transitional period = FALSE) OR intermediate speed sesnor raw when transitional period = TRUE update fail and sample time	≠ FORWARD ≠ REVERSE **P17C5 P17D3 intermediate speed ≥ sensor RPM**	service mode $04 active diagnostic monitor enable intermediate speed sesnor count sample period P17C5 fault active OR P17C5 test fail this key on senor type cailbration (senor type is directional) transitional period detected = FALSE when: on period OR on period when direction unknown OR on period on period when direction is reverse OR on period on period when direction is forward transitional period detected = TRUE when: on period on period when direction unknown	= FALSE = 1 Boolean ≠ 0 counts = FALSE = FALSE = CeTNSR_e_NSPD_Dual SpdSnsr ≥ 0.4434 seconds ≤ 0.2773 seconds < 0.2363 seconds > 0.1240 seconds < 0.0811 seconds > 0.0088 seconds < 0.4434 seconds > 0.2773 seconds	fail time ≥ 3.500 seconds out of sample time ≥ 5.000 seconds 6.26 millisecond update	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intermediate Speed Sensor 2 Direction Not Plausible - Forward	P17C6	The intermediate speed sensor 2 is a directional sensor, and raw intermediate speed sensor 2 direction is rationalized based on attained gear. Attained gear is a true indication of gear based on measured gear ratio, TISS/TOSS. Intermediate speed sensor 2 direction can be predicted, based on a function of the attained gear. When the raw intermediate speed sensor 2 direction does not correlate to the predicted direction and does not correlate to the attained gear, the intermediate speed sensor 2 directional is in error.	intermediate speed sensor 2 direction raw AND attained gear	**intermediate speed sensor 1 or 2** **≠ predicted direction** = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds	2.50 seconds	Type A, 1 Trips
			intermediate speed sensor 2 direction raw AND attained gear AND attained gear	**intermediate speed sensor 1 or 2** **≠ predicted direction** ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time	**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 2 direction raw AND TIS direction AND attained gear	**intermediate speed sensor 1 or 2** **≠ predicted direction** ≠ FORWARD = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete)	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 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 2 direction raw AND raw TIS direction AND attained gear AND attained gear	**intermediate speed sensor 1 or 2** ≠ **predicted direction** ≠ FORWARD ≥ 1st gear ≤ 10th gear	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed engine speed time battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active range shift state (auto trans shift complete) enable time	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds ≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete ≥ 1.00 seconds	2.50 seconds	
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 2 direction raw) AND attained gear	**intermediate speed sensor 1 or 2** ≠ **predicted direction** **intermediate speed sensor 1 or 2** ≠ **predicted direction** = REVERSE	when the following conditions are met update the enable time: diagnsotic monitor enable TOSS sensor type must be directional engine speed ~~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.
						engine speed time for transmission hydraulic pressure available seconds		
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active	≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE		
					range shift state (auto trans shift complete)	= range shift complete		
					enable time	≥ 1.00 seconds		
			(intermediate speed sensor 1 direction raw OR intermediate speed sensor 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	**speed sensor directional rationality** = **enable calibration** = CeTOSR_e_Directional ≥ 500.0 RPM ≥ **engine speed time for transmission hydraulic pressure available** seconds	2.50 seconds	
					battery voltage for time service fast learn active run/crank voltage for time attained gear P0721 Fault Active	≥ 9.00 volts ≥ 0.100 seconds = FALSE ≥ 9.00 volt ≥ 0.100 seconds = REVERSE = FALSE = range shift complete		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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.
Transmission Intermediate Speed Sensor B Circuit Low	P17CC	Controller specific analog circuit diagnoses the transmission intermediate speed sensor and wiring for a short to ground fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission intermediate speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	≤ 0.250 volts (≤ 0.5 Ω impedance between signal and controller ground)	service mode $04 active diagnostic monitor enable P17CD fault active service fast learn run crank voltage battery voltage sensor configuration is single OR dual P17CC fault active OR P17CC test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE ≥ 10.00 volts ≥ 10.00 volts = CeTNSR_e_NSPD_DualSpdSnsr = FALSE = FALSE	fail time ≥ 0.050 seconds, update fail count 12.5 millisecond update rate fail count ≥ 40 counts 12.5 millisecond update rate run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Intermediate Speed Sensor B Circuit High	P17CD	Controller specific analog circuit diagnoses the transmission intermediate speed sensor and wiring for a short to voltage fault by comparing a voltage measurement to controller specific voltage thresholds.	transmission intermediate speed sesnor raw voltage, update fail time, 12.5 millisecond update rate	≥ 4.750 volts (≤ 0.5 Ω impedance between signal and controller power)	service mode $04 active diagnostic monitor enable P17CC fault active service fast learn run crank voltage battery voltage sensor configuration is single OR dual P17CD fault active OR P17CD test fail this key on	= FALSE = 1 Boolean = FALSE = FALSE ≥ 10.00 volts ≥ 10.00 volts = CeTNSR_e_NSPD_DualSpdSnsr = FALSE = FALSE	fail time ≥ 0.050 seconds, update fail count 12.5 millisecond update rate fail count ≥ 40 counts 12.5 millisecond update rate run crank and battery voltage time ≥ 5.000 seconds	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intermediate Speed Sensor 1 Direction Error	P17D3	The diagnostic monitor determines if the direction transmission intermediate speed sensor value is coherent based on the on period time of the directional sensor and raw speed sensor value. When the on period time indicates a transitional state, the direction must also be transitional as measured by very slow raw signal RPM. When the on period time indicates a non-transitional state, forward or reverse, the direction must also be transition, not forward and not reverse.	intermediate speed sesnor raw direction when transitional period = FALSE AND intermediate speed sesnor raw direction when transitional period = FALSE OR intermediate speed sesnor raw when transitional period = TRUE update fail and sample time 6.26 millisecond update rate	≠ FORWARD ≠ REVERSE **P17C5 P17D3 intermediate speed ≥ sensor RPM**	service mode $04 active diagnostic monitor enable intermediate speed sesnor count sample period P17D3 fault active OR P17D3 test fail this key on senor type cailbration (senor type is directional) transitional period detected = FALSE when: on period OR on period when direction unknown OR on period on period when direction is reverse OR on period on period when direction is forward transitional period detected = TRUE when: on period on period when direction unknown	= FALSE = 1 Boolean ≠ 0 counts = FALSE = FALSE = CeTNSR_e_NSPD_Dual SpdSnsr ≥ 0.4434 seconds ≤ 0.2773 seconds < 0.2363 seconds > 0.1240 seconds < 0.0811 seconds > 0.0088 seconds < 0.4434 seconds > 0.2773 seconds	fail time ≥ 3.500 seconds out of sample time ≥ 5.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Intermediate Speed Sensor B Circuit Range/ Performance	P17D6	The diagnostic monitor rationalizes the transmission intermediate shaft speed sensor by using the transmission output shaft output speed sensor and the known ratio between the transmission intermediate shaft speed and the transmission output shaft output speed based on the commanded gear and the transmission lever node design. The estimated transmission intermediate shaft speed is equal to the gear ratio times the transmission output shaft output speed. The absolute value of the delta between the measured transmission intermediate shaft speed and the estimated transmission intermediate shaft speed is used to determine if the measured transmission intermediate shaft speed is rational.	delta1 = ABS (transmission input speed - (transmission output speed * gear ratio commanded)) AND delta2 = ABS (transmission input speed - (transmission intermediate speed * ratio calibration)) update faiil time 25 millisecond update rate	> 10.0 RPM > **P17D6 intermediate speed sensor fail RPM threshold** see supporting tables	diagnostic monitor enable speed sesnor configuration calibration is dual ratio calibration is function of command gear and intermediate speed sesnor when not REVERSE ratio calibration is function of command gear and intermediate speed sesnor when REVERSE ********** delay time updates when: estimated transmission intermediate speed (transmission input	= 1 Boolean = CeTNSR_e_NSPD_DualSpdSnsr = **P17D6 ratio calibration when not REVERSE** see supporting tables = **P17D6 ratio calibration when REVERSE** see supporting tables ********** ≥	fail time ≥ **P17D6 intermediate speed sensor fail time threshold** see supporting tables fail time threshold met increments fail count, fail count ≥ **P17D6 intermediate speed sensor fail count threshold** see supporting tables ********** delay time ≥	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 P17CC fault active P17CD fault active battery voltage	**P17D6 minimum estimated transmission intermediate speed to enable fail evaluation** see supporting tables ≥ **P17D6 minimum transmission input speed to enable fail evaluation** see supporting tables = **P17D6 holding clutch states** see supporting tables = REVERSE OR = 1st thru 10th ********** ≥ 240.0 RPM ≥ 36.0 RPM = nuetral idle mode ON = range shift complete = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE = FALSE	**P17D6 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 = FALSE ≥ 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.
Up and Down Shift Switch Performance	P1876	This diagnostic monitor rationalizes the PRNDL, transmission shift lever position, against the state for the tap-up-tap-down (TUTD) enable switch or the manual-up-manual-down (MUMD) enable switch. The switch circuit is considered failing when the PRNDL is in park, reverse or neutral, and the switch circuit is indicating the switch in in the enable, or TUTD/ MUMD function request state. The switch can only be in the enable state when the PRNDL is in the appropriate drive range, for example D9, D8 or D7, but not in park, reverse or neutral.	(PRNDL OR PRNDL OR PRNDL) AND (shift lever range calibration is tap-up-tap-down (TUTD) OR shift lever range calibration is manual-up-manual-down (MUMD)) AND TUTD/MUMD enable request (switch state) update fail time 100 millisecond update rate	= NEUTRAL = REVERSE = PARK = CeTUDR_e_TUTD_ModeOnly = TRUE	service mode $04 active diagnostic monitor enable (P1876 test fail this key on OR P1876 fault active) PRNDL OR PRNDL OR PRNDL DTCs not test fail this key on DTCs not fault active	= FALSE = 1 Boolean = FALSE = FALSE = NEUTRAL = REVERSE = PARK P0815, P0816, P0826 Transmission Shift Lever Position Validity U0100, P0815, P0816, P0826, P1761, P0707, P0708	fail time ≥ 3.00 seconds, update fail count fail count ≥ 5 counts 100 millisecond update rate	Emissions Neutral Diagnostic – Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Switch Run/ Start Position Circuit Low	P2534	Detects a low ignition switch run/start position curcuit. This diagnostic reports the DTC when this circut is low. Monitoring occurs when the ECM run/ crank is active.	Ignition switch Run/Start position circuit low	Run / Crank = FALSE	Ignition switch Run/Start position circuit low diag enable and Run / Crank active ECM	= 1.00 = TRUE	280 failures out of 280 samples 25 ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Switch Run/ Start Position Circuit High	P2535	Detects a high ignition switch run/start position curcuit. This diagnostic reports the DTC when this circut is high. Monitoring occurs when the ECM run/ crank is NOT active.	Ignition switch Run/Start position circuit high	Run / Crank = TRUE	Ignition switch Run/Start position circuit low diag enable and Run / Crank active ECM	= 1.00 = FALSE	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 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 Ω impedance between signal and controller ground	diagnostic monitor enable high side drive 2 ON P2670 fault active P2670 test fail this key on	= 1 Boolean = TRUE = FALSE = FALSE	fail count ≥ 6 counts out of sample count ≥ 2,400 counts 6.25 millisecond update rate	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid D Stuck Off	P2714	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C1 clutch slip speed, update fail time 6.25 milliscond update	≥ 200.0 RPM	use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled service fast learn active service solenoid cleaning procedure active hydraulic pressure	= 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean	fail time ≥ 1.00 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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			available: engine speed enable C4 clutch slip speed fail compare when: diagnostic clutch test C4 ((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 FASLE (startle mitigation) clutch steady state adaptive active transmission output shaft speed C4 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation accelerator pedal position engine speed diagnostic clutch test C4 set to HOLDING CLUTCH when: clutch solenoid test state	≥ 500.0 RPM = HOLDING CLUTCH = FALSE = TRUE ≠ initial startle mitigation gear = FALSE = 0 Boolean = FALSE ≥ 36.0 RPM = TRUE ≥ 0.50 % ≥ 1,000.0 RPM = NEUTRAL TEST	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

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 a clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to the GF9 C4 C4, or, GR10 C4 C123467810R, clutch pressure control solenoid.			((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) C4 clutch pressured map clutch solenoid test state set to NEUTRAL TEST when: test trigger initialize range shift complete time, when range shift state, range shift complete time must time down to zero when range shift complete test trigger set to TRUE: enable forward gear AND direction request OR enable reverse gear AND direction request current loop test trigger clutch control solenoid test state range shift state NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on	= FALSE = TRUE ≠ initial startle mitigation gear = mapped to line pressure, C4 clutch pressure has transtioned from off-applying-applied = TRUE ≠ range shift completed = 1 Boolean = forward gear = 0 Boolean = reverse gear = FALSE ≠ NEUTRAL TEST = range shift completed	initialize range shift complete time = 1.000 seconds, range shift complete time must time down to zero when range shift complete	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			
					DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		
					DTCs not test fail this key on	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821		
					DTCs not fault active	AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

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 not power down shift, C4 clutch slip speed update fail time 6.25 milliscond update	< 50.0 RPM < 50.0 RPM	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	= 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean	shift type is power down shift, fail time ≥ 0.600 seconds, OR shift type is not power down shift, fail time ≥ 0.150 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 a clutch pressure control solenoid stuck			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: engine speed transmission output shaft speed set solenoid stuck on test trigger to TRUE when: clutch pressure control solenoid stuck off stuck intrusive shift request startle mitigation active (see startle mitigation active NOTE below) clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) initialize active clutch controller (clutch control processing in process of sequencing clutches on	= TRUE Boolean = FALSE Boolean = FALSE Boolean ≥ 500.0 RPM ≥ 36.0 RPM = FALSE = FALSE ≠ TIE UP TEST TEST STATE ≠ TIE UP TEST HOLD = TRUE	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		on test is disabled. This diagnostic monitor is relative to the GF9 C4 C4, or, GR10 C4 C123467810R, clutch pressure control solenoid.			and off for auto trans shift) (shift type enable for staged steady state shift - shift in process when new shift type occurs - interrupted shift OR shift type enable for garage shift OR shift type enable for negative torque up shift OR shift type enable for open throttle power on up shift OR shift type enable for closed throttle down shift OR shift type enable for open throttle power down shift OR shift type enable for closed throttle lift foot up shift) OR clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) transition clutch controller active clutch controller (staged steady sate shift - shift not in process, no new shift type occuring, no interrupted shift) set clutch control solenoid test state to TIE UP TEST	= 0 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = TIE UP TEST TEST STATE = TIE UP TEST HOLD = TRUE ≠ staged steady state		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					TEST STATE when: solenoid stuck on test trigger current loop clutch control solenoid test state OR current loop clutch control solenoid test state (see clutch control solenoid test state NOTE below) range shift state solenoid stuck on test trigger additional off going clutch occured (clutch control solenoid test state OR clutch control solenoid test state) (see clutch control solenoid test state NOTE below) diagnostic clutch test (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 pressure	= TRUE = TEST WAITING = TIE UP TEST HOLD ≠ range shift complete = TRUE = TRUE = TIE UP TEST TEST STATE = TIE UP TEST HOLD = OFF GOING CLUTCH TEST = TRUE = 1 Boolean ≤ 350.0 kPa	for C4 off going clutch pressure time ≥ **P2715 C4 clutch exhaust delay time closed throttle lift foot up shift** OR	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							P2715 C4 clutch exhaust delay time open throttle power on up shift OR **P2715 C4 clutch exhaust delay time garage shift** OR **P2715 C4 clutch exhaust delay time closed throttle down shift** OR **P2715 C4 clutch exhaust delay time negative torque up shift** OR **P2715 C4 clutch exhaust delay time open throttle power down shift** see supporting tables	
					engine torque primary on coming clutch active primary on coming control state closed throttle down shift primary on coming clutch pressure OR	≥ 8,191.8 Nm = TRUE ≠ clutch fill phase ≥ **on coming clutch minimum command pressure, closed throttle down shift**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					garage shift primary on coming clutch pressure OR	**on coming clutch minimum command ≥ pressure, garage shift**		
					negative torque up shift primary on coming clutch pressure OR	**on coming clutch minimum command pressure, negative ≥ torque up shift**		
					power down shift primary on coming clutch pressure OR	**on coming clutch minimum command pressure, power down ≥ shift**		
					power on up shift C1 on coming clutch pressure OR	**C1 on coming clutch minimum command pressure, power on up ≥ shift**		
					power on up shift C2 on coming clutch pressure OR	**C2 on coming clutch minimum command pressure, power on up ≥ shift**		
					power on up shift C3 on coming clutch pressure OR	**C3 on coming clutch minimum command pressure, power on up ≥ shift**		
					power on up shift C5 on coming clutch pressure OR	**C5 on coming clutch minimum command pressure, power on up ≥ shift**		
					power on up shift C6 on coming clutch pressure			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					OR garage shift primary on coming clutch pressure OR negative torque up shift primary on coming clutch pressure OR open throttle power down shift primary on coming clutch pressure OR closed throttle down shift primary on coming clutch pressure C4 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an automatic transmission shift due to two conditions: Current value of clutch control solenoid test state is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on	**C6 on coming clutch minimum command pressure, power on up ≥ shift** ≥ 400.0 kPa ≥ 600.0 kPa ≥ 750.0 kPa ≥ 400.0 kPa = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					diagnostic monitor is currently executing. AND That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed ≥ clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift state = range shift complete. NOTE: Startle mitigation is used to detect			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					DTCs not fault pending DTCs not test fail this key on DTCs not fault active	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0 P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821 AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

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 or 10 speed C123467810R 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 Increment fail time	≥ 200 K Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid D Control Circuit Low	P2720	Controller specific circuit diagnoses 9 speed C4 or 10 speed C123467810R 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.100 seconds out of sample time ≥ s 0.167 econds	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 or 10 speed C123467810R 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller voltage source	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid E Stuck Off	P2723	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C1 clutch slip speed, update fail time 6.25 milliscond update	≥ 200.0 RPM	use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled service fast learn active service solenoid cleaning procedure active hydraulic pressure	= 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean	fail time ≥ 1.00 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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			available: engine speed enable C5 clutch slip speed fail compare when: diagnostic clutch test C5 ((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 FASLE (startle mitigation) clutch steady state adaptive active transmission output shaft speed C5 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation accelerator pedal position engine speed diagnostic clutch test C5 set to HOLDING CLUTCH when: clutch solenoid test state	≥ 500.0 RPM = HOLDING CLUTCH = FALSE = TRUE ≠ initial startle mitigation gear = FALSE = 0 Boolean = FALSE ≥ 36.0 RPM = TRUE ≥ 0.50 % ≥ 1,000.0 RPM = NEUTRAL TEST	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

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 a clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to the GF9 C5 C57R, or, GR10 C5 C1356789, clutch pressure control solenoid.			((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) C5 clutch pressured map clutch solenoid test state set to NEUTRAL TEST when: test trigger initialize range shift complete time, when range shift state, range shift complete time must time down to zero when range shift complete test trigger set to TRUE: enable forward gear AND direction request OR enable reverse gear AND direction request current loop test trigger clutch control solenoid test state range shift state NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on	= FALSE = TRUE ≠ initial startle mitigation gear = mapped to line pressure, C5 clutch pressure has transtioned from off-applying-applied = TRUE ≠ range shift completed = 1 Boolean = forward gear = 0 Boolean = reverse gear = FALSE ≠ NEUTRAL TEST = range shift completed	initialize range shift complete time = 1.000 seconds, range shift complete time must time down to zero when range shift complete	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			
					DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		
					DTCs not test fail this key on	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821		
					DTCs not fault active	AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

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 not power down shift, C5 clutch slip speed update fail time 6.25 milliscond update	< 50.0 RPM < 50.0 RPM	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	= 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean	shift type is power down shift, fail time ≥ 0.600 seconds, OR shift type is not power down shift, fail time ≥ 0.150 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 a clutch pressure control solenoid stuck			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: engine speed transmission output shaft speed set solenoid stuck on test trigger to TRUE when: clutch pressure control solenoid stuck off stuck intrusive shift request startle mitigation active (see startle mitigation active NOTE below) clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) initialize active clutch controller (clutch control processing in process of sequencing clutches on	= TRUE Boolean = FALSE Boolean = FALSE Boolean ≥ 500.0 RPM ≥ 36.0 RPM = FALSE = FALSE ≠ TIE UP TEST TEST STATE ≠ TIE UP TEST HOLD = TRUE	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		on test is disabled. This diagnostic monitor is relative to the GF9 C5 C57R, or, GR10 C5 C1356789, clutch pressure control solenoid.			and off for auto trans shift) (shift type enable for staged steady state shift - shift in process when new shift type occurs - interrupted shift OR shift type enable for garage shift OR shift type enable for negative torque up shift OR shift type enable for open throttle power on up shift OR shift type enable for closed throttle down shift OR shift type enable for open throttle power down shift OR shift type enable for closed throttle lift foot up shift) OR clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) transition clutch controller active clutch controller (staged steady sate shift - shift not in process, no new shift type occuring, no interrupted shift) set clutch control solenoid test state to TIE UP TEST	= 0 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = TIE UP TEST TEST STATE = TIE UP TEST HOLD = TRUE ≠ staged steady state		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					TEST STATE when: solenoid stuck on test trigger current loop clutch control solenoid test state OR current loop clutch control solenoid test state (see clutch control solenoid test state NOTE below) range shift state solenoid stuck on test trigger additional off going clutch occured (clutch control solenoid test state OR clutch control solenoid test state) (see clutch control solenoid test state NOTE below) diagnostic clutch test (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 pressure	= TRUE = TEST WAITING = TIE UP TEST HOLD ≠ range shift complete = TRUE = TRUE = TIE UP TEST TEST STATE = TIE UP TEST HOLD = OFF GOING CLUTCH TEST = TRUE = 1 Boolean ≤ 350.0 kPa	for C5 off going clutch pressure time ≥ **P2724 C5 clutch exhaust delay time closed throttle lift foot up shift** OR	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							P2724 C5 clutch exhaust delay time open throttle power on up shift OR **P2724 C5 clutch exhaust delay time garage shift** OR **P2724 C5 clutch exhaust delay time closed throttle down shift** OR **P2724 C5 clutch exhaust delay time negative torque up shift** OR **P2724 C5 clutch exhaust delay time open throttle power down shift** see supporting tables	
					engine torque primary on coming clutch active primary on coming control state	≥ 8,191.8 Nm = TRUE ≠ clutch fill phase		
					closed throttle down shift primary on coming clutch pressure OR	≥ **on coming clutch minimum command pressure, closed throttle down shift**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						on coming clutch minimum command
					garage shift primary on coming clutch pressure	**≥ pressure, garage shift**
					OR	
						on coming clutch minimum command pressure, negative
					negative torque up shift primary on coming clutch pressure	**≥ torque up shift**
					OR	**on coming clutch minimum command pressure, power down**
					power down shift primary on coming clutch pressure	**≥ shift**
					OR	**C1 on coming clutch minimum command pressure, power on up**
					power on up shift C1 on coming clutch pressure	**≥ shift**
					OR	**C2 on coming clutch minimum command pressure, power on up**
					power on up shift C2 on coming clutch pressure	**≥ shift**
					OR	**C3 on coming clutch minimum command pressure, power on up**
					power on up shift C3 on coming clutch pressure	**≥ shift**
					OR	**C4 on coming clutch minimum command pressure, power on up**
					power on up shift C4 on coming clutch pressure	**≥ shift**
					OR	**C6 on coming clutch minimum command pressure, power on up**
					power on up shift C6 on coming clutch pressure	**≥ shift**
					OR	
					garage shift primary on	≥ 400.0 kPa

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					coming clutch pressure OR negative torque up shift primary on coming clutch pressure OR open throttle power down shift primary on coming clutch pressure OR closed throttle down shift primary on coming clutch pressure C5 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an automatic transmission shift due to two conditions: Current value of clutch control solenoid test state is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND	 ≥ 450.0 kPa ≥ 750.0 kPa ≥ 400.0 kPa = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					That off going clutch pressure control solenoid stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed ≥ clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift state = range shift complete. NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					solenoid stuck on failure mode that occurs during steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821. DTCs not fault pending	 P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		

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 DTCs not fault active	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821 AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

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 or 10 speed C1356789 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 Increment fail time	≥ 200 K Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid E Control Circuit Low	P2729	Controller specific circuit diagnoses 9 speed C57R or 10 speed C1356789 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.100 seconds out of sample time ≥ 0.167 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 E Control Circuit High	P2730	Controller specific circuit diagnoses 9 speed C57R or 10 speed C1356789 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller voltage source	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid F Stuck Off	P2732	Each pressure control solenoid stuck off diagnostic monitor detects a clutch pressure control solenoid failed hydraulically off, while the solenoid is electrically functional. In the failure mode the clutch slip speed, and gear box gear slip, will be excessive, not near or at zero RPM. The clutch slip speed is calculated based on the transmission lever node design, requiring transmission input shaft speed, transmission output shaft speed, and, one transmission intermediate shaft speed. The clutch pressure control solenoid is tested after an automatic transmission shift occurs and has been considered shift complete, or, steady state gear is deemed active, range shift complete. When the automatic transmission shift is complete, steady state gear is considered, the clutch pressure control solenoid is mapped to transmission line	C1 clutch slip speed, update fail time 6.25 milliscond update	≥ 200.0 RPM	use battery voltage calibration is FALSE OR (use battery voltage calibration is TRUE AND battery voltage use run crank voltage calibration is FALSE OR (use run crank voltage calibration is TRUE AND run crank voltage TCM output driver high side driver 1, clutch pressure control solenoid driver circuit enabled TCM output driver high side driver 2, clutch pressure control solenoid driver circuit enabled service fast learn active service solenoid cleaning procedure active hydraulic pressure	= 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean	fail time ≥ 1.00 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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			available: engine speed enable C6 clutch slip speed fail compare when: diagnostic clutch test C6 ((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 FASLE (startle mitigation) clutch steady state adaptive active transmission output shaft speed C6 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation accelerator pedal position engine speed diagnostic clutch test C6 set to HOLDING CLUTCH when: clutch solenoid test state	≥ 500.0 RPM = HOLDING CLUTCH = FALSE = TRUE ≠ initial startle mitigation gear = FALSE = 0 Boolean = FALSE ≥ 36.0 RPM = TRUE ≥ 0.50 % ≥ 1,000.0 RPM = NEUTRAL TEST	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

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 a clutch pressure control solenoid stuck off test is disabled. This diagnostic monitor is relative to the GF9 C6 C6789/Selectable One Way Clutch (SOWC) CBR1, or, GR10 C6 C45678910R, clutch pressure control solenoid.			((startle mitigation active OR (startle mitigation active AND startle mitigation gear)) (see startle mitigation active NOTE below) C6 clutch pressured map clutch solenoid test state set to NEUTRAL TEST when: test trigger initialize range shift complete time, when range shift state, range shift complete time must time down to zero when range shift complete test trigger set to TRUE: enable forward gear AND direction request OR enable reverse gear AND direction request current loop test trigger clutch control solenoid test state range shift state NOTE: startle mitigation active is used to detect unintended deceleration due to clutch pressure control solenoid stuck on	= FALSE = TRUE ≠ initial startle mitigation gear = mapped to line pressure, C6 clutch pressure has transtioned from off-applying-applied = TRUE ≠ range shift completed = 1 Boolean = forward gear = 0 Boolean = reverse gear = FALSE ≠ NEUTRAL TEST = range shift completed	initialize range shift complete time = 1.000 seconds, range shift complete time must time down to zero when range shift complete	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					failure modes, the clutch pressure control solenoid stuck on DTCs being P0747 P0777 P0797 P2715 P2724 P2733 P2821			
					DTCs not fault pending	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		
					DTCs not test fail this key on	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821		
					DTCs not fault active	AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid F Stuck On	P2733	Each pressure control solenoid stuck on diagnostic monitor detects a clutch pressure control solenoid failed hydraulically on, while the solenoid is electrically functional. The clutch pressure control solenoid is tested during an automatic transmission shift by monitoring the off going clutch slip speed. With the clutch pressure control solenoid failed on, still allowing hydraulic pressure to the clutch being commanded off, the intended off going clutch continues to maintain torque capacity during the transmission automatic shift. In the failure mode, the off going clutch slip speed will remain near zero RPM when the clutch pressure control solenoid is commanded to an off pressure in the normal operation to release the holding clutch. The clutch slip speed is calculated based on the transmission lever node design, requiring	shift type is power down shift, C6 clutch slip speed OR shift type is not power down shift, C6 clutch slip speed update fail time 6.25 milliscond update	< 50.0 RPM < 50.0 RPM	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	= 1 Boolean = 1 Boolean ≥ 9.00 volts = 0 Boolean = 0 Boolean ≥ 9.00 volts = TRUE Boolean	shift type is power down shift, fail time ≥ 0.600 seconds, OR shift type is not power down shift, fail time ≥ 0.150 seconds, update fail count, fail count ≥ 3 counts 6.25 milliscond update battery voltage time ≥ 0.100 seconds run crank voltage time ≥ 0.100 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL 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 a clutch pressure control solenoid stuck			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: engine speed transmission output shaft speed set solenoid stuck on test trigger to TRUE when: clutch pressure control solenoid stuck off stuck intrusive shift request startle mitigation active (see startle mitigation active NOTE below) clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) initialize active clutch controller (clutch control processing in process of sequencing clutches on	= TRUE Boolean = FALSE Boolean = FALSE Boolean ≥ 500.0 RPM ≥ 36.0 RPM = FALSE = FALSE ≠ TIE UP TEST TEST STATE ≠ TIE UP TEST HOLD = TRUE	engine speed time ≥ **engine speed time for transmission hydraulic pressure available** see supporting table	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		on test is disabled. This diagnostic monitor is relative to the GF9 C6 C6789, or, GR10 C6 C45678910R, clutch pressure control solenoid.			and off for auto trans shift) (shift type enable for staged steady state shift - shift in process when new shift type occurs - interrupted shift OR shift type enable for garage shift OR shift type enable for negative torque up shift OR shift type enable for open throttle power on up shift OR shift type enable for closed throttle down shift OR shift type enable for open throttle power down shift OR shift type enable for closed throttle lift foot up shift) OR clutch control solenoid test state clutch control solenoid test state (see clutch control solenoid test state NOTE below) transition clutch controller active clutch controller (staged steady sate shift - shift not in process, no new shift type occuring, no interrupted shift) set clutch control solenoid test state to TIE UP TEST	= 0 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 1 Boolean = 0 Boolean = TIE UP TEST TEST STATE = TIE UP TEST HOLD = TRUE ≠ staged steady state		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					TEST STATE when: solenoid stuck on test trigger current loop clutch control solenoid test state OR current loop clutch control solenoid test state (see clutch control solenoid test state NOTE below) range shift state solenoid stuck on test trigger additional off going clutch occured (clutch control solenoid test state OR clutch control solenoid test state) (see clutch control solenoid test state NOTE below) diagnostic clutch test (C6 off going clutch pressure control ramp time out complete AND off going clutch pressure ramp control ramp time out enable) OR C6 off going clutch pressure	= TRUE = TEST WAITING = TIE UP TEST HOLD ≠ range shift complete = TRUE = TRUE = TIE UP TEST TEST STATE = TIE UP TEST HOLD = OFF GOING CLUTCH TEST = TRUE = 1 Boolean ≤ 350.0 kPa	for C6 off going clutch pressure time ≥ **P2733 C6 clutch exhaust delay time closed throttle lift foot up shift** OR	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							P2733 C6 clutch exhaust delay time open throttle power on up shift OR **P2733 C6 clutch exhaust delay time garage shift** OR **P2733 C6 clutch exhaust delay time closed throttle down shift** OR **P2733 C6 clutch exhaust delay time negative torque up shift** OR **P2733 C6 clutch exhaust delay time open throttle power down shift** see supporting tables	
					engine torque primary on coming clutch active primary on coming control state closed throttle down shift primary on coming clutch pressure OR	≥ 8,191.8 Nm = TRUE ≠ clutch fill phase ≥ **on coming clutch minimum command pressure, closed throttle down shift**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					garage shift primary on coming clutch pressure OR negative torque up shift primary on coming clutch pressure OR power down shift primary on coming clutch pressure OR power on up shift C1 on coming clutch pressure OR power on up shift C2 on coming clutch pressure OR power on up shift C3 on coming clutch pressure OR power on up shift C4 on coming clutch pressure OR power on up shift C5 on coming clutch pressure OR garage shift primary on coming clutch pressure OR	**on coming clutch minimum command pressure, garage shift** ≥ **on coming clutch minimum command pressure, negative torque up shift** ≥ **on coming clutch minimum command pressure, power down shift** ≥ **C1 on coming clutch minimum command pressure, power on up shift** ≥ **C2 on coming clutch minimum command pressure, power on up shift** ≥ **C3 on coming clutch minimum command pressure, power on up shift** ≥ **C4 on coming clutch minimum command pressure, power on up shift** ≥ **C5 on coming clutch minimum command pressure, power on up shift** ≥ ≥ 400.0 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					negative torque up shift primary on coming clutch pressure OR open throttle power down shift primary on coming clutch pressure OR closed throttle down shift primary on coming clutch pressure C6 clutch slip speed valid, all speed sesnors are functional for lever node clucth slip speed calculation NOTE: Clutch control solenoid test state TIE UP TEST HOLD is necessary, as it is possible to have multiple off going clutches during one automatic transmission shift. Clutch control solenoid test state is set to TIE UP TEST HOLD during an automatic transmission shift due to two conditions: Current value of clutch control solenoid test state is TIE UP TEST TEST STATE, when one off going clutch pressure control solenoid stuck on diagnostic monitor is currently executing. AND That off going clutch pressure control solenoid	≥ 450.0 kPa ≥ 500.0 kPa ≥ 400.0 kPa = TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					stuck on diagnostic monitor currently executing passes, the corresponding clutch slip speed ≥ clutch slip speed fail threshold. Once clutch control solenoid test state is set to TIE UP TEST HOLD, it remains TIE UP TEST HOLD during the automatic transmission shift, until: An additional off going clutch occurs, as indicated by solenoid stuck on test trigger = TRUE, subsequently clutch control solenoid test state is reset to TIE UP TEST TEST STATE, to allow the additional corresponding off going clutch pressure control solenoid stuck on diagnostic monitor to execute. OR The automatic transmission shift completes, range shift state = range shift complete. NOTE: Startle mitigation is used to detect unintended vehicle deceleration due to a clutch pressure control solenoid stuck on failure mode that occurs during			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					steady state gear, not during an automatic transmission shift. The startle mitigation active then forces the transmission clutch pressure control system to a safe gear or neutral state, based on the active and inactive clutches, when the unintended vehicle deceleration occurred. Once a safe vehicle gear state is attained, the gear and clutch pressure control system allows transitions of the clutches on and off, to sequence automatic transmission shifts, single step shifts. As each single step automatic transmission shift occurs the normal pressure control solenoid stuck on diagnostic monitors execute to verify which clutch pressure control solenoid is in the stuck on failure mode, allowing one of the clutch pressure control solenoid stuck on DTCs to set P0747, P0777, P0797, P2715, P2724, P2733, P2821. DTCs not fault pending DTCs not test fail this key	P0716 P0717 P0722 P0723 P077C P077D P07BF P07C0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					on DTCs not fault active	P0707 P0708 P0746 P0747 P0776 P0777 P0796 P0797 P2714 P2715 P2723 P2724 P2732 P2733 P2820 P2821 AcceleratorPedalFailure CrankSensor_FA P0707 P0708 P0716 P0717 P07BF P07C0 P0722 P0723 P077C P077D P172A P172B P176B P176C P176D P17C5 P17CC P17CD P17CE P17D3 P17D6 P2805		

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 or 10 speed C45678910R 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 Increment fail time	≥ 200 K Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid F Control Circuit Low	P2738	Controller specific circuit diagnoses 9 speed C6789 or 10 speed C45678910R 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.100 seconds out of sample time ≥ 0.167 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 F Control Circuit High	P2739	Controller specific circuit diagnoses 9 speed C6789 or 10 speed C45678910R 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller voltage source	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid A Calibration Incorrect	P27A7	The diagnostic monitor verifies that the pressure control solenoid A (GF9 line pressure or GR10 C1 C123456R clutch) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid A electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch – the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault – pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid B Calibration Incorrect	P27A8	The diagnostic monitor verifies that the pressure control solenoid B (GF9 TCC pressure or GR10 C2 C128910R clutch) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid B electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch – the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault – pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power event during the controller initialization before normal time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid C Calibration Incorrect	P27A9	The diagnostic monitor verifies that the pressure control solenoid C (GF9 C1 CB123456 clutch or GR10 C3 C23457910 clutch) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid C electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch – the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault – pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid D Calibration Incorrect	P27AA	The diagnostic monitor verifies that the pressure control solenoid D (GF9 C2 CB29 clutch or GR10 C5 C1356789 clutch) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid D electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch – the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault – pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid E Calibration Incorrect	P27AB	The diagnostic monitor verifies that the pressure control solenoid E (GF9 C3 CB38 clutch or GR10 C4 C23467810R clutch) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid E electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch – the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault – pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid F Calibration Incorrect	P27AC	The diagnostic monitor verifies that the pressure control solenoid F (GF9 C4 C4 clutch or GR10 C6 C45678910R clutch) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid F electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch – the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault – pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid G Calibration Incorrect	P27AD	The diagnostic monitor verifies that the pressure control solenoid G (GF9 C5 C57R clutch or GR10 line pressure) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid G electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch – the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault – pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid H Calibration Incorrect	P27AE	The diagnostic monitor verifies that the pressure control solenoid H (GF9 C6 C6789 clutch or GR10 TCC) characterization data is programmed correctly into the TCM EEPROM to match the pressure control solenoid H electrical characteristics of the device currently installed in the transmission valve body assembly.	pressure control solenoid characterization data programming complete Matching is defined as pressure control solenoid characterization data corresponding to the transmission valve body assembly componentry. pressure control solenoid characterization data programming complete is set to FALSE when any of the following is present: Solenoid data is not programmed or incomplete data fault - occurs when a new or service TCM is installed. OR Solenoid class programming fault – the characterization data indicates a different type of device than the TCM calibration data OR Checksum mismatch – the checksum that was calculated from the programmed pressure control solenoid characterization data region does not match the calculated valve at the time of programming. OR Axis data fault – pressure	= FALSE	Pressure control solenoid characterization data is programmed originally at vehicle plant assembly based on transmission valve body assembly part number associated to the unit installed in vehicle. When valve body is serviced, dealership performs reprogramming of TCM with pressure control solenoid characterization data based on the associated transmission valve body part number installed.		execution of monitor occurs once per controller normal power up event during the controller initialization before normal controller time loop execution	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			control solenoid characterization data has one or more points that are less than the previous match point, axis data must be greater than or equal to previous data values.					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Range 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 sesnor A + ECM internal range sesnor B raw adjusted for high or low time) - 100 %)) Increment fail and sample time, update rate 25 milliseconds	> 5.350 % duty cycle	diagnostic monitor enable P0707 fault active P0708 fault active U0100 fault active ECM internal range sesnor B available from ECM ECM internal range sesnor B fault active battery voltage ABS(TCM internal range sesnor A current loop value - TCM internal range sesnor A previous loop value), update TCM internal range sesnor A stablity time, update rate 25 milliseconds ABS(ECM internal range sesnor B current loop value - ECM internal range sesnor B previous loop value), update ECM internal range sesnor B stablity time, update rate 25 milliseconds TCM internal range sesnor A stability time met OR ECM internal range sesnor B stability time met ECM internal range sesnor B raw adjusted for	= 1 Boolean = FALSE = FALSE = FALSE = TRUE = FALSE ≥ 0.00 volts < 1.001 % duty cycle < 1.001 % duty cycle = ABS(ECM internal range sesnor B raw -	PWM fail time ≥ 1.000 seconds out of sample time ≥ 1.500 seconds battery voltage time ≥ 1.000 seconds TCM internal range sesnor A stability time ≥ 1.000 seconds ECM internal range sesnor B stability time ≥ 1.000 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					high or low time	0.000 %)		

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 or 10 speed Line Pressure 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 Increment fail time	≥ 200 K Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid G Control Circuit Low	P2814	Controller specific circuit diagnoses 9 speed Line Pressure Circuit or 10 speed Line Pressure 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control (PC) Solenoid G Control Circuit High	P2815	Controller specific circuit diagnoses 9 speed Line Pressure Circuit or 10 speed Line Pressure 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 Increment fail time	≤ 0.5 Ω impedance between signal and controller voltage source	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid H Performance /Stuck Off	P2817	The diagnostic monitor detects the transmission torque converter control valve solenoid failed hydraulically off. The monitor executes when the transmission torque converter is commanded to a “lock” mode during which the torque converter will be controlled to near zero (0.0) RPM slip speed, or, an “on” mode during which the torque converter will be controlled to target slip speed using slip speed error. The transmission torque converter control valve solenoid is considered failed hydraulically off when the “lock” mode slip speed is excessive, or, when the ‘on” mode slip speed error is excessive.	if use TCC slip speed error OR TCC control mode TCC slip speed error = TCC slip speed - TCC comand slip speed else if TCC control mode torque convert slip = engine speed - transmission input shaft speed then update fail time 25 millisecond update rate	= 0 Boolean = ON mode (controlled slip mode) ≥ **P2817 TCC stuck off fail TCC slip speed** see supporting table = LOCK ≥ 130.0 RPM	diagnostic monitor enable TCC command capacity TCC command pressure (TCC control mode previous TCC control mode previous TCC control mode previous) AND (TCC control mode current OR TCC control mode current) (TCC stuck off enable OR TCC stuck on enable) hydraulic pressure available: engine speed	= 1 Boolean ≥ 0.00 % ≥ 400.0 kPa ≠ TCC control mode current ≠ ON mode (controlled slip mode) ≠ LOCK = ON mode (controlled slip mode) = LOCK = 1 Boolean = 1 Boolean ≥ 500.0 RPM	fail time ≥ 4.000 seconds increment fail count fail count ≥ 3 counts 25 millisecond update rate TCC command capacity time ≥ 0.00 seconds TCC command pressure time ≥ 2.00 seconds engine speed time ≥ **engine speed time for transmission hydraulic pressure available**	Type B, 2 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							see supporting table	
					service fast learn active	= FALSE		
					battery voltage	≥ 9.00 volts	battery voltage time ≥ 0.100 seconds	
					run crank voltage	≥ 9.00 volts	run crank voltage time ≥ 0.100 seconds	
					P281B falut active	= FALSE		
					P281D falut active	= FALSE		
					P281E falut active	= FALSE		
					P0722 fault pending	= FALSE		
					P0723 fault pending	= FALSE		
					P0716 fault pending	= FALSE		
					P0717 fault pending	= FALSE		
					P07BF fault pending	= FALSE		
					P07C0 fault pending	= FALSE		
					(PTO active OR	= FALSE		
					PTO disable calibration)	= 1 Boolean		
					accelerator pedal position	≥ 8.0 %		
					accelerator pedal position	≤ 99.0 %		
					range shift state	= range shift complete		
					transmission fluid temperature	≥ -6.66 °C		
					transmission fluid temperature	≤ 130.0 °C		
					engine torque	≥ 50.0 Nm		
					engine torque	≤ 8,191.8 Nm		
					P2817 test fail this key on	= FALSE		
					(TCC control mode OR	= ON mode (controlled slip mode)		
					TCC control mode)	= LOCK		
					break latch state (clutch select valve solenoid)	= disabled (clutch select valve not transitioning)		
					attained gear	≥ CeCGSR_e_CR_Second		
					DTCs not fault active	AcceleratorPedalFailure EngineTorqueEstInaccurate P0716, P0717, P07BF,		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P07C0 P0722, P0723, P077C, P077D		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid H Stuck On - GR10 specific	P2818	The diagnostic monitor detects the transmission torque converter control valve solenoid failed hydraulically on. The torque converter hydraulic control circuit is multiplexed with the transmission clutch select valve hydraulic control circuit, allowing for the torque converter control valve solenoid stuck on test to execute when the clutch select valve solenoid is commanded ON. When the clutch select valve solenoid is commanded ON as the vehicle speed decreases toward zero KPH, and, if the torque converter control valve solenoid is stuck on, the torque converter slip speed rate of change will have a large slope while decreasing toward zero RPM, and the torque converter slip speed will remain low near zero RPM.	when: [active clutch control ABS(TCC slip speed) (set point engine speed - engine speed) (maximum engine speed during garage shift - engine speed) engine torque update TCC stuck on fail time garage shift] OR when: [active clutch control ABS(TCC slip speed) engine torque (set point engine speed - engine speed) rate of change of engine speed update TCC stuck on stall pending time]	= garage shift ≤ 30.0 RPM ≥ 50.0 RPM ≥ 50.0 RPM ≥ 30.0 Nm ≠ garage shift ≤ 30.0 RPM ≥ 70.0 Nm ≥ 50.0 RPM ≤ -2,000.0 RPM/ second	(TCC stuck off enable OR TCC stuck on enable) hydraulic pressure available: engine speed	= 1 Boolean = 1 Boolean ≥ 500.0 RPM	when: TCC stuck on fail time garage shift **P2818 TCC stuck on fail time garage ≥ shift - GR10** update fail count when: fail count ≥ 3 counts set DTC fault active 25 millisecond update rate when: TCC stuck on stall pending time ≥ **P2818 TCC stuck on fail time stall pending - GR10** when: fail count ≥ 4 counts set DTC fault active 25 millisecond update rate engine speed time ≥	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							engine speed time for transmission hydraulic pressure available	
					service fast learn active	= FALSE		
					battery voltage	≥ 9.00 volts		
					run crank voltage	≥ 9.00 volts		
							battery voltage time ≥ 0.100 seconds	
					P281B falut active	= FALSE		
					P281D falut active	= FALSE	run crank voltage time ≥ 0.100 seconds	
					P281E falut active	= FALSE		
					P0722 fault pending	= FALSE		
					P0723 fault pending	= FALSE		
					P0716 fault pending	= FALSE		
					P0717 fault pending	= FALSE		
					P07BF fault pending	= FALSE		
					P07C0 fault pending	= FALSE		
					P0746 fault pending	= FALSE		
					P0747 fault pending	= FALSE		
					P0776 fault pending	= FALSE		
					P0777 fault pending	= FALSE		
					P0796 fault pending	= FALSE		
					P0797 fault pending	= FALSE		
					P2714 fault pending	= FALSE		
					P2715 fault pending	= FALSE		
					P2723 fault pending	= FALSE		
					P2724 fault pending	= FALSE		
					P2732 fault pending	= FALSE		
					P2733 fault pending	= FALSE		
					P2820 fault pending	= FALSE		
					P2821 fault pending	= FALSE		
					PRNDL	≠ NEUTRAL		
					PRNDL	≠ REVERSE		
					diagnostic monitor enable	1 Boolean		
					TCC command mode	= OFF		
					(PTO active OR	= FALSE		
					PTO disable calibration)	= 1 Boolean		
					transmission fluid	≥ -6.66 °C		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					temperature transmission fluid temperature engine torque engine torque P2818 test fail this key on vehicle speed (garage shift) vehicle speed (not garage shift) engine speed engine speed accelerator pedal position 4WD low state (driver shift mode active OR driver shift mode calibration) (misfire requests TCC off OR misfire TCC off calibration) clucth control solenoid stuck ON AND stuck OFF intrusive shift active TCC solenoid pulse request minumum trubine speed DTCs not fault active	≤ 130.00 °C ≥ -25.0 Nm ≤ 800.0 Nm = FALSE ≤ 4.0 KPH ≤ 15.0 KPH ≥ 200.0 RPM ≤ 600.0 RPM ≤ 95.0 % = FALSE = FALSE = 0 Boolean = FALSE = 0 Boolean = FALSE = FALSE = FALSE ≤ set point engine speed - 50.0 RPM AcceleratorPedalFailure EngineTorqueEstInaccurate P0716, P0717, P07BF, P07C0 P0722, P0723, P077C, P077D		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid H Control Circuit/Open	P281B	Controller specific circuit diagnoses 9 speed TCC Control Circuit or 10 speed TCC Control Circuit for an open circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates an open circuit Controller specific circuit voltage thresholds are set to meet the following controller specification for an open circuit Increment fail time	≥ 200 K Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid H Control Circuit Low	P281D	Controller specific circuit diagnoses 9 speed TCC Pressure Control Circuit or 10 speed TCC Control Circuit for a ground short circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a ground short Controller specific circuit voltage thresholds are set to meet the following controller specification for a ground short Increment fail time	≤ 0.5 Ω impedance between signal and controller ground	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Pressure Control Solenoid H Control Circuit High	P281E	Controller specific circuit diagnoses 9 speed TCC Pressure Control Circuit or 10 speed TCC Control Circuit for a short to voltage circuit failure by comparing a voltage measurement to controller specific voltage thresholds.	Voltage measurement outside of controller specific acceptable range indicates a short to voltage Controller specific circuit voltage thresholds are set to meet the following controller specification for a short to voltage Increment fail time	≤ 0.5 Ω impedance between signal and controller voltage source	battery voltage run crank voltage OR accessory voltage active diagnostic monitor enable calibration	≥ 9.00 volts and ≤ 32.00 volts ≥ 5.00 volts = TRUE = 1 Boolean	≥ 1.000 seconds 25 milliseconds 12.5 milliseconds fail time ≥ 0.300 seconds out of sample time ≥ 0.500 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures exceeds before the sample time of is reached	3 counts (equivalent to 0.0375 seconds) 0.0375 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds CAN hardware is bus OFF for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts > 0.1625 seconds	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.
Lost Communication With ECM	U0100	This DTC monitors for a loss of communication with the engine control module	Message is not received from controller for Message $0BE Message $0C9 Message $18E Message $1A1 Message $1A3 Message $1AA Message $1BA Message $287 Message $3D1 Message $3E9 Message $4C1 Message $4C7 Message $4D1 Message $4F1 Message $589	 ≥ 0.50 seconds ≥ 0.50 seconds ≥ 0.50 seconds ≥ 0.50 seconds ≥ 12.00 seconds ≥ 12.00 seconds ≥ 12.00 seconds ≥ 0.50 seconds ≥ 12.00 seconds ≥ 12.00 seconds ≥ 12.00 seconds ≥ 12.00 seconds ≥ 12.00 seconds ≥ 12.00 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 5.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 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.
					Network Management is not active for U0100 ECM	> 0.4000 seconds Not Active on Current Key Cycle is present on the bus		

Initial Supporting table - 10 speed transmission clutch definition and gear state to clutch map

Description: indicates clutch definition and gear state verses applied and released clutches for 10 speed transmission

Value Units: applied or released
X Unit: clutch
Y Units: gear index Y axis, actual gear column 1

y/x	1	2	3	4	5	6	7	8
1		C1 = C123456R	C2 = C1289-10R	C3 = C234579-10	C4 = C234678-10R	C5 = C1356789	C6 = C456789-10R	C7 = OWC12
2	1st gear braking	applied	applied	released	released	applied	released	applied
3	1st gear free wheel	applied	applied	released	released	applied	released	released
4	2nd gear braking	applied	applied	applied	applied	released	released	applied
5	2nd gear free wheel	applied	applied	applied	applied	released	released	released
6	3rd gear	applied	released	applied	applied	applied	released	released
7	4th gear	applied	released	applied	applied	released	applied	released
8	5th gear	applied	released	applied	released	applied	applied	released
9	6th gear	applied	released	released	released	applied	applied	released
10	7th gear	released	released	applied	applied	applied	applied	released
11	8th gear	released	applied	released	applied	applied	applied	released
12	9th gear	released	applied	applied	released	applied	applied	released
13	10th gear	released	applied	applied	applied	released	applied	released
14	reverse gear	applied	applied	released	applied	released	released	released

Initial Supporting table - 9 speed transmission clutch definition and gear state to clutch map

Description: indicates clutch definition and gear state verses applied and released clutches for 9 speed transmission

Value Units: applied or released
X Unit: clutch
Y Units: gear index Y axis, actual gear column 1

y/x	1	2	3	4	5	6	7	8
1		C1 = CB123456	C2 = C6789	C3 = CB1R	C4 = CB29	C5 = CB38	C6 = C4	C7 = C57R
2	1st gear braking	applied	released	applied	released	released	released	released
3	1st gear free wheel	applied	released	released	released	released	released	released
4	2nd gear	applied	released	released	applied	released	released	released
5	3rd gear	applied	released	released	released	applied	released	released
6	4th gear	applied	released	released	released	released	applied	released
7	5th gear	applied	released	released	released	released	released	applied
8	6th gear	applied	applied	released	released	released	released	released
9	7th gear	released	applied	released	released	released	released	applied
10	8th gear	released	applied	released	released	applied	released	released
11	9th gear	released	applied	released	applied	released	released	released
12	reverse gear	released	released	applied	released	released	released	applied

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
X Unit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.275	0.200	0.100

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
X Unit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.275	0.200	0.100

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

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

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.275	0.200	0.100

Initial Supporting table - KaPSDR_e_GFX_ModeVlvA_StFnl

Description: mode valve A position

X Unit: ETRS diagnostic range
Y Units: ETRS command direction

y/x	1	2	3	4	5	6	7
1		CeSTGR_e_ETRS_Park	CeSTGR_e_ETRS_NeutLo	CeSTGR_e_ETRS_NeutHi	CeSTGR_e_ETRS_Drive	CeSTGR_e_ETRS_Rvrs	CeSTGR_e_ETRS_NeutShf
2	CeSTGR_e_ETRS_Park	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
3	CeSTGR_e_ETRS_NeutLo	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
4	CeSTGR_e_ETRS_NeutHi	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
5	CeSTGR_e_ETRS_Drive	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh
6	CeSTGR_e_ETRS_Rvrs	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
7	CeSTGR_e_ETRS_NeutShf	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh

Initial Supporting table - KaPSDR_e_GFX_ModeVlvB_StFnl

Description: mode valve B position

X Unit: ETRS diagnostic range
Y Units: ETRS command direction

y/x	1	2	3	4	5	6	7
1		CeSTGR_e_ETRS_Park	CeSTGR_e_ETRS_NeutLo	CeSTGR_e_ETRS_NeutHi	CeSTGR_e_ETRS_Drive	CeSTGR_e_ETRS_Rvrs	CeSTGR_e_ETRS_NeutShf
2	CeSTGR_e_ETRS_Park	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
3	CeSTGR_e_ETRS_NeutLo	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
4	CeSTGR_e_ETRS_NeutHi	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh
5	CeSTGR_e_ETRS_Drive	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
6	CeSTGR_e_ETRS_Rvrs	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh
7	CeSTGR_e_ETRS_NeutShf	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh

Initial Supporting table - KtPSDR_t_ModeVlvA_EngOff_Lim

Description: used for both engine off mode valve A stability delay time required to enable fail time update and fail time threshold

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40	-20	0	20	130
1	3.000	2.400	2.000	1.000	0.500

Initial Supporting table - KtPSDR_t_ModeVlvA_GS_TurbDlyLim

Description: mode valve A garage shift transtion turbine speed delay

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - KtPSDR_t_ModeVlvB_EngOff_Lim

Description: used for both engine off mode valve B stability delay time required to enable fail time update and fail time threshold

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius

y/x	-40	-20	0	20	130
1	3.000	2.400	2.000	1.000	0.500

Initial Supporting table - KtPSDR_t_ParkServo_EngOff_Lim

Description: P187E time engine must be not running to enable fail time update

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.00	-20.00	0.00	20.00	130.00
1	3.100	2.500	2.100	1.100	0.600

Initial Supporting table - KtPSDR_t_ParkStatDlyLim

Description: fail delay time

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.00	-20.00	0.00	20.00	130.00
1	4.000	0.731	0.244	0.244	0.244

Initial Supporting table - KtPSDR_t_ParkVlvStkOff_DlyLim

Description: P187E Transmission Park Valve Stuck Off fail enable delay time

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.00	-20.00	0.00	20.00	130.00
1	1.600	0.600	0.400	0.400	0.400

Initial Supporting table - KtPSDR_t_ParkVlvStkOn_DlyLim

Description: P187D Transmission Park Valve Stuck On fail enable delay time

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	2.000	0.700	0.250	0.250	0.250

Initial Supporting table - KtPSDR_t_PISA_EngOff_Lim

Description: P18A8 fail time, engine not running

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.00	-20.00	0.00	20.00	130.00
1	0.200	0.200	0.200	0.200	0.200

Initial Supporting table - KtTMDC_t_EngOnHydPresThrsh

Description: hydraulic system pressure is available when engine speed is above engine speed threshold for this amount of time

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.275	0.200	0.100

Initial Supporting table - NumClchTieUp

Description: NumClchTieUp

Value Units: minimum # of clutches
X Unit: command gear or attained gear
Y Units: not applicable, no units, single row table f(gear)

NumClchTieUp - Part 1							
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5
1	2	3	2	2	2	2	2

NumClchTieUp - Part 2							
y/x	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3
1	2	2	1	1	1	1	1

NumClchTieUp - Part 3							
y/x	CeCGSR_e_NeutralC2C4	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6	CeCGSR_e_NeutralC4C5
1	1	1	1	1	1	1	1

NumClchTieUp - Part 4							
y/x	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4
1	1	1	3	2	2	2	2

NumClchTieUp - Part 5							
y/x	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	2	2	2	1	1	1	1

NumClchTieUp - Part 6							
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5
1	1	1	1	1	1	1	1

NumClchTieUp - Part 7							
y/x	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth
1	1	1	2	1	1	1	1

NumClchTieUp - Part 8							
y/x	CeCGSR_e_Fifth	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth	

Initial Supporting table - NumClchTieUp

1	1	1	1	1	1	1	

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

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

Value Units: Max Time for Last Seed Timeout (ms)
X Unit: Operating Loop Sequence (enum)

P0606_Last Seed Timeout f(Loop Time) - Part 1

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	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_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	200.000	200.000	200.000	8,191.875	8,191.875	8,191.875	

Initial Supporting table - P0606_Program Sequence Watch Enable f(Core, Loop Time)

Description: The enabling flags for the program sequence watch as a function of processor core and operating loop time sequence.

Value Units: PSW enable flag (boolean)
X Unit: Processor Core (enum)
Y Units: Operating Loop Time Sequence (enum)

y/x	CeTSKR_e_CPU	CeTSKR_e_CPU2	CeTSKR_e_CPU3	CeTSKR_e_CPU4
CePISR_e_5msSeq	0	0	0	0
CePISR_e_6p25msSeq	1	0	0	0
CePISR_e_10msSeq	0	0	0	0
CePISR_e_12p5msSeq	1	0	0	0
CePISR_e_20msSeq	0	0	0	0
CePISR_e_25msSeq	1	0	0	0
CePISR_e_40msSeq	0	0	0	0
CePISR_e_50msSeq	0	0	0	0
CePISR_e_80msSeq	0	0	0	0
CePISR_e_100msSeq	0	0	0	0
CePISR_e_EventA_Seq	0	0	0	0
CePISR_e_EventB_Seq	0	0	0	0
CePISR_e_EventC_Seq	1	0	0	0

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_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	3	3	3	3	3	3	3

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	3	3	3	3	3	3	

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

Description: Sample threshold for PSW per operating loop.

Value Units: Sample threshold for PSW (count)
X Unit: Operating Loop (enum)

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	4	4	4	4	4	4	

Initial Supporting table - P0723 transmission engaged state time threshold

Description: time necessary after transmission engaged state indicates transmsision engaged to allow P0723 enable

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

y/x	-40.000	0.000	40.000
1	5.000	3.000	1.000

Initial Supporting table - P0747 C1 clutch exhaust delay time 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 - P0747 C1 clutch exhaust delay time 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 - P0747 C1 clutch exhaust delay time garage shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in garage shift

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

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

Initial Supporting table - P0747 C1 clutch exhaust delay time 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 - P0747 C1 clutch exhaust delay time 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 - P0747 C1 clutch exhaust delay time 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	2.000	1.100	0.813	0.500	0.269

Initial Supporting table - P0777 C2 clutch exhaust delay time 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	0.350	0.200

Initial Supporting table - P0777 C2 clutch exhaust delay time closed throttle lift foot up shift

Description: P0777 C2 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 - P0777 C2 clutch exhaust delay time garage shift

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

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

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

Initial Supporting table - P0777 C2 clutch exhaust delay time 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 - P0777 C2 clutch exhaust delay time open throttle power down shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in open throttle power down shift

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

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.212	0.212

Initial Supporting table - P0777 C2 clutch exhaust delay time open throttle power on up shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in open throttle power on up shift

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

y/x	-40.00	-20.00	0.00	30.00	110.00
1	3.100	0.900	0.800	0.700	0.262

Initial Supporting table - P0797 C3 clutch exhaust delay time 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	1.300	1.000	0.950	0.469	0.200

Initial Supporting table - P0797 C3 clutch exhaust delay time 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 - P0797 C3 clutch exhaust delay time 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 - P0797 C3 clutch exhaust delay time open throttle power down shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in open throttle power down shift

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

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.387	0.144

Initial Supporting table - P0797 C3 clutch exhaust delay time open throttle power on up shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in open throttle power on up shift

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

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.900	0.800	0.750	0.650	0.256

Initial Supporting table - P0797 C3clutch exhaust delay time garage shift

Description: P0797 C3 clutch hydraulic circuit exhaust time in garage shift

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

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

Initial Supporting table - P171D hydraulic pressure delay

Description: Time to delay the initial x of y counter due to hydraulic transients. Thresholds are a function of transmission fluid temperature. Horizontal axis is transmission fluid temperature (DegC) and table output is delay time (seconds).

Value Units: delay time seconds
X Unit: transmission fluid temperature DegC

y/x	-40	0	20	30	40	50	60
1	0.090	0.090	0.080	0.050	0.050	0.050	0.050

Initial Supporting table - P171D predicted turbine speed error

Description: Predicted turbine speed vs actual turbine speed error. Thresholds are a function of engine speed and transmission fliud temperature. Diagnostic is considered failing above these values. Table vertical axis is engine speed (RPM), horizontal axis is transmission fluid temperature (DegC) and table output is predicted turbine speed error (RPM).

Value Units: turbine speed RPM error
X Unit: transmission fluid temperature DegC
Y Units: engine speed RPM

y/x	-40	0	10	20	40
0	300	300	300	300	300
500	300	300	300	300	300
1,100	300	300	300	300	300
1,500	300	300	300	300	300
2,500	300	300	300	300	300

Initial Supporting table - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.000	1.000

Initial Supporting table - P176B holding clutch states

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

Value Units: TRUE or FALSE
X Unit: intermediate speed sensor select
Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	0	1
CeCGSR_e_CR_First	0	1
CeCGSR_e_CR_Second	0	1
CeCGSR_e_CR_Third	1	1
CeCGSR_e_CR_Fourth	0	1
CeCGSR_e_CR_Fifth	0	1
CeCGSR_e_CR_Sixth	0	1
CeCGSR_e_CR_Seventh	0	1
CeCGSR_e_CR_Eighth	1	1
CeCGSR_e_CR_Ninth	0	1
CeCGSR_e_CR_Tenth	1	1

Initial Supporting table - P176B intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	4	4

Initial Supporting table - P176B intermediate speed sensor fail time threshold

Description: P176B intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	2.000	2.000

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

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

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	172.0	172.0

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

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	172.0	172.0

Initial Supporting table - P176B ratio calibration when not REVERSE

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

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.5848	6.3694	1.0000	2.4450	1.0000	0.5227	1.0000	1.0000	1.1905	1.0000
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Initial Supporting table - P176B ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

Description: P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update

Value Units: intermediate speed sensor RPM
X Unit: intermediate speed sensor 1 or 2

y/x	0	1
1	25	25

Initial Supporting table - P2715 C4 clutch exhaust delay time closed throttle down shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in closed throttle down shift

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

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.400	0.750	0.700	0.663	0.225

Initial Supporting table - P2715 C4 clutch exhaust delay time 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 - P2715 C4 clutch exhaust delay time garage shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in garage shift

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

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

Initial Supporting table - P2715 C4 clutch exhaust delay time 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 - P2715 C4 clutch exhaust delay time open throttle power down shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in open throttle power down shift

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

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.119	0.119

Initial Supporting table - P2715 C4 clutch exhaust delay time open throttle power on up shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in open throttle power on up shift

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

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.900	0.650	0.600	0.550	0.300

Initial Supporting table - P2724 C5 clutch exhaust delay time 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	1.700	1.369	1.100	0.650	0.337

Initial Supporting table - P2724 C5 clutch exhaust delay time 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 - P2724 C5 clutch exhaust delay time garage shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in garage shift

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

y/x	-40	-20	0	30	110
1	2	1	1	1	1

Initial Supporting table - P2724 C5 clutch exhaust delay time 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 - P2724 C5 clutch exhaust delay time open throttle power down shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in open throttle power down shift

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

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.900	0.613	0.450	0.300	0.163

Initial Supporting table - P2724 C5 clutch exhaust delay time 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	2.900	1.350	1.100	0.850	0.406

Initial Supporting table - P2733 C6 clutch exhaust delay time closed throttle down shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in closed throttle down shift

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

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.400	1.100	0.719	0.400	0.350

Initial Supporting table - P2733 C6 clutch exhaust delay time closed throttle lift foot up shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

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

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

Initial Supporting table - P2733 C6 clutch exhaust delay time garage shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in garage shift

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

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

Initial Supporting table - P2733 C6 clutch exhaust delay time negative torque up shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in negative torque up shift

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

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

Initial Supporting table - P2733 C6 clutch exhaust delay time open throttle power down shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in open throttle power down shift

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

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.850	0.350	0.300	0.238	0.131

Initial Supporting table - P2733 C6 clutch exhaust delay time open throttle power on up shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in open throttle power on up shift

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

y/x	-40.00	-20.00	0.00	30.00	110.00
1	1.600	1.100	0.950	0.600	0.600

Initial Supporting table - P2D2 Cltch Slip Sum

Description:

Value Units: rate of change of output rpm (dn) per 25 milliseconds
X Unit: % brake pedal position
Y Units: not applicable, no units, single row table f(brake pedal position)

y/x	0	15	20	30	35	50	75	88	100
1	-8,192	-8,192	-8,192	-8,192	-8,192	-8,192	-8,192	-8,192	-8,192

Initial Supporting table - P2D2 Decel Pressure - C1

Description: clutch 1 command pressure threshold below which clutch 1 is considered released, such that, clutch 1 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C1 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	120.0	120.0	9,999.0	315.4	375.3

P2D2 Decel Pressure - C1 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	9,999.0	120.0	315.4	120.0	9,999.0

P2D2 Decel Pressure - C1 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	9,999.0	9,999.0	9,999.0	50.0	50.0

P2D2 Decel Pressure - C1 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50.0	315.4	50.0	50.0	375.3

P2D2 Decel Pressure - C1 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	590.7	590.7	50.0	120.0	9,999.0

P2D2 Decel Pressure - C1 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	315.4	375.3	9,999.0	120.0	315.4

P2D2 Decel Pressure - C1 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	120.0	9,999.0	50.0	50.0	50.0

P2D2 Decel Pressure - C1 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	315.4	50.0	50.0	375.3	590.7

P2D2 Decel Pressure - C1 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C1

1	590.7	50.0	120.0	9,999.0	9,999.0
P2D2 Decel Pressure - C1 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	9,999.0	9,999.0	9,999.0	9,999.0	9,999.0
P2D2 Decel Pressure - C1 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	9,999.0	590.7	375.3	315.4	50.0
P2D2 Decel Pressure - C1 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C2

Description: clutch 2 command pressure threshold below which clutch 2 is considered released, such that, clutch 2 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C2 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	329	329	329	9,999	2,044
P2D2 Decel Pressure - C2 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	732	447	329	468	9,999
P2D2 Decel Pressure - C2 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	2,125	732	447	50	50
P2D2 Decel Pressure - C2 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	9,999	50	50	2,044
P2D2 Decel Pressure - C2 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	701	701	50	329	329
P2D2 Decel Pressure - C2 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	9,999	2,044	732	447	329
P2D2 Decel Pressure - C2 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	468	9,999	50	50	50
P2D2 Decel Pressure - C2 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	9,999	50	50	2,044	701
P2D2 Decel Pressure - C2 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C2

1	701	50	468	519	519
P2D2 Decel Pressure - C2 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	9,999	9,999	2,125	732	447
P2D2 Decel Pressure - C2 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	329	701	2,044	9,999	50
P2D2 Decel Pressure - C2 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C3

Description: clutch 3 command pressure threshold below which clutch 3 is considered released, such that, clutch 3 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C3 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	224	224	227	1,185	9,999

P2D2 Decel Pressure - C3 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	646	224	227	224	1,295

P2D2 Decel Pressure - C3 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	9,999	646	330	50	50

P2D2 Decel Pressure - C3 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	1,185	50	50	9,999

P2D2 Decel Pressure - C3 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	618	618	50	224	227

P2D2 Decel Pressure - C3 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	1,185	9,999	646	224	227

P2D2 Decel Pressure - C3 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	224	1,295	50	50	50

P2D2 Decel Pressure - C3 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	1,185	50	50	9,999	618

P2D2 Decel Pressure - C3 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C3

1	618	50	224	249	249
P2D2 Decel Pressure - C3 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	1,295	1,295	9,999	646	330
P2D2 Decel Pressure - C3 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	227	618	9,999	1,185	50
P2D2 Decel Pressure - C3 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C4

Description: clutch 4 command pressure threshold below which clutch 4 is considered released, such that, clutch 4 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C4 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	396	396	439	954	1,452

P2D2 Decel Pressure - C4 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	9,999	396	839	396	1,045

P2D2 Decel Pressure - C4 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	1,564	9,999	1,622	50	50

P2D2 Decel Pressure - C4 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	954	50	50	1,452

P2D2 Decel Pressure - C4 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	9,999	9,999	50	396	439

P2D2 Decel Pressure - C4 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	954	1,452	9,999	396	839

P2D2 Decel Pressure - C4 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	396	1,045	50	50	50

P2D2 Decel Pressure - C4 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	954	50	50	1,452	9,999

P2D2 Decel Pressure - C4 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C4

1	9,999	50	396	439	439
P2D2 Decel Pressure - C4 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	1,045	1,045	1,564	9,999	1,622
P2D2 Decel Pressure - C4 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	839	2,030	1,452	954	50
P2D2 Decel Pressure - C4 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C5

Description: clutch 5 command pressure threshold below which clutch 5 is considered released, such that, clutch 5 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C5 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	127	127	127	233	291
P2D2 Decel Pressure - C5 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	591	9,999	628	127	233
P2D2 Decel Pressure - C5 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	291	591	9,999	50	50
P2D2 Decel Pressure - C5 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	715	50	50	1,088
P2D2 Decel Pressure - C5 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	9,999	50	50	127	127
P2D2 Decel Pressure - C5 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	233	291	591	9,999	628
P2D2 Decel Pressure - C5 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	127	233	50	50	50
P2D2 Decel Pressure - C5 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	715	50	50	1,088	9,999
P2D2 Decel Pressure - C5 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C5

1	50	50	9,999	127	127
P2D2 Decel Pressure - C5 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	233	233	291	591	9,999
P2D2 Decel Pressure - C5 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	628	9,999	1,088	715	50
P2D2 Decel Pressure - C5 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C6

Description: clutch 6 command pressure threshold below which clutch 6 is considered released, such that, clutch 6 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C6 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	162	162	162	258	302
P2D2 Decel Pressure - C6 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	461	231	9,999	162	258
P2D2 Decel Pressure - C6 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	302	461	948	50	50
P2D2 Decel Pressure - C6 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	9,999	50	50	9,999
P2D2 Decel Pressure - C6 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	50	9,999	50	162	162
P2D2 Decel Pressure - C6 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	258	302	461	231	9,999
P2D2 Decel Pressure - C6 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	162	258	50	50	50
P2D2 Decel Pressure - C6 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	9,999	50	50	9,999	50
P2D2 Decel Pressure - C6 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C6

1	9,999	50	231	162	162
P2D2 Decel Pressure - C6 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	258	258	302	461	948
P2D2 Decel Pressure - C6 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	9,999	9,999	9,999	9,999	50
P2D2 Decel Pressure - C6 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C7

Description: clutch 7 command pressure threshold below which clutch 7 is considered released, such that, clutch 7 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C7 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	50	50	50	50	50
P2D2 Decel Pressure - C7 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	50	50	50	9,999	50
P2D2 Decel Pressure - C7 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	50	50	50	50	50
P2D2 Decel Pressure - C7 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	50	50	50	50
P2D2 Decel Pressure - C7 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	50	50	50	50	50
P2D2 Decel Pressure - C7 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	50	50	50	50	50
P2D2 Decel Pressure - C7 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	9,999	50	50	50	50
P2D2 Decel Pressure - C7 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	50	50	50	50	50
P2D2 Decel Pressure - C7 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C7

1	50	50	9,999	9,999	50
P2D2 Decel Pressure - C7 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	50	50	50	50	50
P2D2 Decel Pressure - C7 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	50	50	50	50	50
P2D2 Decel Pressure - C7 - Part 12					
y/x					
1					

Initial Supporting table - transmission fluid temperature warm up time

Description:

Value Units: transmission fluid temperature normal warn up time, seconds
X Unit: transmission fluid temperature at controller power up, °C

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,500.0	1,200.0	600.0	60.0

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

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

P0606_Last Seed Timeout f(Loop Time) - Part 1

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	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_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	200.000	200.000	200.000	8,191.875	8,191.875	8,191.875	

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

Description: Fail threshold for PSW per operating loop.

P0606_PSW Sequence Fail f(Loop Time) - Part 1

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	3	3	3	3	3	3	3

P0606_PSW Sequence Fail f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	3	3	3	3	3	3	

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

Description: Sample threshold for PSW per operating loop.

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq	CePISR_e_40msSeq
1	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq	
1	4	4	4	4	4	4	

Initial Supporting table - 10 speed transmission clutch definition and gear state to clutch map

Description: indicates clutch definition and gear state verses applied and released clutches for 10 speed transmission

Value Units: applied or released
X Unit: clutch
Y Units: gear index Y axis, actual gear column 1

y/x	1	2	3	4	5	6	7	8
1		C1 = C123456R	C2 = C1289-10R	C3 = C234579-10	C4 = C234678-10R	C5 = C1356789	C6 = C456789-10R	C7 = OWC12
2	1st gear braking	applied	applied	released	released	applied	released	applied
3	1st gear free wheel	applied	applied	released	released	applied	released	released
4	2nd gear braking	applied	applied	applied	applied	released	released	applied
5	2nd gear free wheel	applied	applied	applied	applied	released	released	released
6	3rd gear	applied	released	applied	applied	applied	released	released
7	4th gear	applied	released	applied	applied	released	applied	released
8	5th gear	applied	released	applied	released	applied	applied	released
9	6th gear	applied	released	released	released	applied	applied	released
10	7th gear	released	released	applied	applied	applied	applied	released
11	8th gear	released	applied	released	applied	applied	applied	released
12	9th gear	released	applied	applied	released	applied	applied	released
13	10th gear	released	applied	applied	applied	released	applied	released
14	reverse gear	applied	applied	released	applied	released	released	released

Initial Supporting table - 9 speed transmission clutch definition and gear state to clutch map

Description: indicates clutch definition and gear state verses applied and released clutches for 9 speed transmission

Value Units: applied or released
X Unit: clutch
Y Units: gear index Y axis, actual gear column 1

y/x	1	2	3	4	5	6	7	8
1		C1 = CB123456	C2 = C6789	C3 = CB1R	C4 = CB29	C5 = CB38	C6 = C4	C7 = C57R
2	1st gear braking	applied	released	applied	released	released	released	released
3	1st gear free wheel	applied	released	released	released	released	released	released
4	2nd gear	applied	released	released	applied	released	released	released
5	3rd gear	applied	released	released	released	applied	released	released
6	4th gear	applied	released	released	released	released	applied	released
7	5th gear	applied	released	released	released	released	released	applied
8	6th gear	applied	applied	released	released	released	released	released
9	7th gear	released	applied	released	released	released	released	applied
10	8th gear	released	applied	released	released	applied	released	released
11	9th gear	released	applied	released	applied	released	released	released
12	reverse gear	released	released	applied	released	released	released	applied

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: ime needed for engine speed to trigger "transmission hydraulic pressure available"

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

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.275	0.200	0.100

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
X Unit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.275	0.200	0.100

Initial Supporting table - KaPSDR_e_GFX_ModeVlvA_StFnl

Description: mode valve A position

Value Units: mode valve position
X Unit: ETRS diagnostic range
Y Units: ETRS command direction

KaPSDR_e_GFX_ModeVlvA_StFnl - Part 1

y/x	1	2	3	4
1		CeSTGR_e_ETRS_Park	CeSTGR_e_ETRS_NeutLo	CeSTGR_e_ETRS_NeutHi
2	CeSTGR_e_ETRS_Park	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
3	CeSTGR_e_ETRS_NeutLo	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
4	CeSTGR_e_ETRS_NeutHi	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
5	CeSTGR_e_ETRS_Drive	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh
6	CeSTGR_e_ETRS_Rvrs	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
7	CeSTGR_e_ETRS_NeutShf	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh

KaPSDR_e_GFX_ModeVlvA_StFnl - Part 2

y/x	5	6	7	
1	CeSTGR_e_ETRS_Drive	CeSTGR_e_ETRS_Rvrs	CeSTGR_e_ETRS_NeutShf	
2	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	
3	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	
4	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	
5	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	
6	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	
7	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	

Initial Supporting table - KaPSDR_e_GFX_ModeVlvB_StFnl

Description: mode valve B position

Value Units: mode valve B position
X Unit: ETRS diagnostic range

KaPSDR_e_GFX_ModeVlvB_StFnl - Part 1

y/x	1	2	3
1		CeSTGR_e_ETRS_Park	CeSTGR_e_ETRS_NeutLo
2	CeSTGR_e_ETRS_Park	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
3	CeSTGR_e_ETRS_NeutLo	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
4	CeSTGR_e_ETRS_NeutHi	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh
5	CeSTGR_e_ETRS_Drive	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
6	CeSTGR_e_ETRS_Rvrs	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh
7	CeSTGR_e_ETRS_NeutShf	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh

KaPSDR_e_GFX_ModeVlvB_StFnl - Part 2

y/x	4	5	6
1	CeSTGR_e_ETRS_NeutHi	CeSTGR_e_ETRS_Drive	CeSTGR_e_ETRS_Rvrs
2	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
3	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
4	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh
5	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow	CePSCR_e_ModeValveLow
6	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh
7	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh	CePSCR_e_ModeValveHigh

KaPSDR_e_GFX_ModeVlvB_StFnl - Part 3

y/x	7		
1	CeSTGR_e_ETRS_NeutShf		
2	CePSCR_e_ModeValveLow		
3	CePSCR_e_ModeValveLow		
4	CePSCR_e_ModeValveHigh		
5	CePSCR_e_ModeValveLow		
6	CePSCR_e_ModeValveHigh		
7	CePSCR_e_ModeValveHigh		

Initial Supporting table - KtPSDR_t_ModeVlvA_EngOff_Lim

Description: used for both engine off mode valve A stability delay time required to enable fail time update and fail time threshold

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40	-20	0	20	130
1	3.000	2.400	2.000	1.000	0.500

Initial Supporting table - KtPSDR_t_ModeVlvA_GS_TurbDlyLim

Description: mode valve A garage shift transtion turbine speed delay

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.0	-20.0	0.0	20.0	130.0
1	0.250	0.250	0.250	0.250	0.250

Initial Supporting table - KtPSDR_t_ModeVlvB_EngOff_Lim

Description: used for both engine off mode valve B stability delay time required to enable fail time update and fail time threshold

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius

y/x	-40	-20	0	20	130
1	3.000	2.400	2.000	1.000	0.500

Initial Supporting table - KtPSDR_t_ParkServo_EngOff_Lim

Description: P187E time engine must be not running to enable fail time update

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.00	-20.00	0.00	20.00	130.00
1	3.100	2.500	2.100	1.100	0.600

Initial Supporting table - KtPSDR_t_ParkStatDlyLim

Description: fail delay time

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.00	-20.00	0.00	20.00	130.00
1	4.000	0.731	0.244	0.244	0.244

Initial Supporting table - KtPSDR_t_ParkVlvStkOff_DlyLim

Description: P187E Transmission Park Valve Stuck Off fail enable delay time

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.00	-20.00	0.00	20.00	130.00
1	1.600	0.600	0.400	0.400	0.400

Initial Supporting table - KtPSDR_t_ParkVlvStkOn_DlyLim

Description: P187D Transmission Park Valve Stuck On fail enable delay time

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.00	-20.00	0.00	20.00	130.00
1.00	2.000	0.700	0.250	0.250	0.250

Initial Supporting table - KtPSDR_t_PISA_EngOff_Lim

Description: P18A8 fail time, engine not running

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.00	-20.00	0.00	20.00	130.00
1	0.200	0.200	0.200	0.200	0.200

Initial Supporting table - KtTMDC_t_EngOnHydPresThrsh

Description: hydraulic system pressure is available when engine speed is above engine speed threshold for this amount of time

Value Units: seconds
X Unit: transmission fluid temperature, degrees Celsius
Y Units: unitless

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.275	0.200	0.100

Initial Supporting table - NumClchTieUp

Description: NumClchTieUp

Value Units: minimum # of clutches
X Unit: command gear or attained gear
Y Units: not applicable, no units, single row table f(gear)

NumClchTieUp - Part 1							
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5
1	2	3	2	2	2	2	2

NumClchTieUp - Part 2							
y/x	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3
1	2	2	1	1	1	1	1

NumClchTieUp - Part 3							
y/x	CeCGSR_e_NeutralC2C4	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6	CeCGSR_e_NeutralC4C5
1	1	1	1	1	1	1	1

NumClchTieUp - Part 4							
y/x	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4
1	1	1	3	2	2	2	2

NumClchTieUp - Part 5							
y/x	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	2	2	2	1	1	1	1

NumClchTieUp - Part 6							
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5
1	1	1	1	1	1	1	1

NumClchTieUp - Part 7							
y/x	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth
1	1	1	2	1	1	1	1

NumClchTieUp - Part 8							
y/x	CeCGSR_e_Fifth	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth	

Initial Supporting table - NumClchTieUp

1	1	1	1	1	1	1	

Initial Supporting table - P0723 transmission engaged state time threshold

Description: time necessary after transmission engaged state indicates transmsision engaged to allow P0723 enable

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

y/x	-40.000	0.000	40.000
1	5.000	3.000	1.000

Initial Supporting table - P0741 (GF9 specific) TCC slip speed crash RPM

Description: RPM limit used to establish slip crashed when TCC oil became available

Value Units: RPM
X Unit: % accelerator position

y/x	0.00	15.00	25.00	50.00	75.00
1	100	100	160	233	300

Initial Supporting table - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.000	1.000

Initial Supporting table - P176B holding clutch states

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

Value Units: TRUE or FALSE
X Unit: intermediate speed sensor select
Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	0	1
CeCGSR_e_CR_First	0	1
CeCGSR_e_CR_Second	0	1
CeCGSR_e_CR_Third	1	1
CeCGSR_e_CR_Fourth	0	1
CeCGSR_e_CR_Fifth	0	1
CeCGSR_e_CR_Sixth	0	1
CeCGSR_e_CR_Seventh	0	1
CeCGSR_e_CR_Eighth	1	1
CeCGSR_e_CR_Ninth	0	1
CeCGSR_e_CR_Tenth	1	1

Initial Supporting table - P176B intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	4	4

Initial Supporting table - P176B intermediate speed sensor fail time threshold

Description: P176B intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	2.000	2.000

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

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

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	172.0	172.0

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

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	172.0	172.0

Initial Supporting table - P176B ratio calibration when not REVERSE

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

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.5848	6.3694	1.0000	2.4450	1.0000	0.5227	1.0000	1.0000	1.1905	1.0000
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Initial Supporting table - P176B ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

Description: P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update

Value Units: intermediate speed sensor RPM
X Unit: intermediate speed sensor 1 or 2

y/x	0	1
1	25	25

Initial Supporting table - P2817 TCC stuck off fail TCC slip speed

Description: TCC stuck off slip speed fail threshold when TCC is in ON mode (controlled slip mode)

Value Units: RPM
X Unit: engine torque Nm

y/x	0.00	64.00	128.00	192.00	256.00	320.00	384.00	448.00	512.00
1	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

Initial Supporting table - P2818 (GF9 specific) control valve test time

Description: Value to initialize the torque converter clutch control valve test time to after clutch select valve solenoid is turned on, window of time in which the torque converter clutch slip speed and derivative slip speed must be evaluated for failure. Window is a time down window from the calibration value to zero (0.0) seconds.

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

y/x	-7.00	10.00	40.00
1	0.600	0.300	0.100

Initial Supporting table - P2818 stuck on test time

Description: Value to initialize the TCC Stuck On test time to after transition of clutch select valve allowing TCC hydraulic circuit connectivity. Window is a time down window from the calibration value to zero (0.0) seconds.

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

y/x	-7.00	10.00	40.00
1	1.500	1.250	1.000

Initial Supporting table - P2818 torque convert derivative slip speed fail threshold

Description: The fail threshold, rate of change of torque converter slip speed, at which the torque convert clutch is considered stuck on.

Value Units: RPM/second
X Unit: transmission fluid temperature °C

y/x	-7.00	10.00	40.00
0	-600.0	-600.0	-600.0
15	-600.0	-600.0	-600.0
25	-900.0	-900.0	-900.0
50	-1,200.0	-1,200.0	-1,200.0
75	-1,500.0	-1,500.0	-1,500.0

Initial Supporting table - P2D2 Cltch Slip Sum

Description:

Value Units: rate of change of output rpm (dn) per 25 milliseconds
X Unit: % brake pedal position
Y Units: not applicable, no units, single row table f(brake pedal position)

y/x	0	15	20	30	35	50	75	88	100
1	-8,192	-8,192	-8,192	-8,192	-8,192	-8,192	-8,192	-8,192	-8,192

Initial Supporting table - P2D2 Decel Pressure - C1

Description: clutch 1 command pressure threshold below which clutch 1 is considered released, such that, clutch 1 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C1 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	120.0	120.0	9,999.0	315.4	375.3

P2D2 Decel Pressure - C1 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	9,999.0	120.0	315.4	120.0	9,999.0

P2D2 Decel Pressure - C1 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	9,999.0	9,999.0	9,999.0	50.0	50.0

P2D2 Decel Pressure - C1 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50.0	315.4	50.0	50.0	375.3

P2D2 Decel Pressure - C1 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	590.7	590.7	50.0	120.0	9,999.0

P2D2 Decel Pressure - C1 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	315.4	375.3	9,999.0	120.0	315.4

P2D2 Decel Pressure - C1 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	120.0	9,999.0	50.0	50.0	50.0

P2D2 Decel Pressure - C1 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	315.4	50.0	50.0	375.3	590.7

P2D2 Decel Pressure - C1 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C1

1	590.7	50.0	120.0	9,999.0	9,999.0
P2D2 Decel Pressure - C1 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	9,999.0	9,999.0	9,999.0	9,999.0	9,999.0
P2D2 Decel Pressure - C1 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	9,999.0	590.7	375.3	315.4	50.0
P2D2 Decel Pressure - C1 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C2

Description: clutch 2 command pressure threshold below which clutch 2 is considered released, such that, clutch 2 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C2 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	329	329	329	9,999	2,044

P2D2 Decel Pressure - C2 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	732	447	329	468	9,999

P2D2 Decel Pressure - C2 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	2,125	732	447	50	50

P2D2 Decel Pressure - C2 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	9,999	50	50	2,044

P2D2 Decel Pressure - C2 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	701	701	50	329	329

P2D2 Decel Pressure - C2 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	9,999	2,044	732	447	329

P2D2 Decel Pressure - C2 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	468	9,999	50	50	50

P2D2 Decel Pressure - C2 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	9,999	50	50	2,044	701

P2D2 Decel Pressure - C2 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C2

1	701	50	468	519	519
P2D2 Decel Pressure - C2 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	9,999	9,999	2,125	732	447
P2D2 Decel Pressure - C2 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	329	701	2,044	9,999	50
P2D2 Decel Pressure - C2 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C3

Description: clutch 3 command pressure threshold below which clutch 3 is considered released, such that, clutch 3 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C3 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	224	224	227	1,185	9,999

P2D2 Decel Pressure - C3 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	646	224	227	224	1,295

P2D2 Decel Pressure - C3 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	9,999	646	330	50	50

P2D2 Decel Pressure - C3 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	1,185	50	50	9,999

P2D2 Decel Pressure - C3 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	618	618	50	224	227

P2D2 Decel Pressure - C3 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	1,185	9,999	646	224	227

P2D2 Decel Pressure - C3 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	224	1,295	50	50	50

P2D2 Decel Pressure - C3 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	1,185	50	50	9,999	618

P2D2 Decel Pressure - C3 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C3

1	618	50	224	249	249
P2D2 Decel Pressure - C3 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	1,295	1,295	9,999	646	330
P2D2 Decel Pressure - C3 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	227	618	9,999	1,185	50
P2D2 Decel Pressure - C3 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C4

Description: clutch 4 command pressure threshold below which clutch 4 is considered released, such that, clutch 4 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C4 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	396	396	439	954	1,452

P2D2 Decel Pressure - C4 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	9,999	396	839	396	1,045

P2D2 Decel Pressure - C4 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	1,564	9,999	1,622	50	50

P2D2 Decel Pressure - C4 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	954	50	50	1,452

P2D2 Decel Pressure - C4 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	9,999	9,999	50	396	439

P2D2 Decel Pressure - C4 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	954	1,452	9,999	396	839

P2D2 Decel Pressure - C4 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	396	1,045	50	50	50

P2D2 Decel Pressure - C4 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	954	50	50	1,452	9,999

P2D2 Decel Pressure - C4 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C4

1	9,999	50	396	439	439
P2D2 Decel Pressure - C4 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	1,045	1,045	1,564	9,999	1,622
P2D2 Decel Pressure - C4 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	839	2,030	1,452	954	50
P2D2 Decel Pressure - C4 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C5

Description: clutch 5 command pressure threshold below which clutch 5 is considered released, such that, clutch 5 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C5 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	127	127	127	233	291
P2D2 Decel Pressure - C5 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	591	9,999	628	127	233
P2D2 Decel Pressure - C5 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	291	591	9,999	50	50
P2D2 Decel Pressure - C5 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	715	50	50	1,088
P2D2 Decel Pressure - C5 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	9,999	50	50	127	127
P2D2 Decel Pressure - C5 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	233	291	591	9,999	628
P2D2 Decel Pressure - C5 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	127	233	50	50	50
P2D2 Decel Pressure - C5 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	715	50	50	1,088	9,999
P2D2 Decel Pressure - C5 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C5

1	50	50	9,999	127	127
P2D2 Decel Pressure - C5 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	233	233	291	591	9,999
P2D2 Decel Pressure - C5 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	628	9,999	1,088	715	50
P2D2 Decel Pressure - C5 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C6

Description: clutch 6 command pressure threshold below which clutch 6 is considered released, such that, clutch 6 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C6 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	162	162	162	258	302

P2D2 Decel Pressure - C6 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	461	231	9,999	162	258

P2D2 Decel Pressure - C6 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	302	461	948	50	50

P2D2 Decel Pressure - C6 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	9,999	50	50	9,999

P2D2 Decel Pressure - C6 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	50	9,999	50	162	162

P2D2 Decel Pressure - C6 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	258	302	461	231	9,999

P2D2 Decel Pressure - C6 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	162	258	50	50	50

P2D2 Decel Pressure - C6 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	9,999	50	50	9,999	50

P2D2 Decel Pressure - C6 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C6

1	9,999	50	231	162	162
P2D2 Decel Pressure - C6 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	258	258	302	461	948
P2D2 Decel Pressure - C6 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	9,999	9,999	9,999	9,999	50
P2D2 Decel Pressure - C6 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C7

Description: clutch 7 command pressure threshold below which clutch 7 is considered released, such that, clutch 7 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C7 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	50	50	50	50	50

P2D2 Decel Pressure - C7 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	50	50	50	9,999	50

P2D2 Decel Pressure - C7 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	50	50	50	50	50

P2D2 Decel Pressure - C7 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	50	50	50	50	50

P2D2 Decel Pressure - C7 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC2C3C4C5	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	50	50	50	50	50

P2D2 Decel Pressure - C7 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	50	50	50	50	50

P2D2 Decel Pressure - C7 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	9,999	50	50	50	50

P2D2 Decel Pressure - C7 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	50	50	50	50	50

P2D2 Decel Pressure - C7 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC2C3C4C5	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C7

1	50	50	9,999	9,999	50
P2D2 Decel Pressure - C7 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	50	50	50	50	50
P2D2 Decel Pressure - C7 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	50	50	50	50	50
P2D2 Decel Pressure - C7 - Part 12					
y/x					
1					

Initial Supporting table - transmission fluid temperature warm up time

Description:

Value Units: transmission fluid temperature normal warn up time, seconds
X Unit: transmission fluid temperature at controller power up, °C

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,500.0	1,200.0	600.0	60.0

Initial Supporting table - 10 speed transmission clutch definition and gear state to clutch map

Description: indicates clutch definition and gear state verses applied and released clutches for 10 speed transmission

Value Units: applied or released
X Unit: clutch
Y Units: gear index Y axis, actual gear column 1

y/x	1	2	3	4	5	6	7	8
1		C1 = C123456R	C2 = C1289-10R	C3 = C234579-10	C4 = C234678-10R	C5 = C1356789	C6 = C456789-10R	C7 = OWC12
2	1st gear braking	applied	applied	released	released	applied	released	applied
3	1st gear free wheel	applied	applied	released	released	applied	released	released
4	2nd gear braking	applied	applied	applied	applied	released	released	applied
5	2nd gear free wheel	applied	applied	applied	applied	released	released	released
6	3rd gear	applied	released	applied	applied	applied	released	released
7	4th gear	applied	released	applied	applied	released	applied	released
8	5th gear	applied	released	applied	released	applied	applied	released
9	6th gear	applied	released	released	released	applied	applied	released
10	7th gear	released	released	applied	applied	applied	applied	released
11	8th gear	released	applied	released	applied	applied	applied	released
12	9th gear	released	applied	applied	released	applied	applied	released
13	10th gear	released	applied	applied	applied	released	applied	released
14	reverse gear	applied	applied	released	applied	released	released	released

Initial Supporting table - 9 speed transmission clutch definition and gear state to clutch map

Description: indicates clutch definition and gear state verses applied and released clutches for 9 speed transmission

Value Units: applied or released
X Unit: clutch
Y Units: gear index Y axis, actual gear column 1

y/x	1	2	3	4	5	6	7	8
1		C1 = CB123456	C2 = C6789	C3 = CB1R	C4 = CB29	C5 = CB38	C6 = C4	C7 = C57R
2	1st gear braking	applied	released	applied	released	released	released	released
3	1st gear free wheel	applied	released	released	released	released	released	released
4	2nd gear	applied	released	released	applied	released	released	released
5	3rd gear	applied	released	released	released	applied	released	released
6	4th gear	applied	released	released	released	released	applied	released
7	5th gear	applied	released	released	released	released	released	applied
8	6th gear	applied	applied	released	released	released	released	released
9	7th gear	released	applied	released	released	released	released	applied
10	8th gear	released	applied	released	released	applied	released	released
11	9th gear	released	applied	released	applied	released	released	released
12	reverse gear	released	released	applied	released	released	released	applied

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
X Unit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
X Unit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

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

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

Initial Supporting table - intermediate speed sensor 1 or 2 predicted direction

Description:

Value Units: predicted direction: forward, reverse, unknown
X Unit: attained gear
Y Units: intermediate speed sensor 1 or 2

intermediate speed sensor 1 or 2 predicted direction - Part 1			
y/x	CeCGSR_e_CR_NullForSched	CeCGSR_e_CR_Neutral	CeCGSR_e_CR_Park
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 2			
y/x	CeCGSR_e_CR_Reverse	CeCGSR_e_CR_First	CeCGSR_e_CR_Second
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown

intermediate speed sensor 1 or 2 predicted direction - Part 3			
y/x	CeCGSR_e_CR_Third	CeCGSR_e_CR_Fourth	CeCGSR_e_CR_Fifth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 4			
y/x	CeCGSR_e_CR_Sixth	CeCGSR_e_CR_Seventh	CeCGSR_e_CR_Eighth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward

intermediate speed sensor 1 or 2 predicted direction - Part 5			
y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	

Initial Supporting table - NumClchTieUp

Description: NumClchTieUp

Value Units: minimum # of clutches
X Unit: command gear or attained gear
Y Units: not applicable, no units, single row table f(gear)

NumClchTieUp - Part 1							
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5
1	5	5	4	4	4	4	4

NumClchTieUp - Part 2							
y/x	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3
1	4	4	3	3	3	3	3

NumClchTieUp - Part 3							
y/x	CeCGSR_e_NeutralC2C4	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6	CeCGSR_e_NeutralC4C5
1	3	3	3	3	3	3	3

NumClchTieUp - Part 4							
y/x	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4
1	3	1	5	4	4	4	4

NumClchTieUp - Part 5							
y/x	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	4	4	4	3	3	3	3

NumClchTieUp - Part 6							
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6
1	3	3	3	3	3	3	1

NumClchTieUp - Part 7							
y/x	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth
1	1	1	2	1	2	1	1

NumClchTieUp - Part 8							
y/x	CeCGSR_e_Fifth	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth	

Initial Supporting table - NumClchTieUp

1	1	1	1	1	1	1	

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

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

Value Units: Max Time for Last Seed Timeout (ms)
X Unit: Operating Loop Sequence (enum)

P0606_Last Seed Timeout f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	200.000	200.000	200.000	200.000	200.000	200.000	200.000	200.000

P0606_Last Seed Timeout f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	200.000	200.000	200.000	500.000	1,000.000	8,191.875	8,191.875	8,191.875

Initial Supporting table - P0606_Program Sequence Watch Enable f(Core, Loop Time)

Description: The enabling flags for the program sequence watch as a function of processor core and operating loop time sequence.

Value Units: PSW enable flag (boolean)
X Unit: Processor Core (enum)
Y Units: Operating Loop Time Sequence (enum)

y/x	CeTSKR_e_CPU	CeTSKR_e_CPU2	CeTSKR_e_CPU3	CeTSKR_e_CPU4
CePISR_e_2p5msSeq	0	0	0	0
CePISR_e_3p125msSeq	0	0	0	0
CePISR_e_5msSeq	0	0	0	0
CePISR_e_6p25msSeq	1	0	0	0
CePISR_e_10msSeq	0	0	0	0
CePISR_e_12p5msSeq	1	0	0	0
CePISR_e_20msSeq	0	0	0	0
CePISR_e_25msSeq	1	0	0	0
CePISR_e_40msSeq	0	0	0	0
CePISR_e_50msSeq	1	0	0	0
CePISR_e_80msSeq	0	0	0	0
CePISR_e_100msSeq	0	0	0	0
CePISR_e_250msSeq	0	0	0	0
CePISR_e_EventA_Seq	0	0	0	0
CePISR_e_EventB_Seq	0	0	0	0
CePISR_e_EventC_Seq	0	0	0	0

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

Description: Fail threshold for PSW per operating loop.

Value Units: Fail threshold for PSW (count)
X Unit: Operating Loop (enum)

P0606_PSW Sequence Fail f(Loop Time) - Part 1

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

P0606_PSW Sequence Fail f(Loop Time) - Part 2

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

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

Description: Sample threshold for PSW per operating loop.

Value Units: Sample threshold for PSW (count)
X Unit: Operating Loop (enum)

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	4	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	4	4	4	4	4	4	4	4

Initial Supporting table - P0723 transmission engaged state time threshold

Description: time necessary after transmission engaged state indicates transmsision engaged to allow P0723 enable

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

y/x	-40.000	-20.000	20.000
1	5.000	3.000	1.000

Initial Supporting table - P0747 C1 clutch exhaust delay time 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 - P0747 C1 clutch exhaust delay time 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 - P0747 C1 clutch exhaust delay time 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 - P0747 C1 clutch exhaust delay time 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 - P0747 C1 clutch exhaust delay time 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 - P0747 C1 clutch exhaust delay time open throttle power on up shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in open throttle power on up shift

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

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - P0777 C2 clutch exhaust delay time 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 - P0777 C2 clutch exhaust delay time closed throttle lift foot up shift

Description: P0777 C2 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 - P0777 C2 clutch exhaust delay time 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 - P0777 C2 clutch exhaust delay time 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 - P0777 C2 clutch exhaust delay time 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 - P0777 C2 clutch exhaust delay time open throttle power on up shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in open throttle power on up shift

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

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - P0797 C3 clutch exhaust delay time 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 - P0797 C3 clutch exhaust delay time 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 - P0797 C3 clutch exhaust delay time 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 - P0797 C3 clutch exhaust delay time 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 - P0797 C3 clutch exhaust delay time 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	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - P0797 C3clutch exhaust delay time 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 - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P176B holding clutch states

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

Value Units: TRUE or FALSE
X Unit: intermediate speed sensor select
Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P176B intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P176B intermediate speed sensor fail time threshold

Description: P176B intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

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

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

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

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

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B ratio calibration when not REVERSE

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

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P176B ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

Description: P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update

Value Units: intermediate speed sensor RPM
X Unit: intermediate speed sensor 1 or 2

y/x	0	1
1	225	225

Initial Supporting table - P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P17D6 holding clutch states

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

Value Units: TRUE or FALSE
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P17D6 intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P17D6 intermediate speed sensor fail RPM threshold

Description: P17D6 intermediate speed sensor fail RPM speed threshold

Value Units: RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	100	100

Initial Supporting table - P17D6 intermediate speed sensor fail time threshold

Description: P17D6 intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P17D6 minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P17D6 ratio calibration when REVERSE or P17D6 ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 ratio calibration when not REVERSE

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

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P17D6 ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P2715 C4 clutch exhaust delay time 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 - P2715 C4 clutch exhaust delay time 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 - P2715 C4 clutch exhaust delay time 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 - P2715 C4 clutch exhaust delay time 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 - P2715 C4 clutch exhaust delay time 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 - P2715 C4 clutch exhaust delay time open throttle power on up shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in open throttle power on up shift

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

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - P2724 C5 clutch exhaust delay time 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 - P2724 C5 clutch exhaust delay time 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 - P2724 C5 clutch exhaust delay time 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 - P2724 C5 clutch exhaust delay time 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 - P2724 C5 clutch exhaust delay time 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 - P2724 C5 clutch exhaust delay time open throttle power on up shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in open throttle power on up shift

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

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - P2733 C6 clutch exhaust delay time closed throttle down shift

Description: P2733 C6 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 - P2733 C6 clutch exhaust delay time closed throttle lift foot up shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

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

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

Initial Supporting table - P2733 C6 clutch exhaust delay time garage shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in garage shift

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

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

Initial Supporting table - P2733 C6 clutch exhaust delay time negative torque up shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in negative torque up shift

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

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

Initial Supporting table - P2733 C6 clutch exhaust delay time open throttle power down shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in open throttle power down shift

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

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

Initial Supporting table - P2733 C6 clutch exhaust delay time open throttle power on up shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in open throttle power on up shift

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

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - P2D2 Cltch Slip Sum

Description:

Value Units: rate of change of output rpm (dn) per 25 milliseconds
X Unit: % brake pedal position
Y Units: not applicable, no units, single row table f(brake pedal position)

y/x	0	15	20	30	35	50	75	88	100
1	-4	-4	-4	-4	-4	-4	-4	-4	-4

Initial Supporting table - P2D2 Decel Pressure - C1

Description: clutch 1 command pressure threshold below which clutch 1 is considered released, such that, clutch 1 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C1 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	405.5	405.5	99,999.0	266.7	405.5

P2D2 Decel Pressure - C1 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	405.5	405.5	405.5	99,999.0	99,999.0

P2D2 Decel Pressure - C1 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	99,999.0	99,999.0	99,999.0	266.7	266.7

P2D2 Decel Pressure - C1 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	260.4	266.7	405.5	405.5	405.5

P2D2 Decel Pressure - C1 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	405.5	405.5	405.5	405.5	99,999.0

P2D2 Decel Pressure - C1 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	266.7	405.5	405.5	405.5	405.5

P2D2 Decel Pressure - C1 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999.0	99,999.0	266.7	266.7	260.4

P2D2 Decel Pressure - C1 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	266.7	405.5	405.5	405.5	405.5

P2D2 Decel Pressure - C1 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C1

1	405.5	405.5	99,999.0	99,999.0	99,999.0
P2D2 Decel Pressure - C1 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999.0	99,999.0	99,999.0	99,999.0	99,999.0
P2D2 Decel Pressure - C1 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999.0	405.5	260.4	247.8	266.7
P2D2 Decel Pressure - C1 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C2

Description: clutch 2 command pressure threshold below which clutch 2 is considered released, such that, clutch 2 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C2 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	602	602	326	99,999	602
P2D2 Decel Pressure - C2 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	602	602	602	99,999	99,999
P2D2 Decel Pressure - C2 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	326	326	326	99,999	99,999
P2D2 Decel Pressure - C2 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	99,999	99,999	602	602	602
P2D2 Decel Pressure - C2 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	602	602	99,999	602	326
P2D2 Decel Pressure - C2 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	99,999	602	602	602	602
P2D2 Decel Pressure - C2 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C2 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	99,999	602	602	602	602
P2D2 Decel Pressure - C2 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C2

1	602	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C2 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999	99,999	326	209	230
P2D2 Decel Pressure - C2 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	210	602	99,999	99,999	99,999
P2D2 Decel Pressure - C2 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C3

Description: clutch 3 command pressure threshold below which clutch 3 is considered released, such that, clutch 3 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C3 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	99,999	99,999	1,798	99,999	99,999

P2D2 Decel Pressure - C3 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	99,999	1,798	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	99,999	1,798	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	99,999	99,999	99,999	99,999	1,798

P2D2 Decel Pressure - C3 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	1,798	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	1,798	99,999	99,999	99,999	1,798

P2D2 Decel Pressure - C3 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C3

1	1,798	99,999	231	99,999	99,999
P2D2 Decel Pressure - C3 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C3 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	980	99,999	1,798	99,999	99,999
P2D2 Decel Pressure - C3 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C4

Description: clutch 4 command pressure threshold below which clutch 4 is considered released, such that, clutch 4 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C4 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	2,887	2,887	2,887	2,107	2,887

P2D2 Decel Pressure - C4 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	99,999	2,887	2,887	99,999	429

P2D2 Decel Pressure - C4 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	2,887	99,999	99,999	2,107	99,999

P2D2 Decel Pressure - C4 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	2,107	2,107	99,999	2,887	2,887

P2D2 Decel Pressure - C4 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	99,999	99,999	99,999	2,887	2,887

P2D2 Decel Pressure - C4 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	2,107	2,887	99,999	2,887	2,887

P2D2 Decel Pressure - C4 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	429	2,107	99,999	2,107

P2D2 Decel Pressure - C4 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	2,107	99,999	2,887	2,887	99,999

P2D2 Decel Pressure - C4 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C4

1	99,999	99,999	99,999	429	429
P2D2 Decel Pressure - C4 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999	99,999	99,999	99,999	2,887
P2D2 Decel Pressure - C4 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999	99,999	99,999	2,107	99,999
P2D2 Decel Pressure - C4 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C5

Description: clutch 5 command pressure threshold below which clutch 5 is considered released, such that, clutch 5 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C5 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	2,084	2,084	1,087	2,084	2,084
P2D2 Decel Pressure - C5 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	1,087	99,999	1,087	99,999	712
P2D2 Decel Pressure - C5 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	1,087	1,087	99,999	2,084	2,084
P2D2 Decel Pressure - C5 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	99,999	2,084	2,084	99,999	2,084
P2D2 Decel Pressure - C5 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	99,999	2,084	99,999	2,084	1,087
P2D2 Decel Pressure - C5 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	2,084	2,084	1,087	99,999	1,087
P2D2 Decel Pressure - C5 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	712	2,084	2,084	99,999
P2D2 Decel Pressure - C5 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	2,084	2,084	99,999	2,084	99,999
P2D2 Decel Pressure - C5 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C5

1	2,084	99,999	196	99,999	99,999
P2D2 Decel Pressure - C5 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	712	712	99,999	1,087	99,999
P2D2 Decel Pressure - C5 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999	99,999	99,999	99,999	2,084
P2D2 Decel Pressure - C5 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C6

Description: clutch 6 command pressure threshold below which clutch 6 is considered released, such that, clutch 6 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C6 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	617	617	617	235	617
P2D2 Decel Pressure - C6 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	617	617	99,999	99,999	235
P2D2 Decel Pressure - C6 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	617	617	617	235	235
P2D2 Decel Pressure - C6 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	141	99,999	617	617	99,999
P2D2 Decel Pressure - C6 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	617	99,999	617	617	617
P2D2 Decel Pressure - C6 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	235	617	617	617	99,999
P2D2 Decel Pressure - C6 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	235	235	235	141
P2D2 Decel Pressure - C6 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	99,999	617	617	99,999	617
P2D2 Decel Pressure - C6 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C6

1	99,999	617	99,999	141	141
P2D2 Decel Pressure - C6 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	235	235	617	99,999	99,999
P2D2 Decel Pressure - C6 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C6 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C7

Description: clutch 7 command pressure threshold below which clutch 7 is considered released, such that, clutch 7 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C7 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C7

1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C7 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C7 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C7 - Part 12					
y/x					
1					

Initial Supporting table - transmission fluid temperature warm up time

Description:

Value Units: transmission fluid temperature normal warn up time, seconds
X Unit: transmission fluid temperature at controller power up, °C

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,400.0	1,000.0	500.0	10.0

Initial Supporting table - 10 speed transmission clutch definition and gear state to clutch map

Description: indicates clutch definition and gear state verses applied and released clutches for 10 speed transmission

Value Units: applied or released
X Unit: clutch
Y Units: gear index Y axis, actual gear column 1

y/x	1	2	3	4	5	6	7	8
1		C1 = C123456R	C2 = C1289-10R	C3 = C234579-10	C4 = C234678-10R	C5 = C1356789	C6 = C456789-10R	C7 = OWC12
2	1st gear braking	applied	applied	released	released	applied	released	applied
3	1st gear free wheel	applied	applied	released	released	applied	released	released
4	2nd gear braking	applied	applied	applied	applied	released	released	applied
5	2nd gear free wheel	applied	applied	applied	applied	released	released	released
6	3rd gear	applied	released	applied	applied	applied	released	released
7	4th gear	applied	released	applied	applied	released	applied	released
8	5th gear	applied	released	applied	released	applied	applied	released
9	6th gear	applied	released	released	released	applied	applied	released
10	7th gear	released	released	applied	applied	applied	applied	released
11	8th gear	released	applied	released	applied	applied	applied	released
12	9th gear	released	applied	applied	released	applied	applied	released
13	10th gear	released	applied	applied	applied	released	applied	released
14	reverse gear	applied	applied	released	applied	released	released	released

Initial Supporting table - 9 speed transmission clutch definition and gear state to clutch map

Description: indicates clutch definition and gear state verses applied and released clutches for 9 speed transmission

Value Units: applied or released
X Unit: clutch
Y Units: gear index Y axis, actual gear column 1

y/x	1	2	3	4	5	6	7	8
1		C1 = CB123456	C2 = C6789	C3 = CB1R	C4 = CB29	C5 = CB38	C6 = C4	C7 = C57R
2	1st gear braking	applied	released	applied	released	released	released	released
3	1st gear free wheel	applied	released	released	released	released	released	released
4	2nd gear	applied	released	released	applied	released	released	released
5	3rd gear	applied	released	released	released	applied	released	released
6	4th gear	applied	released	released	released	released	applied	released
7	5th gear	applied	released	released	released	released	released	applied
8	6th gear	applied	applied	released	released	released	released	released
9	7th gear	released	applied	released	released	released	released	applied
10	8th gear	released	applied	released	released	applied	released	released
11	9th gear	released	applied	released	applied	released	released	released
12	reverse gear	released	released	applied	released	released	released	applied

Initial Supporting table - C1 on coming clutch minimum command pressure, power on up shift

Description: C1 on coming clutch minimum command pressure when shift type is power on up shift

Value Units: kPa
X Unit: engine torque, Nm
Y Units: unitless

y/x	0.0	50.0	100.0	200.0	300.0
1	690.0	690.0	690.0	690.0	690.0

Initial Supporting table - C2 on coming clutch minimum command pressure, power on up shift

Description: C2 on coming clutch minimum command pressure when shift type is power on up shift

Value Units: kPa
X Unit: engine 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 - C3 on coming clutch minimum command pressure, power on up shift

Description: C3 on coming clutch minimum command pressure when shift type is power on up shift

Value Units: kPa
X Unit: engine 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 - C4 on coming clutch minimum command pressure, power on up shift

Description: C4 on coming clutch minimum command pressure when shift type is power on up shift

Value Units: kPa
X Unit: engine torque, Nm
Y Units: unitless

y/x	0.0	50.0	100.0	200.0	300.0
1	250.0	300.0	350.0	400.0	450.0

Initial Supporting table - C5 on coming clutch minimum command pressure, power on up shift

Description: C5 on coming clutch minimum command pressure when shift type is power on up shift

Value Units: kPa
X Unit: engine 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 - C6 on coming clutch minimum command pressure, power on up shift

Description: C6 on coming clutch minimum command pressure when shift type is power on up shift

Value Units: kPa
X Unit: engine 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 - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
X Unit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
X Unit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: ime needed for engine speed to trigger "transmission hydraulic pressure available"

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

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
X Unit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

Initial Supporting table - intermediate speed sensor 1 or 2 predicted direction

Description:

Value Units: predicted direction: forward, reverse, unknown
X Unit: attained gear
Y Units: intermediate speed sensor 1 or 2

intermediate speed sensor 1 or 2 predicted direction - Part 1			
y/x	CeCGSR_e_CR_NullForSched	CeCGSR_e_CR_Neutral	CeCGSR_e_CR_Park
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
intermediate speed sensor 1 or 2 predicted direction - Part 2			
y/x	CeCGSR_e_CR_Reverse	CeCGSR_e_CR_First	CeCGSR_e_CR_Second
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
intermediate speed sensor 1 or 2 predicted direction - Part 3			
y/x	CeCGSR_e_CR_Third	CeCGSR_e_CR_Fourth	CeCGSR_e_CR_Fifth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
intermediate speed sensor 1 or 2 predicted direction - Part 4			
y/x	CeCGSR_e_CR_Sixth	CeCGSR_e_CR_Seventh	CeCGSR_e_CR_Eighth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
intermediate speed sensor 1 or 2 predicted direction - Part 5			
y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	

Initial Supporting table - NumClchTieUp

Description: NumClchTieUp

Value Units: minimum # of clutches
X Unit: command gear or attained gear
Y Units: not applicable, no units, single row table f(gear)

NumClchTieUp - Part 1							
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5
1	5	5	4	4	4	4	4

NumClchTieUp - Part 2							
y/x	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3
1	4	4	3	3	3	3	3

NumClchTieUp - Part 3							
y/x	CeCGSR_e_NeutralC2C4	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6	CeCGSR_e_NeutralC4C5
1	3	3	3	3	3	3	3

NumClchTieUp - Part 4							
y/x	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4
1	3	1	5	4	4	4	4

NumClchTieUp - Part 5							
y/x	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	4	4	4	3	3	3	3

NumClchTieUp - Part 6							
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6
1	3	3	3	3	3	3	1

NumClchTieUp - Part 7							
y/x	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth
1	1	1	2	1	2	1	1

NumClchTieUp - Part 8							
y/x	CeCGSR_e_Fifth	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth	

Initial Supporting table - NumClchTieUp

1	1	1	1	1	1	1	

Initial Supporting table - on coming clutch minimum command pressure, closed throttle down shift

Description: On coming clutch minimum command pressure to enable clutch stuck on diagnostic monitor test when shift type is closed throttle down shift

Value Units: kPa
X Unit: on coming clutch
Y Units: unitless

y/x	CeTSER_e_C1_Clutch	CeTSER_e_C2_Clutch	CeTSER_e_C3_Clutch	CeTSER_e_C4_Clutch	CeTSER_e_C5_Clutch	CeTSER_e_C6_Clutch
1	400.0	400.0	400.0	400.0	400.0	400.0

Initial Supporting table - on coming clutch minimum command pressure, garage shift

Description: On coming clutch minimum command pressure to enable clutch stuck on diagnostic monitor test when shift type is garage shift

Value Units: kPa
X Unit: on coming clutch
Y Units: unitless

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	450.0	750.0	850.0	400.0	400.0	400.0

Initial Supporting table - on coming clutch minimum command pressure, negative torque up shift

Description: On coming clutch minimum command pressure to enable clutch stuck on diagnostic monitor test when shift type is negative torque up shift

Value Units: kPa
X Unit: on coming clutch
Y Units: unitless

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	450.0	450.0	450.0	600.0	450.0	450.0

Initial Supporting table - on coming clutch minimum command pressure, power down shift

Description: On coming clutch minimum command pressure to enable clutch stuck on diagnostic monitor test when shift type is power down shift

Value Units: kPa
X Unit: on coming clutch
Y Units: unitless

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	450.0	500.0	600.0	750.0	750.0	500.0

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

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

Value Units: Max Time for Last Seed Timeout (ms)
X Unit: Operating Loop Sequence (enum)

P0606_Last Seed Timeout f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	200.000	200.000	200.000	200.000	200.000	200.000	200.000	200.000

P0606_Last Seed Timeout f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	200.000	200.000	200.000	500.000	1,000.000	8,191.875	8,191.875	8,191.875

Initial Supporting table - P0606_Program Sequence Watch Enable f(Core, Loop Time)

Description: The enabling flags for the program sequence watch as a function of processor core and operating loop time sequence.

Value Units: PSW enable flag (boolean)
X Unit: Processor Core (enum)
Y Units: Operating Loop Time Sequence (enum)

y/x	CeTSKR_e_CPU	CeTSKR_e_CPU2	CeTSKR_e_CPU3	CeTSKR_e_CPU4
CePISR_e_2p5msSeq	0	0	0	0
CePISR_e_3p125msSeq	0	0	0	0
CePISR_e_5msSeq	0	0	0	0
CePISR_e_6p25msSeq	1	0	0	0
CePISR_e_10msSeq	0	0	0	0
CePISR_e_12p5msSeq	1	0	0	0
CePISR_e_20msSeq	0	0	0	0
CePISR_e_25msSeq	1	0	0	0
CePISR_e_40msSeq	0	0	0	0
CePISR_e_50msSeq	1	0	0	0
CePISR_e_80msSeq	0	0	0	0
CePISR_e_100msSeq	0	0	0	0
CePISR_e_250msSeq	0	0	0	0
CePISR_e_EventA_Seq	0	0	0	0
CePISR_e_EventB_Seq	0	0	0	0
CePISR_e_EventC_Seq	0	0	0	0

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

Description: Fail threshold for PSW per operating loop.

Value Units: Fail threshold for PSW (count)
X Unit: Operating Loop (enum)

P0606_PSW Sequence Fail f(Loop Time) - Part 1

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

P0606_PSW Sequence Fail f(Loop Time) - Part 2

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

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

Description: Sample threshold for PSW per operating loop.

Value Units: Sample threshold for PSW (count)
X Unit: Operating Loop (enum)

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	4	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	4	4	4	4	4	4	4	4

Initial Supporting table - P0723 transmission engaged state time threshold

Description: time necessary after transmission engaged state indicates transmsision engaged to allow P0723 enable

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

y/x	-40.000	-20.000	20.000
1	5.000	3.000	1.000

Initial Supporting table - P0741 GR10 torque converter K factor fail limit

Description:

Value Units: transmission torque converter K factor
X Unit: transmission torque converter speed ratio = transmission turbine shaft speed / engine speed

y/x	0.000	0.100	0.200	0.300	0.500	0.700	0.800	0.945	0.950
1	400.0	350.0	250.0	250.0	250.0	250.0	500.0	700.0	16,383.8

Initial Supporting table - P0747 C1 clutch exhaust delay time 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 - P0747 C1 clutch exhaust delay time 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 - P0747 C1 clutch exhaust delay time 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 - P0747 C1 clutch exhaust delay time 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 - P0747 C1 clutch exhaust delay time 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 - P0747 C1 clutch exhaust delay time open throttle power on up shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in open throttle power on up shift

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

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - P0777 C2 clutch exhaust delay time 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 - P0777 C2 clutch exhaust delay time closed throttle lift foot up shift

Description: P0777 C2 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 - P0777 C2 clutch exhaust delay time 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 - P0777 C2 clutch exhaust delay time 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 - P0777 C2 clutch exhaust delay time 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 - P0777 C2 clutch exhaust delay time open throttle power on up shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in open throttle power on up shift

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

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - P0797 C3 clutch exhaust delay time 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 - P0797 C3 clutch exhaust delay time 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 - P0797 C3 clutch exhaust delay time 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 - P0797 C3 clutch exhaust delay time 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 - P0797 C3 clutch exhaust delay time 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	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - P0797 C3clutch exhaust delay time 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 - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P176B holding clutch states

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

Value Units: TRUE or FALSE
X Unit: intermediate speed sensor select
Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P176B intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P176B intermediate speed sensor fail time threshold

Description: P176B intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

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

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

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

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

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B ratio calibration when not REVERSE

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

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P176B ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

Description: P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update

Value Units: intermediate speed sensor RPM
X Unit: intermediate speed sensor 1 or 2

y/x	0	1
1	225	225

Initial Supporting table - P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P17D6 holding clutch states

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

Value Units: TRUE or FALSE
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P17D6 intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P17D6 intermediate speed sensor fail RPM threshold

Description: P17D6 intermediate speed sensor fail RPM speed threshold

Value Units: RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	100	100

Initial Supporting table - P17D6 intermediate speed sensor fail time threshold

Description: P17D6 intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P17D6 minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P17D6 ratio calibration when REVERSE or P17D6 ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 ratio calibration when not REVERSE

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

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P17D6 ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P2715 C4 clutch exhaust delay time 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 - P2715 C4 clutch exhaust delay time 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 - P2715 C4 clutch exhaust delay time 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 - P2715 C4 clutch exhaust delay time 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 - P2715 C4 clutch exhaust delay time 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 - P2715 C4 clutch exhaust delay time open throttle power on up shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in open throttle power on up shift

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

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - P2724 C5 clutch exhaust delay time 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 - P2724 C5 clutch exhaust delay time 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 - P2724 C5 clutch exhaust delay time 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 - P2724 C5 clutch exhaust delay time 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 - P2724 C5 clutch exhaust delay time 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 - P2724 C5 clutch exhaust delay time open throttle power on up shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in open throttle power on up shift

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

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - P2733 C6 clutch exhaust delay time closed throttle down shift

Description: P2733 C6 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 - P2733 C6 clutch exhaust delay time closed throttle lift foot up shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

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

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

Initial Supporting table - P2733 C6 clutch exhaust delay time garage shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in garage shift

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

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

Initial Supporting table - P2733 C6 clutch exhaust delay time negative torque up shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in negative torque up shift

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

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

Initial Supporting table - P2733 C6 clutch exhaust delay time open throttle power down shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in open throttle power down shift

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

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

Initial Supporting table - P2733 C6 clutch exhaust delay time open throttle power on up shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in open throttle power on up shift

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

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - P2817 TCC stuck off fail TCC slip speed

Description: TCC stuck off slip speed fail threshold when TCC is in ON mode (controlled slip mode)

Value Units: RPM
X Unit: engine torque Nm

y/x	0.00	64.00	128.00	192.00	256.00	320.00	384.00	448.00	512.00
1	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

Initial Supporting table - P2818 TCC stuck on fail time garage shift - GR10

Description: GR10 P2818 TCC stuck on fail time garage shift

Value Units: seconds
X Unit: rate of change of engine speed, RPM/second
Y Units: unitless

y/x	50	100	150	250	300
1	0.250	0.200	0.125	0.100	0.100

Initial Supporting table - P2818 TCC stuck on fail time stall pending - GR10

Description: GR10 P2818 TCC stuck on fail time stall pending

Value Units: seconds
X Unit: rate of change of engine speed, RPM/second
Y Units: unitless

y/x	50	100	150	250	300
1	0.750	0.300	0.300	0.300	0.300

Initial Supporting table - P2D2 Cltch Slip Sum

Description:

Value Units: rate of change of output rpm (dn) per 25 milliseconds
X Unit: % brake pedal position
Y Units: not applicable, no units, single row table f(brake pedal position)

y/x	0	15	20	30	35	50	75	88	100
1	-4	-4	-4	-4	-4	-4	-4	-4	-4

Initial Supporting table - P2D2 Decel Pressure - C1

Description: clutch 1 command pressure threshold below which clutch 1 is considered released, such that, clutch 1 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C1 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	405.5	405.5	99,999.0	266.7	405.5

P2D2 Decel Pressure - C1 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	405.5	405.5	405.5	99,999.0	99,999.0

P2D2 Decel Pressure - C1 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	99,999.0	99,999.0	99,999.0	266.7	266.7

P2D2 Decel Pressure - C1 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	260.4	266.7	405.5	405.5	405.5

P2D2 Decel Pressure - C1 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	405.5	405.5	405.5	405.5	99,999.0

P2D2 Decel Pressure - C1 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	266.7	405.5	405.5	405.5	405.5

P2D2 Decel Pressure - C1 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999.0	99,999.0	266.7	266.7	260.4

P2D2 Decel Pressure - C1 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	266.7	405.5	405.5	405.5	405.5

P2D2 Decel Pressure - C1 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C1

1	405.5	405.5	99,999.0	99,999.0	99,999.0
P2D2 Decel Pressure - C1 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999.0	99,999.0	99,999.0	99,999.0	99,999.0
P2D2 Decel Pressure - C1 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999.0	405.5	260.4	247.8	266.7
P2D2 Decel Pressure - C1 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C2

Description: clutch 2 command pressure threshold below which clutch 2 is considered released, such that, clutch 2 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C2 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	602	602	326	99,999	602
P2D2 Decel Pressure - C2 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	602	602	602	99,999	99,999
P2D2 Decel Pressure - C2 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	326	326	326	99,999	99,999
P2D2 Decel Pressure - C2 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	99,999	99,999	602	602	602
P2D2 Decel Pressure - C2 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	602	602	99,999	602	326
P2D2 Decel Pressure - C2 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	99,999	602	602	602	602
P2D2 Decel Pressure - C2 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C2 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	99,999	602	602	602	602
P2D2 Decel Pressure - C2 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C2

1	602	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C2 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999	99,999	326	209	230
P2D2 Decel Pressure - C2 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	210	602	99,999	99,999	99,999
P2D2 Decel Pressure - C2 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C3

Description: clutch 3 command pressure threshold below which clutch 3 is considered released, such that, clutch 3 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C3 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	99,999	99,999	1,798	99,999	99,999

P2D2 Decel Pressure - C3 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	99,999	1,798	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	99,999	1,798	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	99,999	99,999	99,999	99,999	1,798

P2D2 Decel Pressure - C3 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	1,798	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	1,798	99,999	99,999	99,999	1,798

P2D2 Decel Pressure - C3 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C3

1	1,798	99,999	231	99,999	99,999
P2D2 Decel Pressure - C3 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C3 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	980	99,999	1,798	99,999	99,999
P2D2 Decel Pressure - C3 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C4

Description: clutch 4 command pressure threshold below which clutch 4 is considered released, such that, clutch 4 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C4 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	2,887	2,887	2,887	2,107	2,887

P2D2 Decel Pressure - C4 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	99,999	2,887	2,887	99,999	429

P2D2 Decel Pressure - C4 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	2,887	99,999	99,999	2,107	99,999

P2D2 Decel Pressure - C4 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	2,107	2,107	99,999	2,887	2,887

P2D2 Decel Pressure - C4 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	99,999	99,999	99,999	2,887	2,887

P2D2 Decel Pressure - C4 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	2,107	2,887	99,999	2,887	2,887

P2D2 Decel Pressure - C4 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	429	2,107	99,999	2,107

P2D2 Decel Pressure - C4 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	2,107	99,999	2,887	2,887	99,999

P2D2 Decel Pressure - C4 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C4

1	99,999	99,999	99,999	429	429
P2D2 Decel Pressure - C4 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999	99,999	99,999	99,999	2,887
P2D2 Decel Pressure - C4 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999	99,999	99,999	2,107	99,999
P2D2 Decel Pressure - C4 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C5

Description: clutch 5 command pressure threshold below which clutch 5 is considered released, such that, clutch 5 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C5 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	2,084	2,084	1,087	2,084	2,084

P2D2 Decel Pressure - C5 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	1,087	99,999	1,087	99,999	712

P2D2 Decel Pressure - C5 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	1,087	1,087	99,999	2,084	2,084

P2D2 Decel Pressure - C5 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	99,999	2,084	2,084	99,999	2,084

P2D2 Decel Pressure - C5 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	99,999	2,084	99,999	2,084	1,087

P2D2 Decel Pressure - C5 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	2,084	2,084	1,087	99,999	1,087

P2D2 Decel Pressure - C5 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	712	2,084	2,084	99,999

P2D2 Decel Pressure - C5 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	2,084	2,084	99,999	2,084	99,999

P2D2 Decel Pressure - C5 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C5

1	2,084	99,999	196	99,999	99,999
P2D2 Decel Pressure - C5 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	712	712	99,999	1,087	99,999
P2D2 Decel Pressure - C5 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999	99,999	99,999	99,999	2,084
P2D2 Decel Pressure - C5 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C6

Description: clutch 6 command pressure threshold below which clutch 6 is considered released, such that, clutch 6 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C6 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	617	617	617	235	617
P2D2 Decel Pressure - C6 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	617	617	99,999	99,999	235
P2D2 Decel Pressure - C6 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	617	617	617	235	235
P2D2 Decel Pressure - C6 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	141	99,999	617	617	99,999
P2D2 Decel Pressure - C6 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	617	99,999	617	617	617
P2D2 Decel Pressure - C6 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	235	617	617	617	99,999
P2D2 Decel Pressure - C6 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	235	235	235	141
P2D2 Decel Pressure - C6 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	99,999	617	617	99,999	617
P2D2 Decel Pressure - C6 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C6

1	99,999	617	99,999	141	141
P2D2 Decel Pressure - C6 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	235	235	617	99,999	99,999
P2D2 Decel Pressure - C6 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C6 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C7

Description: clutch 7 command pressure threshold below which clutch 7 is considered released, such that, clutch 7 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C7 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C7

1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C7 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C7 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C7 - Part 12					
y/x					
1					

Initial Supporting table - speed sensor directional rationality enable calibration

Description: speed sensor directional rationality enable calibration

Value Units: Boolean
X Unit: scheduled gear
Y Units: unitless

y/x	CeCGSR_FwdCmded	CeCGSR_NeutCmded	CeCGSR_RvrsCmded	CeCGSR_ParkCmded
1	1	1	1	1

Initial Supporting table - transmission fluid temperature warm up time

Description:

Value Units: transmission fluid temperature normal warn up time, seconds
X Unit: transmission fluid temperature at controller power up, °C

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,400.0	1,000.0	500.0	10.0

Initial Supporting table - 10 speed transmission clutch definition and gear state to clutch map

Description: indicates clutch definition and gear state verses applied and released clutches for 10 speed transmission

Value Units: applied or released
X Unit: clutch
Y Units: gear index Y axis, actual gear column 1

y/x	1	2	3	4	5	6	7	8
1		C1 = C123456R	C2 = C1289-10R	C3 = C234579-10	C4 = C234678-10R	C5 = C1356789	C6 = C456789-10R	C7 = OWC12
2	1st gear braking	applied	applied	released	released	applied	released	applied
3	1st gear free wheel	applied	applied	released	released	applied	released	released
4	2nd gear braking	applied	applied	applied	applied	released	released	applied
5	2nd gear free wheel	applied	applied	applied	applied	released	released	released
6	3rd gear	applied	released	applied	applied	applied	released	released
7	4th gear	applied	released	applied	applied	released	applied	released
8	5th gear	applied	released	applied	released	applied	applied	released
9	6th gear	applied	released	released	released	applied	applied	released
10	7th gear	released	released	applied	applied	applied	applied	released
11	8th gear	released	applied	released	applied	applied	applied	released
12	9th gear	released	applied	applied	released	applied	applied	released
13	10th gear	released	applied	applied	applied	released	applied	released
14	reverse gear	applied	applied	released	applied	released	released	released

Initial Supporting table - 9 speed transmission clutch definition and gear state to clutch map

Description: indicates clutch definition and gear state verses applied and released clutches for 9 speed transmission

Value Units: applied or released
X Unit: clutch
Y Units: gear index Y axis, actual gear column 1

y/x	1	2	3	4	5	6	7	8
1		C1 = CB123456	C2 = C6789	C3 = CB1R	C4 = CB29	C5 = CB38	C6 = C4	C7 = C57R
2	1st gear braking	applied	released	applied	released	released	released	released
3	1st gear free wheel	applied	released	released	released	released	released	released
4	2nd gear	applied	released	released	applied	released	released	released
5	3rd gear	applied	released	released	released	applied	released	released
6	4th gear	applied	released	released	released	released	applied	released
7	5th gear	applied	released	released	released	released	released	applied
8	6th gear	applied	applied	released	released	released	released	released
9	7th gear	released	applied	released	released	released	released	applied
10	8th gear	released	applied	released	released	applied	released	released
11	9th gear	released	applied	released	applied	released	released	released
12	reverse gear	released	released	applied	released	released	released	applied

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
X Unit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
X Unit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: ime needed for engine speed to trigger "transmission hydraulic pressure available"

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

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
X Unit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

Initial Supporting table - intermediate speed sensor 1 or 2 predicted direction

Description:

Value Units: predicted direction: forward, reverse, unknown
X Unit: attained gear
Y Units: intermediate speed sensor 1 or 2

intermediate speed sensor 1 or 2 predicted direction - Part 1			
y/x	CeCGSR_e_CR_NullForSched	CeCGSR_e_CR_Neutral	CeCGSR_e_CR_Park
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
intermediate speed sensor 1 or 2 predicted direction - Part 2			
y/x	CeCGSR_e_CR_Reverse	CeCGSR_e_CR_First	CeCGSR_e_CR_Second
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
intermediate speed sensor 1 or 2 predicted direction - Part 3			
y/x	CeCGSR_e_CR_Third	CeCGSR_e_CR_Fourth	CeCGSR_e_CR_Fifth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
intermediate speed sensor 1 or 2 predicted direction - Part 4			
y/x	CeCGSR_e_CR_Sixth	CeCGSR_e_CR_Seventh	CeCGSR_e_CR_Eighth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
intermediate speed sensor 1 or 2 predicted direction - Part 5			
y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	

Initial Supporting table - NumClchTieUp

Description: NumClchTieUp

Value Units: minimum # of clutches
X Unit: command gear or attained gear
Y Units: not applicable, no units, single row table f(gear)

NumClchTieUp - Part 1							
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5
1	5	5	4	4	4	4	4

NumClchTieUp - Part 2							
y/x	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3
1	4	4	3	3	3	3	3

NumClchTieUp - Part 3							
y/x	CeCGSR_e_NeutralC2C4	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6	CeCGSR_e_NeutralC4C5
1	3	3	3	3	3	3	3

NumClchTieUp - Part 4							
y/x	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4
1	3	1	5	4	4	4	4

NumClchTieUp - Part 5							
y/x	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	4	4	4	3	3	3	3

NumClchTieUp - Part 6							
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6
1	3	3	3	3	3	3	1

NumClchTieUp - Part 7							
y/x	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth
1	1	1	2	1	2	1	1

NumClchTieUp - Part 8							
y/x	CeCGSR_e_Fifth	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth	

Initial Supporting table - NumClchTieUp

1	1	1	1	1	1	1	

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

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

Value Units: Max Time for Last Seed Timeout (ms)
X Unit: Operating Loop Sequence (enum)

P0606_Last Seed Timeout f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	200.000	200.000	200.000	200.000	200.000	200.000	200.000	200.000

P0606_Last Seed Timeout f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	200.000	200.000	200.000	500.000	1,000.000	8,191.875	8,191.875	8,191.875

Initial Supporting table - P0606_Program Sequence Watch Enable f(Core, Loop Time)

Description: The enabling flags for the program sequence watch as a function of processor core and operating loop time sequence.

Value Units: PSW enable flag (boolean)
X Unit: Processor Core (enum)
Y Units: Operating Loop Time Sequence (enum)

y/x	CeTSKR_e_CPU	CeTSKR_e_CPU2	CeTSKR_e_CPU3	CeTSKR_e_CPU4
CePISR_e_2p5msSeq	0	0	0	0
CePISR_e_3p125msSeq	0	0	0	0
CePISR_e_5msSeq	0	0	0	0
CePISR_e_6p25msSeq	1	0	0	0
CePISR_e_10msSeq	0	0	0	0
CePISR_e_12p5msSeq	1	0	0	0
CePISR_e_20msSeq	0	0	0	0
CePISR_e_25msSeq	1	0	0	0
CePISR_e_40msSeq	0	0	0	0
CePISR_e_50msSeq	1	0	0	0
CePISR_e_80msSeq	0	0	0	0
CePISR_e_100msSeq	0	0	0	0
CePISR_e_250msSeq	0	0	0	0
CePISR_e_EventA_Seq	0	0	0	0
CePISR_e_EventB_Seq	0	0	0	0
CePISR_e_EventC_Seq	0	0	0	0

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

Description: Fail threshold for PSW per operating loop.

Value Units: Fail threshold for PSW (count)
X Unit: Operating Loop (enum)

P0606_PSW Sequence Fail f(Loop Time) - Part 1

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

P0606_PSW Sequence Fail f(Loop Time) - Part 2

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

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

Description: Sample threshold for PSW per operating loop.

Value Units: Sample threshold for PSW (count)
X Unit: Operating Loop (enum)

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	4	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	4	4	4	4	4	4	4	4

Initial Supporting table - P0723 transmission engaged state time threshold

Description: time necessary after transmission engaged state indicates transmsision engaged to allow P0723 enable

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

y/x	-40.000	-20.000	20.000
1	5.000	3.000	1.000

Initial Supporting table - P0747 C1 clutch exhaust delay time 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 - P0747 C1 clutch exhaust delay time 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 - P0747 C1 clutch exhaust delay time 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 - P0747 C1 clutch exhaust delay time 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 - P0747 C1 clutch exhaust delay time 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 - P0747 C1 clutch exhaust delay time open throttle power on up shift

Description: P0747 C1 clutch hydraulic circuit exhaust time in open throttle power on up shift

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

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - P0777 C2 clutch exhaust delay time 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 - P0777 C2 clutch exhaust delay time closed throttle lift foot up shift

Description: P0777 C2 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 - P0777 C2 clutch exhaust delay time 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 - P0777 C2 clutch exhaust delay time 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 - P0777 C2 clutch exhaust delay time 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 - P0777 C2 clutch exhaust delay time open throttle power on up shift

Description: P0777 C2 clutch hydraulic circuit exhaust time in open throttle power on up shift

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

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - P0797 C3 clutch exhaust delay time 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 - P0797 C3 clutch exhaust delay time 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 - P0797 C3 clutch exhaust delay time 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 - P0797 C3 clutch exhaust delay time 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 - P0797 C3 clutch exhaust delay time 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	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - P0797 C3clutch exhaust delay time 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 - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P176B holding clutch states

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

Value Units: TRUE or FALSE
X Unit: intermediate speed sensor select
Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P176B intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P176B intermediate speed sensor fail time threshold

Description: P176B intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

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

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

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

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

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B ratio calibration when not REVERSE

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

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P176B ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

Description: P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update

Value Units: intermediate speed sensor RPM
X Unit: intermediate speed sensor 1 or 2

y/x	0	1
1	225	225

Initial Supporting table - P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P17D6 holding clutch states

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

Value Units: TRUE or FALSE
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P17D6 intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P17D6 intermediate speed sensor fail RPM threshold

Description: P17D6 intermediate speed sensor fail RPM speed threshold

Value Units: RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	100	100

Initial Supporting table - P17D6 intermediate speed sensor fail time threshold

Description: P17D6 intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P17D6 minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P17D6 ratio calibration when REVERSE or P17D6 ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 ratio calibration when not REVERSE

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

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P17D6 ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P2715 C4 clutch exhaust delay time 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 - P2715 C4 clutch exhaust delay time 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 - P2715 C4 clutch exhaust delay time 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 - P2715 C4 clutch exhaust delay time 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 - P2715 C4 clutch exhaust delay time 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 - P2715 C4 clutch exhaust delay time open throttle power on up shift

Description: P2715 C4 clutch hydraulic circuit exhaust time in open throttle power on up shift

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

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - P2724 C5 clutch exhaust delay time 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 - P2724 C5 clutch exhaust delay time 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 - P2724 C5 clutch exhaust delay time 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 - P2724 C5 clutch exhaust delay time 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 - P2724 C5 clutch exhaust delay time 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 - P2724 C5 clutch exhaust delay time open throttle power on up shift

Description: P2724 C5 clutch hydraulic circuit exhaust time in open throttle power on up shift

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

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - P2733 C6 clutch exhaust delay time closed throttle down shift

Description: P2733 C6 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 - P2733 C6 clutch exhaust delay time closed throttle lift foot up shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in closed throttle lift foot up shift

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

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

Initial Supporting table - P2733 C6 clutch exhaust delay time garage shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in garage shift

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

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

Initial Supporting table - P2733 C6 clutch exhaust delay time negative torque up shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in negative torque up shift

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

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

Initial Supporting table - P2733 C6 clutch exhaust delay time open throttle power down shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in open throttle power down shift

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

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

Initial Supporting table - P2733 C6 clutch exhaust delay time open throttle power on up shift

Description: P2733 C6 clutch hydraulic circuit exhaust time in open throttle power on up shift

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

y/x	-40.00	-20.00	0.00	30.00	110.00
1	0.750	0.750	0.750	0.750	0.750

Initial Supporting table - P2817 TCC stuck off fail TCC slip speed

Description: TCC stuck off slip speed fail threshold when TCC is in ON mode (controlled slip mode)

Value Units: RPM
X Unit: engine torque Nm

y/x	0.00	64.00	128.00	192.00	256.00	320.00	384.00	448.00	512.00
1	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

Initial Supporting table - P2D2 Cltch Slip Sum

Description:

Value Units: rate of change of output rpm (dn) per 25 milliseconds
X Unit: % brake pedal position
Y Units: not applicable, no units, single row table f(brake pedal position)

y/x	0	15	20	30	35	50	75	88	100
1	-4	-4	-4	-4	-4	-4	-4	-4	-4

Initial Supporting table - P2D2 Decel Pressure - C1

Description: clutch 1 command pressure threshold below which clutch 1 is considered released, such that, clutch 1 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C1 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	405.5	405.5	99,999.0	266.7	405.5

P2D2 Decel Pressure - C1 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	405.5	405.5	405.5	99,999.0	99,999.0

P2D2 Decel Pressure - C1 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	99,999.0	99,999.0	99,999.0	266.7	266.7

P2D2 Decel Pressure - C1 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	260.4	266.7	405.5	405.5	405.5

P2D2 Decel Pressure - C1 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	405.5	405.5	405.5	405.5	99,999.0

P2D2 Decel Pressure - C1 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	266.7	405.5	405.5	405.5	405.5

P2D2 Decel Pressure - C1 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999.0	99,999.0	266.7	266.7	260.4

P2D2 Decel Pressure - C1 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	266.7	405.5	405.5	405.5	405.5

P2D2 Decel Pressure - C1 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C1

1	405.5	405.5	99,999.0	99,999.0	99,999.0
P2D2 Decel Pressure - C1 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999.0	99,999.0	99,999.0	99,999.0	99,999.0
P2D2 Decel Pressure - C1 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999.0	405.5	260.4	247.8	266.7
P2D2 Decel Pressure - C1 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C2

Description: clutch 2 command pressure threshold below which clutch 2 is considered released, such that, clutch 2 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C2 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	602	602	326	99,999	602

P2D2 Decel Pressure - C2 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	602	602	602	99,999	99,999

P2D2 Decel Pressure - C2 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	326	326	326	99,999	99,999

P2D2 Decel Pressure - C2 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	99,999	99,999	602	602	602

P2D2 Decel Pressure - C2 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	602	602	99,999	602	326

P2D2 Decel Pressure - C2 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	99,999	602	602	602	602

P2D2 Decel Pressure - C2 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C2 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	99,999	602	602	602	602

P2D2 Decel Pressure - C2 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C2

1	602	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C2 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999	99,999	326	209	230
P2D2 Decel Pressure - C2 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	210	602	99,999	99,999	99,999
P2D2 Decel Pressure - C2 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C3

Description: clutch 3 command pressure threshold below which clutch 3 is considered released, such that, clutch 3 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C3 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C3 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	99,999	99,999	1,798	99,999	99,999
P2D2 Decel Pressure - C3 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C3 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	99,999	1,798	99,999	99,999	99,999
P2D2 Decel Pressure - C3 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	99,999	1,798	99,999	99,999	99,999
P2D2 Decel Pressure - C3 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	99,999	99,999	99,999	99,999	1,798
P2D2 Decel Pressure - C3 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	1,798	99,999	99,999	99,999
P2D2 Decel Pressure - C3 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	1,798	99,999	99,999	99,999	1,798
P2D2 Decel Pressure - C3 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C3

1	1,798	99,999	231	99,999	99,999
P2D2 Decel Pressure - C3 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C3 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	980	99,999	1,798	99,999	99,999
P2D2 Decel Pressure - C3 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C4

Description: clutch 4 command pressure threshold below which clutch 4 is considered released, such that, clutch 4 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C4 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	2,887	2,887	2,887	2,107	2,887

P2D2 Decel Pressure - C4 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	99,999	2,887	2,887	99,999	429

P2D2 Decel Pressure - C4 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	2,887	99,999	99,999	2,107	99,999

P2D2 Decel Pressure - C4 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	2,107	2,107	99,999	2,887	2,887

P2D2 Decel Pressure - C4 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	99,999	99,999	99,999	2,887	2,887

P2D2 Decel Pressure - C4 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	2,107	2,887	99,999	2,887	2,887

P2D2 Decel Pressure - C4 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	429	2,107	99,999	2,107

P2D2 Decel Pressure - C4 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	2,107	99,999	2,887	2,887	99,999

P2D2 Decel Pressure - C4 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C4

1	99,999	99,999	99,999	429	429
P2D2 Decel Pressure - C4 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999	99,999	99,999	99,999	2,887
P2D2 Decel Pressure - C4 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999	99,999	99,999	2,107	99,999
P2D2 Decel Pressure - C4 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C5

Description: clutch 5 command pressure threshold below which clutch 5 is considered released, such that, clutch 5 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C5 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	2,084	2,084	1,087	2,084	2,084

P2D2 Decel Pressure - C5 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	1,087	99,999	1,087	99,999	712

P2D2 Decel Pressure - C5 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	1,087	1,087	99,999	2,084	2,084

P2D2 Decel Pressure - C5 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	99,999	2,084	2,084	99,999	2,084

P2D2 Decel Pressure - C5 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	99,999	2,084	99,999	2,084	1,087

P2D2 Decel Pressure - C5 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	2,084	2,084	1,087	99,999	1,087

P2D2 Decel Pressure - C5 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	712	2,084	2,084	99,999

P2D2 Decel Pressure - C5 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	2,084	2,084	99,999	2,084	99,999

P2D2 Decel Pressure - C5 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C5

1	2,084	99,999	196	99,999	99,999
P2D2 Decel Pressure - C5 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	712	712	99,999	1,087	99,999
P2D2 Decel Pressure - C5 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999	99,999	99,999	99,999	2,084
P2D2 Decel Pressure - C5 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C6

Description: clutch 6 command pressure threshold below which clutch 6 is considered released, such that, clutch 6 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C6 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	617	617	617	235	617
P2D2 Decel Pressure - C6 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	617	617	99,999	99,999	235
P2D2 Decel Pressure - C6 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	617	617	617	235	235
P2D2 Decel Pressure - C6 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	141	99,999	617	617	99,999
P2D2 Decel Pressure - C6 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	617	99,999	617	617	617
P2D2 Decel Pressure - C6 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	235	617	617	617	99,999
P2D2 Decel Pressure - C6 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	235	235	235	141
P2D2 Decel Pressure - C6 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	99,999	617	617	99,999	617
P2D2 Decel Pressure - C6 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C6

1	99,999	617	99,999	141	141
P2D2 Decel Pressure - C6 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	235	235	617	99,999	99,999
P2D2 Decel Pressure - C6 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C6 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C7

Description: clutch 7 command pressure threshold below which clutch 7 is considered released, such that, clutch 7 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C7 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C7 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C7

1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C7 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C7 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C7 - Part 12					
y/x					
1					

Initial Supporting table - transmission fluid temperature warm up time

Description:

Value Units: transmission fluid temperature normal warn up time, seconds
X Unit: transmission fluid temperature at controller power up, °C

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,400.0	1,000.0	500.0	10.0

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

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

P0606_Last Seed Timeout f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	200.000	200.000	200.000	200.000	200.000	200.000	200.000	200.000

P0606_Last Seed Timeout f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	200.000	200.000	200.000	500.000	1,000.000	8,191.875	8,191.875	8,191.875

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

Description: Fail threshold for PSW per operating loop.

P0606_PSW Sequence Fail f(Loop Time) - Part 1

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

P0606_PSW Sequence Fail f(Loop Time) - Part 2

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

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

Description: Sample threshold for PSW per operating loop.

P0606_PSW Sequence Sample f(Loop Time) - Part 1

y/x	CePISR_e_2p5msSeq	CePISR_e_3p125msSeq	CePISR_e_5msSeq	CePISR_e_6p25msSeq	CePISR_e_10msSeq	CePISR_e_12p5msSeq	CePISR_e_20msSeq	CePISR_e_25msSeq
1	4	4	4	4	4	4	4	4

P0606_PSW Sequence Sample f(Loop Time) - Part 2

y/x	CePISR_e_40msSeq	CePISR_e_50msSeq	CePISR_e_80msSeq	CePISR_e_100msSeq	CePISR_e_250msSeq	CePISR_e_EventA_Seq	CePISR_e_EventB_Seq	CePISR_e_EventC_Seq
1	4	4	4	4	4	4	4	4

Initial Supporting table - 10 speed transmission clutch definition and gear state to clutch map

Description: indicates clutch definition and gear state verses applied and released clutches for 10 speed transmission

Value Units: applied or released
X Unit: clutch
Y Units: gear index Y axis, actual gear column 1

y/x	1	2	3	4	5	6	7	8
1		C1 = C123456R	C2 = C1289-10R	C3 = C234579-10	C4 = C234678-10R	C5 = C1356789	C6 = C456789-10R	C7 = OWC12
2	1st gear braking	applied	applied	released	released	applied	released	applied
3	1st gear free wheel	applied	applied	released	released	applied	released	released
4	2nd gear braking	applied	applied	applied	applied	released	released	applied
5	2nd gear free wheel	applied	applied	applied	applied	released	released	released
6	3rd gear	applied	released	applied	applied	applied	released	released
7	4th gear	applied	released	applied	applied	released	applied	released
8	5th gear	applied	released	applied	released	applied	applied	released
9	6th gear	applied	released	released	released	applied	applied	released
10	7th gear	released	released	applied	applied	applied	applied	released
11	8th gear	released	applied	released	applied	applied	applied	released
12	9th gear	released	applied	applied	released	applied	applied	released
13	10th gear	released	applied	applied	applied	released	applied	released
14	reverse gear	applied	applied	released	applied	released	released	released

Initial Supporting table - 9 speed transmission clutch definition and gear state to clutch map

Description: indicates clutch definition and gear state verses applied and released clutches for 9 speed transmission

Value Units: applied or released
X Unit: clutch
Y Units: gear index Y axis, actual gear column 1

y/x	1	2	3	4	5	6	7	8
1		C1 = CB123456	C2 = C6789	C3 = CB1R	C4 = CB29	C5 = CB38	C6 = C4	C7 = C57R
2	1st gear braking	applied	released	applied	released	released	released	released
3	1st gear free wheel	applied	released	released	released	released	released	released
4	2nd gear	applied	released	released	applied	released	released	released
5	3rd gear	applied	released	released	released	applied	released	released
6	4th gear	applied	released	released	released	released	applied	released
7	5th gear	applied	released	released	released	released	released	applied
8	6th gear	applied	applied	released	released	released	released	released
9	7th gear	released	applied	released	released	released	released	applied
10	8th gear	released	applied	released	released	applied	released	released
11	9th gear	released	applied	released	applied	released	released	released
12	reverse gear	released	released	applied	released	released	released	applied

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: ime needed for engine speed to trigger "transmission hydraulic pressure available"

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

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

Initial Supporting table - engine speed time for transmission hydraulic pressure available

Description: time needed for engine speed to trigger "transmission hydraulic pressure available"

Value Units: seconds
X Unit: °C

y/x	-40.00	-30.00	-20.00	0.00	40.00
1	0.300	0.300	0.300	0.150	0.150

Initial Supporting table - intermediate speed sensor 1 or 2 predicted direction

Description:

Value Units: predicted direction: forward, reverse, unknown
X Unit: attained gear
Y Units: intermediate speed sensor 1 or 2

intermediate speed sensor 1 or 2 predicted direction - Part 1			
y/x	CeCGSR_e_CR_NullForSched	CeCGSR_e_CR_Neutral	CeCGSR_e_CR_Park
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
intermediate speed sensor 1 or 2 predicted direction - Part 2			
y/x	CeCGSR_e_CR_Reverse	CeCGSR_e_CR_First	CeCGSR_e_CR_Second
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
intermediate speed sensor 1 or 2 predicted direction - Part 3			
y/x	CeCGSR_e_CR_Third	CeCGSR_e_CR_Fourth	CeCGSR_e_CR_Fifth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionUnknown
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
intermediate speed sensor 1 or 2 predicted direction - Part 4			
y/x	CeCGSR_e_CR_Sixth	CeCGSR_e_CR_Seventh	CeCGSR_e_CR_Eighth
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionUnknown	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward
intermediate speed sensor 1 or 2 predicted direction - Part 5			
y/x	CeCGSR_e_CR_Ninth	CeCGSR_e_CR_Tenth	
CeTSRR_e_C2C_ClchSpdSnsr1	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	
CeTSRR_e_C2C_ClchSpdSnsr2	CeTNSR_e_DirectionForward	CeTNSR_e_DirectionForward	

Initial Supporting table - NumClchTieUp

Description: NumClchTieUp

Value Units: minimum # of clutches
X Unit: command gear or attained gear
Y Units: not applicable, no units, single row table f(gear)

NumClchTieUp - Part 1							
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5
1	5	5	4	4	4	4	4

NumClchTieUp - Part 2							
y/x	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3
1	4	4	3	3	3	3	3

NumClchTieUp - Part 3							
y/x	CeCGSR_e_NeutralC2C4	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6	CeCGSR_e_NeutralC4C5
1	3	3	3	3	3	3	3

NumClchTieUp - Part 4							
y/x	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4
1	3	1	5	4	4	4	4

NumClchTieUp - Part 5							
y/x	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	4	4	4	3	3	3	3

NumClchTieUp - Part 6							
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6
1	3	3	3	3	3	3	1

NumClchTieUp - Part 7							
y/x	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth
1	1	1	2	1	2	1	1

NumClchTieUp - Part 8							
y/x	CeCGSR_e_Fifth	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth	

Initial Supporting table - NumClchTieUp

1	1	1	1	1	1	1	

Initial Supporting table - P0723 transmission engaged state time threshold

Description: time necessary after transmission engaged state indicates transmsision engaged to allow P0723 enable

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

y/x	-40.000	-20.000	20.000
1	5.000	3.000	1.000

Initial Supporting table - P176B delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P176B holding clutch states

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

Value Units: TRUE or FALSE
X Unit: intermediate speed sensor select
Y Units: commanded gear

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P176B intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P176B intermediate speed sensor fail time threshold

Description: P176B intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

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

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

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

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

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192.0	192.0

Initial Supporting table - P176B ratio calibration when not REVERSE

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

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P176B ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P17C5 P17D3 intermediate speed sensor RPM

Description: P17C5 P17D3 intermediate speed sensor RPM at signal period transtion to enable fail time update

Value Units: intermediate speed sensor RPM
X Unit: intermediate speed sensor 1 or 2

y/x	0	1
1	225	225

Initial Supporting table - P17D6 delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Description: delay to allow transmission input, intermediate and output speeds to stablize for fail evaluation

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	0.500	0.500

Initial Supporting table - P17D6 holding clutch states

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

Value Units: TRUE or FALSE
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
CeCGSR_e_CR_NullForSched	1	1
CeCGSR_e_CR_Neutral	1	1
CeCGSR_e_CR_Park	1	1
CeCGSR_e_CR_Reverse	1	1
CeCGSR_e_CR_First	1	1
CeCGSR_e_CR_Second	1	1
CeCGSR_e_CR_Third	1	0
CeCGSR_e_CR_Fourth	1	0
CeCGSR_e_CR_Fifth	1	0
CeCGSR_e_CR_Sixth	1	0
CeCGSR_e_CR_Seventh	0	0
CeCGSR_e_CR_Eighth	0	0
CeCGSR_e_CR_Ninth	0	0
CeCGSR_e_CR_Tenth	0	0

Initial Supporting table - P17D6 intermediate speed sensor fail count threshold

Description: P176B intermediate speed sensor fail count threshold

Value Units: fail counts
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	3	3

Initial Supporting table - P17D6 intermediate speed sensor fail RPM threshold

Description: P17D6 intermediate speed sensor fail RPM speed threshold

Value Units: RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	100	100

Initial Supporting table - P17D6 intermediate speed sensor fail time threshold

Description: P17D6 intermediate speed sensor fail time threshold

Value Units: seconds
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.500	1.500

Initial Supporting table - P17D6 minimum estimated transmission intermediate speed to enable fail evaluation

Description: minimum estimated transmission intermediate speed to enable fail evaluation, where estimate is based on transmission input speed / ratio calibration, where ratio calibration is either P17D6 ratio calibration when REVERSE or P17D6 ratio calibration when not REVERSE

Value Units: estimated transmission intermediate speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 minimum transmission input speed to enable fail evaluation

Description: minimum transmission input speed to enable fail evaluation

Value Units: transmission input speed RPM
X Unit: intermediate speed sensor select

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	192	192

Initial Supporting table - P17D6 ratio calibration when not REVERSE

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

Value Units: ratio
X Unit: commanded gear
Y Units: intermediate speed sensor select

y/x	CeTGRR_e_Gear1	CeTGRR_e_Gear2	CeTGRR_e_Gear3	CeTGRR_e_Gear4	CeTGRR_e_Gear5	CeTGRR_e_Gear6	CeTGRR_e_Gear7	CeTGRR_e_Gear8	CeTGRR_e_Gear9	CeTGRR_e_Gear10
CeTSRR_e_C2C_ClchSpdSnsr1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5596	0.4342	0.4342
CeTSRR_e_C2C_ClchSpdSnsr2	1.0000	1.0000	3.1250	1.7699	1.7699	1.3774	1.0000	0.8224	0.6382	0.6382

Initial Supporting table - P17D6 ratio calibration when REVERSE

Description: used to estimate transmission input speed based on transmission intermediate speed when range is REVERSE

Value Units: ratio

y/x	CeTSRR_e_C2C_ClchSpdSnsr1	CeTSRR_e_C2C_ClchSpdSnsr2
1	1.0000	1.0000

Initial Supporting table - P2817 TCC stuck off fail TCC slip speed

Description: TCC stuck off slip speed fail threshold when TCC is in ON mode (controlled slip mode)

Value Units: RPM
X Unit: engine torque Nm

y/x	0.00	64.00	128.00	192.00	256.00	320.00	384.00	448.00	512.00
1	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

Initial Supporting table - P2D2 Cltch Slip Sum

Description:

Value Units: rate of change of output rpm (dn) per 25 milliseconds
X Unit: % brake pedal position
Y Units: not applicable, no units, single row table f(brake pedal position)

y/x	0	15	20	30	35	50	75	88	100
1	-4	-4	-4	-4	-4	-4	-4	-4	-4

Initial Supporting table - P2D2 Decel Pressure - C1

Description: clutch 1 command pressure threshold below which clutch 1 is considered released, such that, clutch 1 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C1 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	405.5	405.5	99,999.0	266.7	405.5

P2D2 Decel Pressure - C1 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	405.5	405.5	405.5	99,999.0	99,999.0

P2D2 Decel Pressure - C1 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	99,999.0	99,999.0	99,999.0	266.7	266.7

P2D2 Decel Pressure - C1 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	260.4	266.7	405.5	405.5	405.5

P2D2 Decel Pressure - C1 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	405.5	405.5	405.5	405.5	99,999.0

P2D2 Decel Pressure - C1 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	266.7	405.5	405.5	405.5	405.5

P2D2 Decel Pressure - C1 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999.0	99,999.0	266.7	266.7	260.4

P2D2 Decel Pressure - C1 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	266.7	405.5	405.5	405.5	405.5

P2D2 Decel Pressure - C1 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C1

1	405.5	405.5	99,999.0	99,999.0	99,999.0
P2D2 Decel Pressure - C1 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999.0	99,999.0	99,999.0	99,999.0	99,999.0
P2D2 Decel Pressure - C1 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999.0	405.5	260.4	247.8	266.7
P2D2 Decel Pressure - C1 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C2

Description: clutch 2 command pressure threshold below which clutch 2 is considered released, such that, clutch 2 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C2 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	602	602	326	99,999	602
P2D2 Decel Pressure - C2 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	602	602	602	99,999	99,999
P2D2 Decel Pressure - C2 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	326	326	326	99,999	99,999
P2D2 Decel Pressure - C2 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	99,999	99,999	602	602	602
P2D2 Decel Pressure - C2 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	602	602	99,999	602	326
P2D2 Decel Pressure - C2 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	99,999	602	602	602	602
P2D2 Decel Pressure - C2 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C2 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	99,999	602	602	602	602
P2D2 Decel Pressure - C2 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C2

1	602	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C2 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999	99,999	326	209	230
P2D2 Decel Pressure - C2 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	210	602	99,999	99,999	99,999
P2D2 Decel Pressure - C2 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C3

Description: clutch 3 command pressure threshold below which clutch 3 is considered released, such that, clutch 3 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C3 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	99,999	99,999	1,798	99,999	99,999

P2D2 Decel Pressure - C3 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	99,999	99,999	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	99,999	1,798	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	99,999	1,798	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	99,999	99,999	99,999	99,999	1,798

P2D2 Decel Pressure - C3 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	1,798	99,999	99,999	99,999

P2D2 Decel Pressure - C3 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	1,798	99,999	99,999	99,999	1,798

P2D2 Decel Pressure - C3 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C3

1	1,798	99,999	231	99,999	99,999
P2D2 Decel Pressure - C3 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C3 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	980	99,999	1,798	99,999	99,999
P2D2 Decel Pressure - C3 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C4

Description: clutch 4 command pressure threshold below which clutch 4 is considered released, such that, clutch 4 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C4 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	2,887	2,887	2,887	2,107	2,887

P2D2 Decel Pressure - C4 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	99,999	2,887	2,887	99,999	429

P2D2 Decel Pressure - C4 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	2,887	99,999	99,999	2,107	99,999

P2D2 Decel Pressure - C4 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	2,107	2,107	99,999	2,887	2,887

P2D2 Decel Pressure - C4 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	99,999	99,999	99,999	2,887	2,887

P2D2 Decel Pressure - C4 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	2,107	2,887	99,999	2,887	2,887

P2D2 Decel Pressure - C4 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	429	2,107	99,999	2,107

P2D2 Decel Pressure - C4 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	2,107	99,999	2,887	2,887	99,999

P2D2 Decel Pressure - C4 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C4

1	99,999	99,999	99,999	429	429
P2D2 Decel Pressure - C4 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999	99,999	99,999	99,999	2,887
P2D2 Decel Pressure - C4 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999	99,999	99,999	2,107	99,999
P2D2 Decel Pressure - C4 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C5

Description: clutch 5 command pressure threshold below which clutch 5 is considered released, such that, clutch 5 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C5 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	2,084	2,084	1,087	2,084	2,084

P2D2 Decel Pressure - C5 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	1,087	99,999	1,087	99,999	712

P2D2 Decel Pressure - C5 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	1,087	1,087	99,999	2,084	2,084

P2D2 Decel Pressure - C5 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	99,999	2,084	2,084	99,999	2,084

P2D2 Decel Pressure - C5 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	99,999	2,084	99,999	2,084	1,087

P2D2 Decel Pressure - C5 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	2,084	2,084	1,087	99,999	1,087

P2D2 Decel Pressure - C5 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	712	2,084	2,084	99,999

P2D2 Decel Pressure - C5 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	2,084	2,084	99,999	2,084	99,999

P2D2 Decel Pressure - C5 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C5

1	2,084	99,999	196	99,999	99,999
P2D2 Decel Pressure - C5 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	712	712	99,999	1,087	99,999
P2D2 Decel Pressure - C5 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999	99,999	99,999	99,999	2,084
P2D2 Decel Pressure - C5 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C6

Description: clutch 6 command pressure threshold below which clutch 6 is considered released, such that, clutch 6 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C6 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	617	617	617	235	617

P2D2 Decel Pressure - C6 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	617	617	99,999	99,999	235

P2D2 Decel Pressure - C6 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	617	617	617	235	235

P2D2 Decel Pressure - C6 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	141	99,999	617	617	99,999

P2D2 Decel Pressure - C6 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	617	99,999	617	617	617

P2D2 Decel Pressure - C6 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	235	617	617	617	99,999

P2D2 Decel Pressure - C6 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	235	235	235	141

P2D2 Decel Pressure - C6 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	99,999	617	617	99,999	617

P2D2 Decel Pressure - C6 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C6

1	99,999	617	99,999	141	141
P2D2 Decel Pressure - C6 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	235	235	617	99,999	99,999
P2D2 Decel Pressure - C6 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C6 - Part 12					
y/x					
1					

Initial Supporting table - P2D2 Decel Pressure - C7

Description: clutch 7 command pressure threshold below which clutch 7 is considered released, such that, clutch 7 cannot carry enough clutch torque that would induce a vehicle deceleration above the design safety metric

Value Units: kPa
X Unit: command gear
Y Units: not applicable, no units, single row table f(command gear)

P2D2 Decel Pressure - C7 - Part 1					
y/x	CeCGSR_e_NullForSched	CeCGSR_e_NeutralNoClutch	CeCGSR_e_NeutralC1	CeCGSR_e_NeutralC2	CeCGSR_e_NeutralC3
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C7 - Part 2					
y/x	CeCGSR_e_NeutralC4	CeCGSR_e_NeutralC5	CeCGSR_e_NeutralC6	CeCGSR_e_NeutralC7	CeCGSR_e_NeutralC1C2
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C7 - Part 3					
y/x	CeCGSR_e_NeutralC1C3	CeCGSR_e_NeutralC1C4	CeCGSR_e_NeutralC1C5	CeCGSR_e_NeutralC2C3	CeCGSR_e_NeutralC2C4
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C7 - Part 4					
y/x	CeCGSR_e_NeutralC2C5	CeCGSR_e_NeutralC2C6	CeCGSR_e_NeutralC3C4	CeCGSR_e_NeutralC3C5	CeCGSR_e_NeutralC3C6
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C7 - Part 5					
y/x	CeCGSR_e_NeutralC4C5	CeCGSR_e_NeutralC4C6	CeCGSR_e_NeutralC1C2C3C6	CeCGSR_e_Park_wNC	CeCGSR_e_Park_wNC1
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C7 - Part 6					
y/x	CeCGSR_e_Park_wNC2	CeCGSR_e_Park_wNC3	CeCGSR_e_Park_wNC4	CeCGSR_e_Park_wNC5	CeCGSR_e_Park_wNC6
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C7 - Part 7					
y/x	CeCGSR_e_Park_wNC7	CeCGSR_e_Park_wNC1C2	CeCGSR_e_Park_wNC2C3	CeCGSR_e_Park_wNC2C4	CeCGSR_e_Park_wNC2C5
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C7 - Part 8					
y/x	CeCGSR_e_Park_wNC2C6	CeCGSR_e_Park_wNC3C4	CeCGSR_e_Park_wNC3C5	CeCGSR_e_Park_wNC3C6	CeCGSR_e_Park_wNC4C5
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C7 - Part 9					
y/x	CeCGSR_e_Park_wNC4C6	CeCGSR_e_Park_wNC1C2C3C6	CeCGSR_e_Reverse	CeCGSR_e_FirstLckd	CeCGSR_e_FirstFW

Initial Supporting table - P2D2 Decel Pressure - C7

1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C7 - Part 10					
y/x	CeCGSR_e_SecondLckd	CeCGSR_e_SecondFW	CeCGSR_e_Third	CeCGSR_e_Fourth	CeCGSR_e_Fifth
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C7 - Part 11					
y/x	CeCGSR_e_Sixth	CeCGSR_e_Seventh	CeCGSR_e_Eighth	CeCGSR_e_Ninth	CeCGSR_e_Tenth
1	99,999	99,999	99,999	99,999	99,999
P2D2 Decel Pressure - C7 - Part 12					
y/x					
1					

Initial Supporting table - transmission fluid temperature warm up time

Description:

Value Units: transmission fluid temperature normal warn up time, seconds
X Unit: transmission fluid temperature at controller power up, °C

y/x	-40.00	-30.00	-20.00	0.00	20.00
1	1,800.0	1,400.0	1,000.0	500.0	10.0

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
Transmission Control Module (TCM)	P0601	Transmission Electro-Hydraulic Control Module Read Only Memory	Incorrect program/calibrations checksum	= TRUE Boolean Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0601 ECM: None	>= 5 Fail Counts	One Trip
Transmission Control Module (TCM)	P0603	Transmission Electro-Hydraulic Control Module Long-Term Memory Reset	Non-volatile memory (static or dynamic) checksum failure at Powerup	= TRUE Boolean Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0603 ECM: None	Runs Continously	One Trip
Transmission Control Module (TCM)	P0604	Transmission Electro-Hydraulic Control Module Random Access Memory	RAM Read/Write Failure (Single Word)	= TRUE Boolean Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0604 ECM: None	>= 5 Fail Counts = 16 Sample Counts	One Trip
Transmission Control Module (TCM)	P062F	Transmission Electro-Hydraulic Control Module Long Term Memory Performance	TCM Non-Volatile Memory bit Incorrect flag at Powerdown	= TRUE Boolean Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P062F ECM: None	Runs Continously	One Trip
Transmission Control Module (TCM)	P0634	Transmission Electro-Hydraulic Control Module Internal Temperature Too High	Fail Case 1 Substrate Temperature	>= 142.1015625 ºC			>= 5 Fail Time (Sec)	One Trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			Fail Case 2					
			Substrate Temperature	>= 50 ºC			>= 2 Fail Time (Sec)	
			Ignition Voltage	>= 18 Volts				
			Note: either fail case can set the DTC					
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Substrate Temp Lo	>= 0 ºC		
					Substrate Temp Hi	<= 170 ºC		
					Substrate Temp Between Temp Range for Time	>= 0.25 Sec		
					P0634 Status is	≠ Test Failed This Key On or Fault Active		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
High Side Driver 1	P0658	Actuator Supply Voltage Circuit Low	The HWIO reports a low voltage (open or ground short) error flag	= TRUE Boolean			>= 4 Fail Counts out of 6 Sample Counts	One Trip
					P0658 Status is not	= Test Failed This Key On or Fault Active		
					High Side Driver 1 On	= True Boolean		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Transmission Control Module (TCM)	P0667	TCM Internal Temp (substrate) Sensor Circuit Range/Performance	If transmission oil temp to substrate temp Δ	> Refer to Table 19 in supporting documents ºC				Two Trips
			If TCM substrate temp to power up temp Δ	> Refer to Table 20 in supporting documents ºC				
			Both conditions above required to increment fail counter Note: table reference temp = to the median temp of trans oil temp, substrate temp and power up temp.				>= 3000 Fail Counts (100ms loop) Out of 3750 Sample Counts (100ms loop)	
			Non-continuous (intermittent) fail conditions will delay resetting fail counter until				>= 700 Pass Counts (100ms loop) Out of 875 Sample Counts (100ms loop)	
					Engine Torque Signal Valid	= TRUE Boolean		
					Accelerator Position Signal Valid	= TRUE Boolean		
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					Brake torque active	= FALSE		
					Below describes the brake torque entry criteria			
					Engine Torque	>= 90 N*m		
					Throttle	>= 30.000305 Pct		
					Transmission Input Speed	<= 200 RPM		
					Vehicle Speed	<= 8 Kph		
					Transmission Range	≠ Park		
					Transmission Range	≠ Neutral		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions			Time Required	Mil Illum.
					PTO	=	Not Active			
					Set Brake Torque Active TRUE if above conditions are met for:	>=	7	sec		
					Below describes the brake torque exit criteria					
					Brake torque entry criteria	=	Not Met			
					Clutch hydraulic pressure	≠	Clutch Hydraulic Air Purge Event			
					Clutch used to exit brake torque active	=	CeTFTD_e_C3_RatlEnbl			
					The above clutch pressure is greater than this value for one loop	>=	600	kpa		
					Set Brake Torque Active FALSE if above conditions are met for:	>=	20	Sec		
					P0667 Status is	≠	Test Failed This Key On or Fault Active			
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0658, P0668, P0669, P06AD, P06AE, P0716, P0712, P0713, P0717, P0722, P0723, P0962, P0963, P0966, P0967, P0970, P0971, P215C, P2720, P2721, P2729, P2730 ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E			
Transmission Control Module (TCM)	P0668	TCM internal temperature (substrate) thermistor failed at a low voltge	Type of Sensor Used	= CeTFTI_e_VoltageDirectPrp						Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			If TCM Substrate Temperature Sensor = Direct Proportional and Temp	<= -249 ºC				
			If TCM Substrate Temperature Sensor = Indirect Proportional and Temp	>= -249 ºC				
			Either condition above will satisfy the fail conditions				>= 60 Fail Timer (Sec)	
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					P0668 Status is	≠ Test Failed This Key On or Fault Active		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Transmission Control Module (TCM)	P0669	TCM internal temperature (substrate) thermistor failed at a high voltage	Type of Sensor Used	= CeTFTI_e_VoltageDirectProp				Two Trips
			If TCM Substrate Temperature Sensor = Direct Proportional and Temp	>= 249 ºC				
			If TCM Substrate Temperature Sensor = Indirect Proportional and Temp	<= 249 ºC				
			Either condition above will satisfy the fail conditions				>= 60 Fail Timer (Sec)	
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					P0669 Status is	≠ Test Failed This Key On or Fault Active		
					For Hybrids, below conditions must also be met			
					Estimated Motor Power Loss	>= 0 kW		
					Estimated Motor Power Loss greater than limit for time	>= 0 Sec		
					Lost Communication with Hybrid Processor Control Module	= FALSE		
					Estimated Motor Power Loss Fault	= FALSE		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723 ECM: None		
Transmission Control Module (TCM)	P06AC	TCM Power-up Temp Sensor Circuit Range/Performance	If TCM power-up temp to substrate temp Δ	> Refer to Table 20 in supporting documents °C				Two Trips
			If transmission oil temp to power up temp Δ	> Refer to Table 18 in supporting documents °C				
			Both conditions above required to increment fail counter Note: table reference temp = to the median temp of trans oil temp, substrate temp and power up temp.				>= 3000 Fail Counts (100ms loop) Out of 3750 Sample Counts (100ms loop)	
			Non-continuous (intermittent) fail conditions will delay resetting fail counter until				>= 700 Pass Counts (100ms loop) Out of 875 Sample Counts (100ms loop)	
					Engine Torque Signal Valid	= TRUE Boolean		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions			Time Required	Mil Illum.
					Accelerator Position Signal Valid	=	TRUE	Boolean		
					Ignition Voltage Lo	>=	8.5996094	Volts		
					Ignition Voltage Hi	<=	31.999023	Volts		
					Engine Speed Lo	>=	400	RPM		
					Engine Speed Hi	<=	7500	RPM		
					Engine Speed is within the allowable limits for	>=	5	Sec		
					Brake torque active	=	FALSE			
					Below describes the brake torque entry criteria					
					Engine Torque	>=	90	N*m		
					Throttle	>=	30.000305	Pct		
					Transmission Input Speed	<=	200	RPM		
					Vehicle Speed	<=	8	Kph		
					Transmission Range	≠	Park			
					Transmission Range	≠	Neutral			
					PTO	=	Not Active			
					Set Brake Torque Active TRUE if above conditions are met for:	>=	7	sec		
					Below describes the brake torque exit criteria					
					Brake torque entry criteria	=	Not Met			
					Clutch hydraulic pressure	≠	Clutch Hydraulic Air Purge Event			
					Clutch used to exit brake torque active	=	CeTFTD_e_C3_RatlEnbl			
					The above clutch pressure is greater than this value for one loop	>=	600	kpa		
					Set Brake Torque Active FALSE if above conditions are met for:	>=	20	Sec		
					P06AC Status is	≠	Test Failed This Key On or Fault Active			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0658, P0668, P0669, P06AD, P06AE, P0716, P0712, P0713, P0717, P0722, P0723, P0962, P0963, P0966, P0967, P0970, P0971, P215C, P2720, P2721, P2729, P2730 ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Transmission Control Module (TCM)	P06AD	TCM power-up thermistor circuit voltage low	Power Up Temp	<= -59 ºC			>= 60 Fail Time (Sec)	Two Trips
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					P06AD Status is	≠ Test Failed This Key On or Fault Active		
					For Hybrids, below conditions must also be met			
					Estimated Motor Power Loss	>= 0 kW		
					Estimated Motor Power Loss greater than limit for time	>= 0 Sec		
					Lost Communication with Hybrid Processor Control Module	= FALSE		
					Estimated Motor Power Loss Fault	= FALSE		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723 ECM: None		
Transmission Control Module (TCM)	P06AE	TCM power-up thermistor circuit voltage high	Power Up Temp	>= 164 ºC			>= 60 Fail Time (Sec)	Two Trips
					Ignition Voltage Lo	>= 8.5996094 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions			Time Required			Mil Illum.
					Ignition Voltage Hi	<=	31.999023	Volts				
					Engine Speed Lo	>=	400	RPM				
					Engine Speed Hi	<=	7500	RPM				
					Engine Speed is within the allowable limits for	>=	5	Sec				
					P06AE Status is	≠	Test Failed This Key On or Fault Active					
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None						
Transmission Fluid Temperature Sensor (TFT)	P0711	Trans Fluid Temp Sensor Circuit Range/Performance	If transmission oil temp to substrate temp Δ	> Refer to Table 19 in supporting documents °C								Two Trips
			If transmission oil temp to power up temp Δ	> Refer to Table 18 in supporting documents °C								
			Both conditions above required to increment fail counter Note: table reference temp = to the median temp of trans oil temp, substrate temp and power up temp.						>= 3000 Fail Counts (100ms loop) Out of 3750 Sample Counts (100ms loop)			
			Non-continuous (intermittent) fail conditions will delay resetting fail counter until						>= 700 Pass Counts (100ms loop) Out of 875 Sample Counts (100ms loop)			
					Engine Torque Signal Valid	=	TRUE	Boolean				
					Accelerator Position Signal Valid	=	TRUE	Boolean				
					Ignition Voltage Lo	>=	8.5996094	Volts				
					Ignition Voltage Hi	<=	31.999023	Volts				
					Engine Speed Lo	>=	400	RPM				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions			Time Required	Mil Illum.
					Engine Speed Hi	<=	7500	RPM		
					Engine Speed is within the allowable limits for	>=	5	Sec		
					Brake torque active	=	FALSE			
					Below describes the brake torque entry criteria					
					Engine Torque	>=	90	N*m		
					Throttle	>=	30.000305	Pct		
					Transmission Input Speed	<=	200	RPM		
					Vehicle Speed	<=	8	Kph		
					Transmission Range	≠	Park			
					Transmission Range	≠	Neutral			
					PTO	=	Not Active			
					Set Brake Torque Active TRUE if above conditions are met for:	>=	7	sec		
					Below describes the brake torque exit criteria					
					Brake torque entry criteria	=	Not Met			
					Clutch hydraulic pressure	≠	Clutch Hydraulic Air Purge Event			
					Clutch used to exit brake torque active	=	CeTFTD_e_C3_RatlEnbl			
					The above clutch pressure is greater than this value for one loop	>=	600	kpa		
					Set Brake Torque Active FALSE if above conditions are met for:	>=	20	Sec		
					P0711 Status is	≠	Test Failed This Key On or Fault Active			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0658, P0668, P0669, P06AD, P06AE, P0716, P0712, P0713, P0717, P0722, P0723, P0962, P0963, P0966, P0967, P0970, P0971, P215C, P2720, P2721, P2729, P2730 ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Transmission Fluid Temperature Sensor (TFT)	P0712	Transmission fluid temperature thermistor failed at a low voltage	Type of Sensor Used	= CeTFTI_e_VoltageDirectProp				Two Trips
			If Transmission Fluid Temperature Sensor = Direct Proportional and Temp	<= -74 °C				
			If Transmission Fluid Temperature Sensor = Indirect Proportional and Temp	>= -74 °C				
			Either condition above will satisfy the fail conditions				>= 60 Fail Time (Sec)	
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					P0712 Status is	≠ Test Failed This Key On or Fault Active		
					For Hybrids, below conditions must also be met			
					Estimated Motor Power Loss	>= 0 kW		
					Estimated Motor Power Loss greater than limit for time	>= 0 Sec		
					Lost Communication with Hybrid Processor Control Module	= FALSE		
					Estimated Motor Power Loss Fault	= FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723 ECM: None		
Transmission Fluid Temperature Sensor (TFT)	P0713	Transmission fluid temperature thermistor failed at a high voltage	Type of Sensor Used	= CeTFTI_e_VoltageDirectProp				Two Trips
			If Transmission Fluid Temperature Sensor = Direct Proportional and Temp	>= 174 ºC				
			If Transmission Fluid Temperature Sensor = Indirect Proportional and Temp	<= 174 ºC				
			Either condition above will satisfy the fail conditions				>= 60 Fail Time (Sec)	
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					P0713 Status is	≠ Test Failed This Key On or Fault Active		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0713, P0716, P0717, P0722, P0723 ECM: None		
Transmission Input Speed Sensor (TISS)	P0716	Input Speed Sensor Performance	Transmission Input Speed Sensor Drops	>= 900 RPM			>= 0.8 Fail Time (Sec)	One Trip
					Engine Torque is	>= 0 N*m		
					Engine Torque is	<= 8191.875 N*m		
					Engine Speed	>= 400 RPM		
					Engine Speed	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					Vehicle Speed is	>= 10 Kph		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					Throttle Position is >= 0 Pct --- Transmission Input Speed is >= 0 RPM The previous requirement has been satisfied for >= 0 Sec --- The change (loop to loop) in transmission input speed is < 8191.875 RPM/Loop The previous requirement has been satisfied for >= 0 Sec Throttle Position Signal Valid = TRUE Boolean Engine Torque Signal Valid = TRUE Boolean Ignition Voltage >= 8.5996094 Volts Ignition Voltage <= 31.999023 Volts P0716 Status is not = Test Failed This Key On or Fault Active		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0717, P0752, P0973, P0974 ECM: P0101, P0102, P0103, P0121, P0122, P0123		
Transmission Input Speed Sensor (TISS)	P0717	Input Speed Sensor Circuit Low Voltage	Fail Case 1 Transmission Input Speed is	< 33 RPM			>= 4.5 Fail Time (Sec)	One Trip
			Fail Case 2 When P0722 DTC Status equal to Test Failed and Transmission Input Speed is	< 653.125 RPM	Controller uses a single power supply for the speed sensors	= 1 Boolean		
					Engine Torque is >= 80 N*m Engine Torque is <= 8191.875 N*m Vehicle Speed >= 10 Kph Engine Torque Signal Valid = TRUE Boolean Ignition Voltage >= 8.5996094 Volts Ignition Voltage <= 31.999023 Volts Engine Speed >= 400 RPM Engine Speed <= 7500 RPM Engine Speed is within the allowable limits for >= 5 Sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					P0717 Status is not = Test Failed This Key On or Fault Active			
					Disable Conditions: MIL not Illuminated for DTC's:	TCM: P0722, P0723 ECM: P0101, P0102, P0103		
Transmission Output Speed Sensor (TOSS)	P0722	Output Speed Sensor Circuit Low Voltage	Transmission Output Speed Sensor Raw Speed	<= 35 RPM			>= 4.5 Fail Time (Sec)	One Trip
					P0722 Status is not = Test Failed This Key On or Fault Active			
					Transmission Input Speed Check = TRUE Boolean			
					Engine Torque Check = TRUE Boolean			
					Throttle Position >= 8.0001831 Pct			
					Transmission Fluid Temperature >= -40 ºC			
					Disable this DTC if the PTO is active = 1 Boolean			
					Engine Torque Signal Valid = TRUE Boolean			
					Throttle Position Signal Valid = TRUE Boolean			
					Ignition Voltage is >= 8.5996094 Volts			
					Ignition Voltage is <= 31.999023 Volts			
					Engine Speed is >= 400 RPM			
					Engine Speed is <= 7500 RPM			
					Engine Speed is within the allowable limits for >= 5 Sec			
					Enable_Flags Defined Below			
					The Engine Torque Check is TRUE, if either of the two following conditions are TRUE			
					Engine Torque Condition 1			
					Range Shift Status ≠ Range shift completed ENUM			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					OR Transmission Range is = Park or Neutral Engine Torque is >= 8191.75 N*m Engine Torque is <= 8191.75 N*m Engine Torque Condition 2 Engine Torque is >= 50 N*m Engine Torque is <= 8191.75 N*m ----------		
					The Transmission Input Speed (TIS) Check is TRUE, if either of the two following conditions are TRUE TIS Check Condition 1 Transmission Input Speed is >= 653.125 RPM Transmission Input Speed is <= 5350 RPM TIS Check Condition 2 Engine Speed without the brake applied is >= 3200 RPM Engine Speed with the brake applied is >= 3200 RPM Engine Speed is <= 8191.875 RPM Controller uses a single power supply for the speed sensors = 1 Boolean Powertrain Brake Pedal is Valid = TRUE Boolean		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0723 ECM: P0101, P0102, P0103, P0121, P0122, P0123		
Transmission Output Speed Sensor (TOSS)	P0723	Output Speed Sensor Circuit Intermittent	Transmission Output Speed Sensor Raw Speed Output Speed Delta Output Speed Drop AND	>= 105 RPM <= 8192 RPM > 650 RPM			>= 0 Enable Time (Sec) >= 0 Enable Time (Sec) >= 1.5 Output Speed Drop Recovery Fail Time (Sec)	One Trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions			Time Required	Mil Illum.
			Transmission Range is	= Driven range (R,D)						

					Range_Disable	=	FALSE	See Below		
					OR					

					Neutral_Range_Enable	=	TRUE	See Below		
					And					
					Neutral_Speed_Enable	=	TRUE	See Below		
					are TRUE concurrently					

					Transmission_Range_Enable	=	TRUE	See Below		
					Transmission_Input_Speed_Enable	=	TRUE	See Below		
					No Change in Transfer Case Range (High <-> Low) for	>=	5	Seconds		
					P0723 Status is not	=	Test Failed This Key On or Fault Active			
					Disable this DTC if the PTO is active	=	1	Boolean		
					Ignition Voltage is	>=	8.5996094	Volts		
					Ignition Voltage is	<=	31.999023	Volts		
					Engine Speed is	>=	400	RPM		
					Engine Speed is	<=	7500	RPM		
					Engine Speed is within the allowable limits for	>=	5	Sec		
					Enable_Flags Defined Below					
					Transmission_Input_Speed_Enable is TRUE when either TIS Condition 1 or TIS Condition 2 is TRUE:					
					TIS Condition 1 is TRUE when both of the following conditions are satsified for	>=	0	Enable Time (Sec)		
					Input Speed Delta	<=	4095.875	RPM		
					Raw Input Speed	>=	500	RPM		
					TIS Condition 2 is TRUE when ALL of the next two conditions are satisfied					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions			Time Required	Mil Illum.
					Input Speed	=	0	RPM		
					A Single Power Supply is used for all speed sensors	=	TRUE	Boolean		

					Neutral_Range_Enable is TRUE when any of the next 3 conditions are TRUE					
					Transmission Range is	=	Neutral	ENUM		
					Transmission Range is	=	Reverse/Neutral Transitonal	ENUM		
					Transmission Range is	=	Neutral/Drive Transitional	ENUM		
					And when a drop occurs					
					Loop to Loop Drop of Transmission Output Speed is	>	650	RPM		

					Range_Disable is TRUE when any of the next three conditions are TRUE					
					Transmission Range is	=	Park	ENUM		
					Transmission Range is	=	Park/Reverse Transitonal	ENUM		
					Input Clutch is not	=	ON (Fully Applied)	ENUM		

					Neutral_Speed_Enable is TRUE when All of the next three conditions are satsified for	>	1.5	Seconds		
					Transmission Output Speed	>	130	RPM		
					The loop to loop change of the Transmission Output Speed is	<	20	RPM		
					The loop to loop change of the Transmission Output Speed is	>	-10	RPM		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					Transmission_Range_Enable is TRUE when one of the next six conditions is TRUE			
					Transmission Range is	= Neutral ENUM		
					Transmission Range is	= Reverse/Neutral Transitional ENUM		
					Transmission Range is	= Neutral/Drive Transitional ENUM		
					Time since a driven range (R,D) has been selected	>= Table Based Time Please Refer to Table 21 in supporting documents Sec		
					Transmission Output Speed Sensor Raw Speed	>= 500 RPM		
					Output Speed when a fault was detected	>= 500 RPM		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0973, P0974, P0976, P0977 ECM: P0101, P0102, P0103, P0121, P0122, P0123		
Torque Converter Clutch (TCC)	P0741	TCC System Stuck OFF	TCC Pressure	>= 750 Kpa			>= 2 Enable Time (Sec)	Two Trips
			Either Condition (A) or (B) Must be Met					
			(A) TCC Slip Error @ TCC On Mode	>= Refer to Table 1 in Supporting Documents RPM			>= 5 Fail Time (Sec)	
			(B) TCC Slip @ Lock On Mode	>= 130 RPM			>= 5 Fail Time (Sec)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions			Time Required			Mil Illum.
			If Above Conditions Have been Met, and Fail Timer Expired, Increment Fail Counter						>=	2	TCC Stuck Off Fail Counter	
					TCC Mode	=	On or Lock					
					Ignition Voltage Lo	>=	8.5996094	Volts				
					Ignition Voltage Hi	<=	31.999023	Volts				
					Engine Speed	>=	400	RPM				
					Engine Speed	<=	7500	RPM				
					Engine Speed is within the allowable limits for	>=	5	Sec				
					Engine Torque Lo	>=	50	N*m				
					Engine Torque Hi	<=	8191.875	N*m				
					Throttle Position Lo	>=	8.0001831	Pct				
					Throttle Position Hi	<=	99.998474	Pct				
					2nd Gear Ratio Lo	>=	2.1948242	Ratio				
					2nd Gear Ratio High	<=	2.5251465	Ratio				
					3rd Gear Ratio Lo	>=	1.4228516	Ratio				
					3rd Gear Ratio High	<=	1.637085	Ratio				
					4th Gear Ratio Lo	>=	1.069458	Ratio				
					4th Gear Ratio High	<=	1.2304688	Ratio				
					5th Gear Ratio Lo	>=	0.7905273	Ratio				
					5th Gear Ratio Hi	<=	0.9095459	Ratio				
					6th Gear Ratio Lo	>=	0.6230469	Ratio				
					6th Gear Ratio High	<=	0.7169189	Ratio				
					Transmission Fluid Temperature Lo	>=	-6.65625	ºC				
					Transmission Fluid Temperature Hi	<=	130	ºC				
					PTO Not Active	=	TRUE	Boolean				
					Engine Torque Signal Valid	=	TRUE	Boolean				
					Throttle Position Signal Valid	=	TRUE	Boolean				
					Dynamic Mode	=	FALSE	Boolean				
					P0741 Status is	≠	Test Failed This Key On or Fault Active					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P0742, P2763, P2764 ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Torque Converter Clutch (TCC)	P0742	TCC System Stuck ON	TCC Slip Speed TCC Slip Speed If Above Conditions Have been Met, and Fail Timer Expired, Increment Fail Counter	>= -50 RPM <= 13 RPM			>= 1.5 Fail Time (Sec) >= 6 Fail Counter	One Trip
					TCC Mode	= Off		
					Enable test if Cmnd Gear = 1stFW and value true	= 1 Boolean		
					Enable test if Cmnd Gear = 2nd and value true	= 0 Boolean		
					Engine Speed Hi	<= 6000 RPM		
					Engine Speed Lo	>= 500 RPM		
					Vehicle Speed HI	<= 511 KPH		
					Vehicle Speed Lo	>= 1 KPH		
					Engine Torque Hi	<= 8191.875 Nm		
					Engine Torque Lo	>= 80 Nm		
					Current Range	≠ Neutral Range		
					Current Range	≠ Reverse Range		
					Transmission Sump Temperature	<= 130 ºC		
					Transmission Sump Temperature	>= 18 ºC		
					Throttle Position Hyst High AND	>= 5.0003052 Pct		
					Max Vehicle Speed to Meet Throttle Enable	<= 8 KPH		
					Once Hyst High has been met, the enable will remain while Throttle Position	>= 2.0004272 Pct		
					Disable for Throttle Position	>= 75 Pct		
					Disable if PTO active and value true	= 1 Boolean		
					Disable if in D1 and value true	= 1 Boolean		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions			Time Required			Mil Illum.
					Disable if in D2 and value true	=	1	Boolean				
					Disable if in D3 and value true	=	1	Boolean				
					Disable if in D4 and value true	=	1	Boolean				
					Disable if in D5 and value true	=	1	Boolean				
					Disable if in MUMD and value true	=	1	Boolean				
					Disable if in TUTD and value true	=	1	Boolean				
					4 Wheel Drive Low Active	=	FALSE	Boolean				
					Disable if Air Purge active and value false	=	0	Boolean				
					RVT Diagnostic Active	=	FALSE	Boolean				
					Ignition Voltage	>=	8.5996094	V				
					Ignition Voltage	<=	31.999023	V				
					Vehicle Speed	<=	511	KPH				
					Engine Speed	>=	400	RPM				
					Engine Speed	<=	7500	RPM				
					Engine Speed is within the allowable limits for	>=	5	Sec				
					Engine Torque Signal Valid	=	TRUE	Boolean				
					Throttle Position Signal Valid	=	TRUE	Boolean				
					P0742 Status is	≠	Test Failed This Key On or Fault Active					
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P0741, P2763, P2764 ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E							
Mode 2 Multiplex Valve	P0751	Shift Solenoid Valve A Stuck Off	Commaned Gear Slip	>= 400 RPM								Two Trips
			Commanded Gear	= 1st Lock rpm								
			Gear Ratio	<= 1.209594727					>= 0.2 Fail Tmr			
			Gear Ratio	>= 1.094360352					= 5 Fail Counts			
			If the above parameters are true									

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
							≠ 0 Neutral Timer (Sec) >= 0.3 Fail Timer (Sec) >= 8 Counts	
					Ignition Voltage Lo Ignition Voltage Hi Engine Speed Lo Engine Speed Hi Engine Speed is within the allowable limits for Transmission Fluid Temperature Range Shift State TPS OR Output Speed Throttle Position Signal Valid from ECM Engine Torque Signal Valid from ECM, High side driver is enabled High-Side Driver is Enabled Input Speed Sensor fault Output Speed Sensor fault Default Gear Option is not present	>= 8.5996094 Volts <= 31.999023 Volts >= 400 RPM <= 7500 RPM >= 5 Sec >= -6.65625 ºC = Range Shift Completed ENUM >= 0.5004883 % >= 67 RPM = TRUE Boolean = TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean = TRUE	
					Disable Conditions: MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Mode 2 Multiplex Valve	P0752	Shift Solenoid Valve A Stuck On	Gear Box Slip	>= 400 RPM				One Trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			Commanded Gear	= 3rd Gear				
			Commanded Gear has Achieved 1st Locked OR 1st Free-Wheel OR 2nd with Mode 2 Sol. Commanded On	= TRUE Boolean				
			If the above parameters are true				>= Please Refer to Table 16 in Supporting Documents Neutral Timer (Sec)	
			Command 4th Gear once Output Shaft Speed	<= 400 RPM				
			If Gear Ratio	>= 3.825683594				
			And Gear Ratio	<= 4.228393555				
							>= 1.5 Fail Timer (Sec)	
							>= 5 Counts	
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					High-Side Driver is Enabled	= TRUE Boolean		
					Throttle Position Signal Valid from ECM	= TRUE Boolean		
					Output Speed	>= 67 RPM		
					OR			
					TPS	>= 0.5004883 %		
					Range Shift State	= Range Shift Completed ENUM		
					Transmission Fluid Temperature	>= -6.65625 ºC		
					Input Speed Sensor fault	= FALSE Boolean		
					Output Speed Sensor fault	= FALSE Boolean		
					Default Gear Option is not present	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Mode 2 Multiplex Valve	P0756	Shift Solenoid Valve B Stuck Off	Fail Case 1 Commanded Gear Gear Box Slip Intrusive Shift to 2nd Commanded Gear Previous Gear Ratio Gear Ratio If the above parameters are true	= 1st Locked >= 400 RPM = 1st Locked Gear <= 2.482177734 >= 2.245849609			>= Please Refer to Table 5 in Supporting Documents Neutral Timer (Sec) >= 1 sec >= 3 counts	One Trip
					Ignition Voltage Lo Ignition Voltage Hi Engine Speed Lo Engine Speed Hi Engine Speed is within the allowable limits for Output Speed OR TPS Range Shift State Transmission Fluid Temperature High-Side Driver is Enabled Throttle Position Signal Valid from ECM Input Speed Sensor fault Output Speed Sensor fault Default Gear Option is not present	>= 8.5996094 Volts <= 31.999023 Volts >= 400 RPM <= 7500 RPM >= 5 Sec >= 67 RPM >= 0.5004883 % = Range Shift Completed ENUM >= -6.65625 ºC = TRUE Boolean = TRUE Boolean = FALSE Boolean = FALSE Boolean = TRUE	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Variable Bleed Solenoid (VBS)	P0776	Pressure Control (PC) Solenoid B Stuck Off [C35R]	Fail Case 1 Case: Steady State 3rd Gear Commanded Gear Gearbox Slip Command 4th Gear once Output Shaft Speed If Gear Ratio And Gear Ratio It the above condiations are true, Increment 3rd gear fail counter and C35R Fail counter	 = 3rd Gear >= 400 RPM <= 400 RPM >= 1.094360352 <= 1.209594727			>= Please Refer to Table 16 in Supporting Documents Neutral Timer (Sec) >= 3 Fail Timer (Sec) >= 3 3rd Gear Fail Counts or >= 14 3-5R Clutch Fail Counts	One Trip
			Fail Case 2 Case: Steady State 5th Gear Commanded Gear Gearbox Slip Intrusive Test: Command 6th Gear If attained Gear=6th gear Time	 = 5th Gear >= 400 Rpm >= Please refer to Table 3 in supporting documents Shift Time (Sec)			>= Please Refer to Table 5 in Supporting Documents Neutral Timer (Sec)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			It the above condiations are true, Increment 5th gear fail counter and C35R Fail counter				>= 3 5th Gear Fail Counts or >= 14 3-5R Clutch Fail Counts	
					PRNDL State defaulted	= FALSE Boolean		
					inhibit RVT	= FALSE Boolean		
					IMS fault pending indication	= FALSE Boolean		
					TPS validity flag	= TRUE Boolean		
					Hydraulic System Pressurized	= TRUE Boolean		
					Minimum output speed for RVT	>= 67 RPM		
					A OR B			
					(A) Output speed enable	>= 67 RPM		
					(B) Accelerator Pedal enable	>= 0.5004883 Pct		
					Common Enable Criteria			
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					Throttle Position Signal valid	= TRUE Boolean		
					HSD Enabled	= TRUE Boolean		
					Transmission Fluid Temperature	>= -6.65625 ºC		
					Input Speed Sensor fault	= FALSE Boolean		
					Output Speed Sensor fault	= FALSE Boolean		
					Default Gear Option is not present	= TRUE		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Variable Bleed Solenoid (VBS)	P0777	Pressure Control (PC) Solinoid B Stuck On [C35R] (Steady State)	Fail Case 1 Case: Steady State 1st Attained Gear slip	>= 400 RPM				One Trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			If the Above is True for Time	>= Table Based Time Please Refer to Table 4 in supporting documents Enable Time (Sec)				
			Intrusive test: (CBR1 clutch exhausted)					
			Gear Ratio	<= 1.608642578				
			Gear Ratio	>= 1.455444336				
			If the above parameters are true				>= 1.1 Fail Timer (Sec) >= 2 Fail Count in 1st Gear or >= 3 Total Fail Counts	
			Fail Case 2 Case: Steady State 2nd gear					
			Max Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 22 in supporting documents rpm/sec				
			Min Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 23 in supporting documents rpm/sec				
			If the Above is True for Time	>= Table Based Time Please Refer to Table 17 in supporting documents Sec				
			Intrusive test: (CB26 clutch exhausted)					
			Gear Ratio	<= 1.608642578				
			Gear Ratio	>= 1.455444336				
			If the above parameters are true				>= 1.1 Fail Timer (Sec)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
							>= 3 Fail Count in 2nd Gear or >= 3 Total Fail Counts	
			Fail Case 3 Case: Steady State 4th gear					
			Max Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 22 in supporting documents rpm/sec				
			Min Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 23 in supporting documents rpm/sec				
			If the Above is True for Time	>= Table Based Time Please Refer to Table 17 in supporting documents Sec				
			Intrusive test: (C1234 clutch exhausted)					
			Gear Ratio	<= 0.89465332				
			Gear Ratio	>= 0.809448242				
			If the above parameters are true				>= 1.1 Fail Timer (Sec)	
							>= 3 Fail Count in 4th Gear or >= 3 Total Fail Counts	
			Fail Case 4 Case: Steady State 6th gear					
			Max Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 22 in supporting documents rpm/sec				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			Min Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 23 in supporting documents rpm/sec				
			If the Above is True for Time	>= Table Based Time Please Refer to Table 17 in supporting documents Sec				
			Intrusive test: (CB26 clutch exhausted)					
			Gear Ratio	<= 0.89465332			>= 1.1 Fail Timer (Sec)	
			Gear Ratio	>= 0.809448242			>= 3 counts	
			If the above parameters are true				>= 1.1 Fail Timer (Sec)	
							>= 3 Fail Count in 6th Gear or	
							>= 3 Total Fail Counts	
					PRNDL State defaulted	= FALSE Boolean		
					inhibit RVT	= FALSE Boolean		
					IMS fault pending indication	= FALSE Boolean		
					output speed	>= 0 RPM		
					TPS validity flag	= TRUE Boolean		
					HSD Enabled	= TRUE Boolean		
					Hydraulic_System_Pressurized	= TRUE Boolean		
					A OR B			
					(A) Output speed enable	>= 67 Nm		
					(B) Accelerator Pedal enable	>= 0.5004883 Nm		
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					if Attained Gear=1st FW Accelerator Pedal enable	>= 5.0003052 Pct		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
						if Attained Gear=1st FW Engine Torque Enable >= 5 Nm if Attained Gear=1st FW Engine Torque Enable <= 8191.875 Nm Transmission Fluid Temperature >= -6.65625 ºC Input Speed Sensor fault = FALSE Boolean Output Speed Sensor fault = FALSE Boolean		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Variable Bleed Solenoid (VBS)	P0777	Pressure Control (PC) Solenoid B StuckOn [C35R] (Dymanic)	Primary Offgoing Clutch is exhausted (See Table 12 in Supporting Documents for Exhaust Delay Timers)	= TRUE Boolean				One Trip
			Primary Oncoming Clutch Pressure Command Status	= Maximum pressurized				
			Primary Offgoing Clutch Pressure Command Status	= Clutch exhaust command				
			Range Shift Status	≠ Initial Clutch Control				
			Attained Gear Slip	<= 40 RPM				
			If the above conditions are true run appropriate Fail 1 Timers Below:					
			fail timer 1 (3-1 shifting with Closed Throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (3-2 shifting with Throttle)	>= 0.299804688 Fail Time (Sec)				
			fail timer 1 (3-2 shifting with Closed Throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (3-4 shifting with Throttle)	>= 0.299804688 Fail Time (Sec)				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			fail timer 1 (3-4shifting with Closed Throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (3-5 shifting with Throttle)	>= 0.299804688 Fail Time (Sec)				
			fail timer 1 (3-5 shifting with Closed Throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (5-3 shifting with Throttle)	>= 0.299804688 Fail Time (Sec)				
			fail timer 1 (5-3 shifting with Closed Throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (5-4 shifting with Throttle)	>= 0.299804688 Fail Time (Sec)				
			fail timer 1 (5-4 shifting with Closed Throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (5-6 shifting with Throttle)	>= 0.299804688 Fail Time (Sec)				
			fail timer 1 (5-6 shifting with Closed Throttle)	>= 0.5 Fail Time (Sec)				
			If Attained Gear Slip is Less than Above Cal Increment Fail Timers				>= Total Fail Time = (Fail 1 + Fail 2) See Enable Timers for Fail Timer 1, and Reference Supporting Table 15 for Fail Timer 2 sec	
			If fail timer is greater than threshold increment corresponding gear fail counter and total fail counter					
			3rd gear fail counter				>= 3 3rd gear fail counts OR	
			5th gear fail counter				>= 3 5th gear fail counts OR	
			Total fail counter				>= 5 total fail counts	
					TUT Enable temperature	>= -6.65625 °C		
					Input Speed Sensor fault	= FALSE Boolean		
					Output Speed Sensor fault	= FALSE Boolean		
					Command / Attained Gear	≠ 1st Boolean		
					High Side Driver ON	= TRUE Boolean		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					output speed limit for TUT	>= 100 RPM		
					input speed limit for TUT	>= 150 RPM		
					PRNDL state defaulted	= FALSE Boolean		
					IMS Fault Pending	= FALSE Boolean		
					Service Fast Learn Mode	= FALSE Boolean		
					HSD Enabled	= TRUE Boolean		
					Default Gear Option is not present	= TRUE		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Variable Bleed Solenoid (VBS)	P0796	Pressure Control (PC) Solenoid C Stuck Off [C456] (Steady State)	Fail Case 1 Case: Steady State 4th Gear					One Trip
			Gear slip	>= 400 RPM			>= Please See Table 5 For Neutral Time Cal Neutral Timer (Sec)	
			Intrusive test: commanded 5th gear					
			If attained Gear ≠5th for time	>= Please refer to Table 3 in Supporting Documents Shift Time (Sec)				
			if the above conditions have been met					
			Increment 4th Gear Fail Counter				>= 3 4th Gear Fail Count	
			and C456 Fail Counters				OR >= 14 C456 Fail Counts	
			Fail Case 2 Case: Steady State 5th Gear					
			Gear slip	>= 400 RPM			>= Please See Table 5 For Neutral Time Cal Neutral Timer (Sec)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			Intrusive test: commanded 6th gear If attained Gear ≠ 6th for time if the above conditions have been met Increment 5th Gear Fail Counter and C456 Fail Counters	>= Please Refer to Table 3 in Supporting Documents Shift Time (Sec)			>= 3 5th Gear Fail Count OR >= 14 C456 Fail Counts	
			Fail Case 3 Case: Steady State 6th Gear Gear slip Intrusive test: commanded 5th gear If attained Gear ≠ 5th for time if the above conditions have been met Increment 6th Gear Fail Counter and C456 Fail Counter and C456 Fail Counter	>= 400 RPM >= Please refer to Table 3 in Supporting Documents Shift Time (Sec)			>= Please See Table 5 For Neutral Time Cal Neutral Timer (Sec) >= 3 6th Gear Fail Count OR >= 14 C456 Fail Counts	
					PRNDL State defaulted = FALSE Boolean inhibit RVT = FALSE Boolean IMS fault pending indication = FALSE Boolean TPS validity flag = TRUE Boolean Hydraulic System Pressurized = TRUE Boolean Minimum output speed for RVT >= 67 RPM A OR B (A) Output speed enable >= 67 RPM (B) Accelerator Pedal enable >= 0.5004883 Pct Common Enable Criteria Ignition Voltage Lo >= 8.5996094 Volts Ignition Voltage Hi <= 31.999023 Volts Engine Speed Lo >= 400 RPM		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
						Engine Speed Hi <= 7500 RPM Engine Speed is within the allowable limits for >= 5 Sec Throttle Position Signal valid = TRUE Boolean HSD Enabled = TRUE Boolean Transmission Fluid Temperature >= -6.65625 ºC Input Speed Sensor fault = FALSE Boolean OutputSpeed Sensor fault = FALSE Boolean Default Gear Option is not present = TRUE Disable Conditions: MIL not Illuminated for DTC's: TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Variable Bleed Solenoid (VBS)	P0797	Pressure Control (PC) Solenoid C Stuck On [C456] (Steady State)	Fail Case 1 Case: Steady State 1st Attained Gear slip If the Above is True for Time Intrusive test: (CBR1 clutch exhausted) Gear Ratio Gear Ratio If the above parameters are true	>= 400 RPM >= Table Based Time Please Refer to Table 4 in supporting documents Enable Time (Sec) <= 1.209594727 >= 1.094360352			>= 1.1 Fail Timer (Sec) >= 2 Fail Count in 1st Gear or >= 3 Total Fail Counts	One Trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			Fail Case 2 Case Steady State 2nd					
			Max Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 22 in supporting documents rpm/sec				
			Min Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 23 in supporting documents rpm/sec				
			If the Above is True for Time	>= Table Based Time Please Refer to Table 17 in supporting documents Sec				
			Intrusive test: (CB26 clutch exhausted)					
			Gear Ratio	<= 1.209594727				
			Gear Ratio	>= 1.094360352				
			If the above parameters are true				>= 1.1 Fail Timer (Sec) >= 3 Fail Count in 2nd Gear or >= 3 Total fail counts	
			Fail Case 3 Case Steady State 3rd					
			Max Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 22 in supporting documents rpm/sec				
			Min Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 23 in supporting documents rpm/sec				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions			Time Required			Mil Illum.
			If the Above is True for Time	>= Table Based Time Please Refer to Table 17 in supporting documents Sec					>= 1.1		Fail Timer (Sec)	
			Intrusive test: (C35R clutch exhausted)						>= 3		Fail Count in 3rd Gear	
			Gear Ratio	<= 1.209594727						OR		
			Gear Ratio	>= 1.094360352					>= 3		Total Fail Counts	
			If the above parameters are true									
					PRNDL State defaulted	=	FALSE	Boolean				
					inhibit RVT	=	FALSE	Boolean				
					IMS fault pending indication	=	FALSE	Boolean				
					output speed	>=	0	RPM				
					TPS validity flag	=	TRUE	Boolean				
					HSD Enabled	=	TRUE	Boolean				
					Hydraulic_System_Pressurized	=	TRUE	Boolean				
					A OR B							
					(A) Output speed enable	>=	67	Nm				
					(B) Accelerator Pedal enable	>=	0.5004883	Nm				
					Ignition Voltage Lo	>=	8.5996094	Volts				
					Ignition Voltage Hi	<=	31.999023	Volts				
					Engine Speed Lo	>=	400	RPM				
					Engine Speed Hi	<=	7500	RPM				
					Engine Speed is within the allowable limits for	>=	5	Sec				
					if Attained Gear=1st FW Accelerator Pedal enable	>=	5.0003052	Pct				
					if Attained Gear=1st FW Engine Torque Enable	>=	5	Nm				
					if Attained Gear=1st FW Engine Torque Enable	<=	8191.875	Nm				
					Transmission Fluid Temperature	>=	-6.65625	ºC				
					Input Speed Sensor fault	=	FALSE	Boolean				
					Output Speed Sensor fault	=	FALSE	Boolean				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					Default Gear Option is not present	= TRUE		
					Disable Conditions:	MIL not Illuminated for DTC's: TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Variable Bleed Solenoid (VBS)	P0797	Pressure Control (PC) Solenoid C Stuck On [C456] (Dynamic)	Primary Offgoing Clutch is exhausted (See Table 11 in Supporting Documents for Exhaust Delay Timers)	= TRUE Boolean				One Trip
			Primary Oncoming Clutch Pressure Command Status	= Maximum pressurized				
			Primary Offgoing Clutch Pressure Command Status	= Clutch exhaust command				
			Range Shift Status	≠ Initial Clutch Control				
			Attained Gear Slip	<= 40 RPM				
			If the above conditions are true increment appropriate Fail 1 Timers Below:					
			fail timer 1 (4-1 shifting with throttle)	>= 0.299804688 Fail Time (Sec)				
			fail timer 1 (4-1 shifting without throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (4-2 shifting with throttle)	>= 0.299804688 Fail Time (Sec)				
			fail timer 1 (4-2 shifting without throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (4-3 shifting with throttle)	>= 0.299804688 Fail Time (Sec)				
			fail timer 1 (4-3 shifting without throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (5-3 shifting with throttle)	>= 0.299804688 Fail Time (Sec)				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			fail timer 1 (5-3 shifting without throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (6-2 shifting with throttle)	>= 0.299804688 Fail Time (Sec)				
			fail timer 1 (6-2 shifting without throttle)	>= 0.5 Fail Time (Sec)				
			If Attained Gear Slip is Less than Above Cal Increment Fail Timers				>= Total Fail Time = (Fail 1 + Fail 2) See Enable Timers for Fail Timer 1, and Reference Supporting Table 15 for Fail Timer 2 sec	
			If fail timer is greater than threshold increment corresponding gear fail counter and total fail counter					
			4th gear fail counter				>= 3 Fail Counter From 4th Gear OR	
			5th gear fail counter				>= 3 Fail Counter From 5th Gear OR	
			6th gear fail counter				>= 3 Fail Counter From 6th Gear OR	
			Total fail counter				>= 5 Total Fail Counter	
					TUT Enable temperature	>= -6.65625 ºC		
					Input Speed Sensor fault	= FALSE Boolean		
					Output Speed Sensor fault	= FALSE Boolean		
					Command / Attained Gear	≠ 1st Boolean		
					High Side Driver ON	= TRUE Boolean		
					output speed limit for TUT	>= 100 RPM		
					input speed limit for TUT	>= 150 RPM		
					PRNDL state defaulted	= FALSE Boolean		
					IMS Fault Pending	= FALSE Boolean		
					Service Fast Learn Mode	= FALSE Boolean		
					HSD Enabled	= TRUE Boolean		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Tap Up Tap Down Switch (TUTD)	P0815	Upshift Switch Circuit	Fail Case 1 Tap Up Switch Stuck in the Up Position in Range 1 Enabled	= 0 Boolean				Special No MIL
			Tap Up Switch Stuck in the Up Position in Range 2 Enabled	= 0 Boolean				
			Tap Up Switch Stuck in the Up Position in Range 3 Enabled	= 0 Boolean				
			Tap Up Switch Stuck in the Up Position in Range 4 Enabled	= 0 Boolean				
			Tap Up Switch Stuck in the Up Position in Range 5 Enabled	= 0 Boolean				
			Tap Up Switch Stuck in the Up Position in Range 6 Enabled	= 0 Boolean				
			Tap Up Switch Stuck in the Up Position in Neutral Enabled	= 1 Boolean				
			Tap Up Switch Stuck in the Up Position in Park Enabled	= 1 Boolean				
			Tap Up Switch Stuck in the Up Position in Reverse Enabled	= 0 Boolean				
			Tap Up Switch ON	= TRUE Boolean			>= 1 Fail Time (Sec)	
			Fail Case 2 Tap Up Switch Stuck in the Up Position in Range 1 Enabled	= 1 Boolean				
			Tap Up Switch Stuck in the Up Position in Range 2 Enabled	= 1 Boolean				
			Tap Up Switch Stuck in the Up Position in Range 3 Enabled	= 1 Boolean				
			Tap Up Switch Stuck in the Up Position in Range 4 Enabled	= 1 Boolean				
			Tap Up Switch Stuck in the Up Position in Range 5 Enabled	= 1 Boolean				
			Tap Up Switch Stuck in the Up Position in Range 6 Enabled	= 1 Boolean				
			Tap Up Switch Stuck in the Up Position in Neutral Enabled	= 0 Boolean				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			Tap Up Switch Stuck in the Up Position in Park Enabled	= 0 Boolean				
			Tap Up Switch Stuck in the Up Position in Reverse Enabled	= 0 Boolean				
			Tap Up Switch ON	= TRUE Boolean				
			NOTE: Both Failcase1 and Failcase 2 Must Be Met				>= 600 Fail Time (Sec)	
					Time Since Last Range Change	>= 1 Enable Time (Sec)		
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					P0815 Status is	≠ Test Failed This Key On or Fault Active		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0816, P0826, P182E, P1876, P1877, P1915, P1761 ECM: None		
Tap Up Tap Down Switch (TUTD)	P0816	Downshift Switch Circuit	Fail Case 1 Tap Down Switch Stuck in the Down Position in Range 1 Enabled	= 0 Boolean				Special No MIL
			Tap Down Switch Stuck in the Down Position in Range 2 Enabled	= 0 Boolean				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria		Threshold Value		Secondary Malfunction	Enable Conditions	Time Required		Mil Illum.
			Tap Down Switch Stuck in the Down Position in Range 3 Enabled	=	0	Boolean					
			Tap Down Switch Stuck in the Down Position in Range 4 Enabled	=	0	Boolean					
			Tap Down Switch Stuck in the Down Position in Range 5 Enabled	=	0	Boolean					
			Tap Down Switch Stuck in the Down Position in Range 6 Enabled	=	0	Boolean					
			Tap Down Switch Stuck in the Down Position in Range Neutral Enabled	=	1	Boolean					
			Tap Down Switch Stuck in the Down Position in Range Park Enabled	=	1	Boolean					
			Tap Down Switch Stuck in the Down Position in Range Reverse Enabled	=	0	Boolean					
			Tap Down Switch ON	=	TRUE	Boolean			>=	1 sec	
			Fail Case 2								
			Tap Down Switch Stuck in the Down Position in Range 1 Enabled	=	1	Boolean					
			Tap Down Switch Stuck in the Down Position in Range 2 Enabled	=	1	Boolean					
			Tap Down Switch Stuck in the Down Position in Range 3 Enabled	=	1	Boolean					
			Tap Down Switch Stuck in the Down Position in Range 4 Enabled	=	1	Boolean					
			Tap Down Switch Stuck in the Down Position in Range 5 Enabled	=	1	Boolean					
			Tap Down Switch Stuck in the Down Position in Range 6 Enabled	=	1	Boolean					
			Tap Down Switch Stuck in the Down Position in Neutral Enabled	=	0	Boolean					
			Tap Down Switch Stuck in the Down Position in Park Enabled	=	0	Boolean					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			Tap Down Switch Stuck in the Down Position in Reverse Enabled	= 0 Boolean				
			Tap Down Switch ON NOTE: Both Failcase1 and Failcase 2 Must Be Met	= TRUE Boolean			>= 600 sec	
					Time Since Last Range Change	>= 1 Enable Time (Sec)		
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					P0816 Status is	≠ Test Failed This Key On or Fault Active		
			Disable Conditions:		MIL not Illuminated for DTC's:	TCM: P0815, P0826, P182E, P1876, P1877, P1915, P1761 ECM: None		
Tap Up Tap Down Switch (TUTD)	P0826	Up and Down Shift Switch Circuit	TUTD Circuit Reads Invalid Voltage	= TRUE Boolean			>= 60 Fail Time (Sec)	Special No MIL
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					P0826 Status is ≠ Test Failed This Key On or Fault Active			
					Disable Conditions: MIL not Illuminated for DTC's:	TCM: P1761 ECM: None		
Variable Bleed Solenoid (VBS)	P0961	Pressure Control (PC) Solenoid A Control Circuit Rationality Test (Line Pressure VBS)	The HWIO reports an invalid voltage (out of range) error flag	= TRUE Boolean			>= 4.4 Fail Time (Sec) out of 5 Sample Time (Sec)	Two Trips
					Ignition Voltage Ignition Voltage Engine Speed Engine Speed Engine Speed is within the allowable limits for	>= 8.5996094 Volts <= 31.999023 Volts >= 400 RPM <= 7500 RPM >= 5 Sec		
					Disable Conditions: MIL not Illuminated for DTC's:	TCM: None ECM: None		
Variable Bleed Solenoid (VBS)	P0962	Pressure Control (PC) Solenoid A Control Circuit Low Voltage (Line Pressure VBS)	The HWIO reports a low voltage (ground short) error flag	= TRUE Boolean			>= 1.5 Fail Time (Sec) out of 1.875 Sample Time (Sec)	One Trip
					Ignition Voltage Ignition Voltage Engine Speed Engine Speed Engine Speed is within the allowable limits for	>= 8.5996094 Volts <= 31.999023 Volts >= 400 RPM <= 7500 RPM >= 5 Sec		
					Disable Conditions: MIL not Illuminated for DTC's:	TCM: None ECM: None		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
Variable Bleed Solenoid (VBS)	P0963	Pressure Control (PC) Solenoid A Control Circuit High Voltage (Line Pressure VBS)	The HWIO reports a high voltage (open or power short) error flag	= TRUE Boolean		>= 4.4 Fail Time (Sec) out of 5 Sample Time (Sec)		Two Trips
					Ignition Voltage >= 8.5996094 Volts Ignition Voltage <= 31.999023 Volts Engine Speed >= 400 RPM Engine Speed <= 7500 RPM Engine Speed is within the allowable limits for >= 5 Sec			
			Disable Conditions:		MIL not Illuminated for DTC's:	TCM: None ECM: None		
Variable Bleed Solenoid (VBS)	P0966	Pressure Control (PC) Solenoid B Control Circuit Low Voltage (C35R VBS)	The HWIO reports a low voltage (ground short) error flag	= TRUE Boolean		>= 0.3 Fail Time (Sec) out of 0.375 Sample Time (Sec)		One Trip
					Ignition Voltage >= 8.5996094 Volts Ignition Voltage <= 31.999023 Volts Engine Speed >= 400 RPM Engine Speed <= 7500 RPM Engine Speed is within the allowable limits for >= 5 Sec P0966 Status is not = Test Failed This Key On or Fault Active			
			Disable Conditions:		MIL not Illuminated for DTC's:	TCM: None ECM: None		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
Variable Bleed Solenoid (VBS)	P0967	Pressure Control (PC) Solenoid B Control Circuit High Voltage (C35R VBS)	The HWIO reports a high voltage (open or power short) error flag	= TRUE Boolean			>= 0.3 Fail Time (Sec) out of 0.375 Sample Time (Sec)	One Trip
					Ignition Voltage >= 8.5996094 Volts Ignition Voltage <= 31.999023 Volts Engine Speed >= 400 RPM Engine Speed <= 7500 RPM Engine Speed is within the allowable limits for >= 5 Sec P0967 Status is not = Test Failed This Key On or Fault Active		
			Disable Conditions:		MIL not Illuminated for DTC's:	TCM: None ECM: None		
Variable Bleed Solenoid (VBS)	P0970	Pressure Control (PC) Solenoid C Control Circuit Low Voltage (C456/CBR1 VBS)	The HWIO reports a low voltage (ground short) error flag	= TRUE Boolean			>= 0.3 Fail Time (Sec) out of 0.375 Sample Time (Sec)	One Trip
					P0970 Status is not = Test Failed This Key On or Fault Active Ignition Voltage >= 8.5996094 Volts Ignition Voltage <= 31.999023 Volts Engine Speed >= 400 RPM Engine Speed <= 7500 RPM Engine Speed is within the allowable limits for >= 5 Sec		
			Disable Conditions:		MIL not Illuminated for DTC's:	TCM: None ECM: None		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
Variable Bleed Solenoid (VBS)	P0971	Pressure Control (PC) Solenoid C Control Circuit High Voltage (C456/CBR1 VBS)	The HWIO reports a high voltage (open or power short) error flag	= TRUE Boolean			>= 0.3 Fail Time (Sec) out of 0.375 Sample Time (Sec)	One Trip
					P0971 Status is not	= Test Failed This Key On or Fault Active		
					Ignition Voltage	>= 8.5996094 Volts		
					Ignition Voltage	<= 31.999023 Volts		
					Engine Speed	>= 400 RPM		
					Engine Speed	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Shift Solinoid	P0973	Shift Solenoid A Control Circuit Low (Mode 2 Solenoid)	The HWIO reports a low voltage (ground short) error flag	= TRUE Boolean			>= 1.2 Fail Time (Sec) out of 1.5 Sample Time (Sec)	One Trip
					P0973 Status is not	= Test Failed This Key On or Fault Active		
					Ignition Voltage	>= 8.5996094 Volts		
					Ignition Voltage	<= 31.999023 Volts		
					Engine Speed	>= 400 RPM		
					Engine Speed	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Shift Solinoid	P0974	Shift Solenoid A Control Circuit High (Mode 2 Solenoid)	The HWIO reports a high voltage (open or power short) error flag	= TRUE Boolean			>= 1.2 Fail Time (Sec)	Two Trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
							out of 1.5 Sample Time (Sec)	
					P0974 Status is not = Test Failed This Key On or Fault Active			
					Ignition Voltage >= 8.5996094 Volts Ignition Voltage <= 31.999023 Volts Engine Speed >= 400 RPM Engine Speed <= 7500 RPM Engine Speed is within the allowable limits for >= 5 Sec			
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Mode 3 Multiplex Valve	P0977	Shift Solenoid B Control Circuit High (Mode 3 Solenoid)	The HWIO reports a high voltage (open or power short) error flag	= TRUE Boolean			>= 1.2 Sec out of 1.5 Sec	One Trip
					P0977 Status is not = Test Failed This Key On or Fault Active			
					Ignition Voltage >= 8.5996094 Volts Ignition Voltage <= 31.999023 Volts Engine Speed >= 400 RPM Engine Speed <= 7500 RPM Engine Speed is within the allowable limits for >= 5 Sec			
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Tap Up Tap Down Switch (TUTD)	P1761	Tap Up and Down switch signal circuit (rolling count)	Rolling count value received from BCM does not match expected value	= TRUE Boolean			>= 3 Fail Counter	Special No MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
							> 10 Sample Timer (Sec)	
					Tap Up Tap Down Message Health = TRUE Boolean Engine Speed Lo >= 400 RPM Engine Speed Hi <= 7500 RPM Engine Speed is within the allowable limits for >= 5 Sec			
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Internal Mode Switch (IMS)	P182E	Internal Mode Switch - Invalid Range	Fail Case 1 Current range = Transition 1 (bit state 1110) Range Previous range ≠ CeTRGR_e_PRNDL_Drive6 Range Previous range ≠ CeTRGR_e_PRNDL_Drive5 Range Range Shift State = Range Shift Completed ENUM Absolute Attained Gear Slip <= 50 rpm Attained Gear <= Sixth Attained Gear >= First Throttle Position Available = TRUE Throttle Position >= 8.000183105 pct Output Speed >= 200 rpm Engine Torque >= 50 Nm Engine Torque <= 8191.75 Nm If the above conditions are met then Increment Fail Timer If Fail Timer has Expired then Increment Fail Counter				>= 1 Fail Seconds >= 5 Fail Counts	One Trip
			Fail Case 2 Output Speed	<= 70 rpm				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria		Threshold Value		Secondary Malfunction	Enable Conditions			Time Required			Mil Illum.
			The following PRNDL sequence events occur in this exact order:											
			PRNDL state	=	Drive 6 (bit state 0110)	Range								
			PRNDL state = Drive 6 for	>=	1	Sec								
			PRNDL state	=	Transition 8 (bit state 0111)	Range								
			PRNDL state	=	Drive 6 (bit state 0110)	Range								
			PRNDL state	=	Transition 1 (bit state 1110)	Range								
			Above sequencing occurs in	<=	1	Sec								
			Neutral Idle Mode	=	Inactive									
			If all conditions above are met Increment delay Timer											
			If the below two conditions are met Increment Fail Timer								>=	3	Fail Seconds	
			delay timer	>=	1	Sec								
			Input Speed	>=	400	Sec								
			If Fail Timer has Expired then Increment Fail Counter								>=	2	Fail Counts	
			Fail Case 3											
			Current range	=	Transition 13 (bit state 0010)	Range	Previous range	≠	CeTRGR_e_PRNDL_Drive5					
			Engine Torque	>=	-8192	Nm	Previous range	≠	CeTRGR_e_PRNDL_Drive5					
			Engine Torque	<=	8191.75	Nm	IMS is 7 position configuration	=	0	Boolean				
			If the above conditions are met then, Increment Fail Timer				If the "IMS 7 Position config" = 1 then the "previous range" criteria above must also be satsified when the "current range" = "Transition 13"				>=	0.225	Seconds	
			If Fail Timer has Expired then Increment Fail Counter								>=	15	Fail Counts	
			Fail Case 4											
			Current range	=	Transition 8 (bit state 0111)	Range	Disable Fail Case 4 if last positive range was Drive 6 and current range is transition 8							
			Inhibit bit (see definition)	=	FALSE		Set inhibit bit true if PRNDL = 1100 (rev) or 0100 (Rev-Neu transition 11) Set inhibit bit false if PRNDL = 1001 (park)							

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria		Threshold Value		Secondary Malfunction	Enable Conditions	Time Required			Mil Illum.
			Steady State Engine Torque	>=	100	Nm						
			Steady State Engine Torque	<=	8191.75	Nm						
			If the above conditions are met then Increment Fail Timer						>=	0.225	Seconds	
			If the above Condtions have been met, Increment Fail Counter						>=	15	Fail Counts	
			Fail Case 5 Throttle Position Available	=	TRUE	Boolean						
			The following PRNDL sequence events occur in this exact order:									
			PRNDL State	=	Reverse (bit state 1100)	Range						
			PRNDL State	=	Transition 11 (bit state 0100)	Range						
			PRNDL State	=	Neutral (bit state 0101)	Range						
			PRNDL State	=	Transition 11 (bit state 0100)	Range						
			Above sequencing occurs in	<=	1	Sec						
			Then delay timer increments									
			Delay timer	>=	5	sec						
			Range Shift State	=	Range Shift Complete							
			Absolute Attained Gear Slip	<=	50	rpm						
			Attained Gear	<=	Sixth							
			Attained Gear	>=	First							
			Throttle Position	>=	8.000183105	pct						
			Output Speed	>=	200	rpm						
			If the above conditions are met Increment Fail Timer						>=	20	Seconds	
			Fail Case 6 Current range	=	Illegal (bit state 0000 or 1000 or 0001)		A Open Circuit Definition (flag set false if the following conditions are met):					
			and				Current Range	≠	Transition 11 (bit state 0100)			
			A Open Circuit (See Definition)	=	FALSE	Boolean	or					
							Last positive state	≠	Neutral (bit state 0101)			
							or					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
						Transition		
					Previous transition state	≠ 8 (bit state 0111)		
					Fail case 5 delay timer	= 0 sec		
			If the above Condtions are met then, Increment Fail timer				>= 6.25 Seconds	
			Fail Case 7					
			Current PRNDL State	= PRNDL circuit ABCP = 1101 Range				
			and					
			Previous PRNDL state	= PRNDL circuit ABCP =1111 Range				
			Input Speed	>= 150 RPM				
			Reverse Trans Ratio	<= 2.975952148 ratio				
			Reverse Trans Ratio	>= 3.423950195 ratio				
			If the above Condtions are met then, Increment Fail timer				>= 6.25 Seconds	
			P182E will report test fail when any of the above 7 fail cases are met					
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					Engine Torque Signal Valid	= TRUE Boolean		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P07C0, P07BF, P077C, P077D ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Internal Mode Switch (IMS)	P1915	Internal Mode Switch Does Not Indicate Park/Neutral (P/N) During Start	PRNDL State is	≠ Park or Neutral Enumeration				One Trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			The following events must occur Sequentially					
			Initial Engine speed	<= 50 RPM			>= 0.25 Enable Time (Sec)	
			Then Engine Speed Between Following Cals					
			Engine Speed Lo Hist	>= 50 RPM				
			Engine Speed Hi Hist	<= 480 RPM			>= 0.06875 Enable Time (Sec)	
			Then					
			Final Engine Speed	>= 525 RPM				
			Final Transmission Input Speed	>= 100 RPM			>= 1.25 Fail Time (Sec)	
					DTC has Ran this Key Cycle?	= FALSE Boolean		
					Ignition Voltage Lo	>= 6 V		
					Ignition Voltage Hi	<= 31.999023 V		
					Ignition Voltage Hyst High (enables above this value)	>= 5 V		
					Ignition Voltage Hyst Low (disabled below this value)	<= 2 V		
					Transmission Output Speed	<= 90 rpm		
					P1915 Status is	≠ Test Failed This Key On or Fault Active		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0722, P0723 ECM: None		
Transmission Control Module (TCM)	P2534	Ignition Switch Run/Start Position Circuit Low	TCM Run crank active (based on voltage thresholds below)	= FALSE Boolean				One Trip
			Ignition Voltage High Hyst (run crank goes true when above this value)	5 Volts			>= 280 Fail Counts (25ms loop)	
			Ignition Voltage Low Hyst (run crank goes false when below this value)	2 Volts			Out of 280 Sample Counts (25ms loop)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					ECM run/crank active status available	= TRUE Boolean		
					ECM run/crank active status	= TRUE Boolean		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Transmission Control Module (TCM)	P2535	Ignition Switch Run/Start Position Circuit High	TCM Run crank active (based on voltage thresholds below)	= TRUE Boolean				One Trip
			Ignition Voltage High Hyst (run crank goes true when above this value)	5 Volts			>= 280 Fail Counts (25ms loop)	
			Ignition Voltage Low Hyst (run crank goes false when below this value)	2 Volts			Out of 280 Sample Counts (25ms loop)	
					ECM run/crank active status available	= TRUE Boolean		
					ECM run/crank active status	= FALSE Boolean		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Variable Bleed Solenoid (VBS)	P2714	Pressure Control (PC) Solenoid D Stuck Off [CB26]	Fail Case 1 Case: Steady State 2nd Gear					One Trip
			Gear slip	>= 400 RPM			>= Please See Table 5 For Neutral Time Cal Neutral Timer (Sec)	
			Intrusive test: commanded 3rd gear					
			If attained Gear = 3rd for Time	>= Table Based Time Please see Table 2 in Supporting Documents Enable Time (Sec)				
			If Above Conditions have been met					
			Increment 2nd gear fail count				>= 3 2nd Gear Fail Count or	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			and CB26 Fail Count				>= 14 CB26 Fail Count	
			Fail Case 2 Case: Steady State 6th Gear					
			Gear slip	>= 400 RPM			>= Please See Table 5 For Neutral Time Cal Neutral Timer (Sec)	
			Intrusive test: commanded 5th gear					
			If attained Gear = 5th For Time	>= Table Based Time Please see Table 2 in Supporting Documents Enable Time (Sec)				
			If Above Conditions have been met, Increment 5th gear fail counter				>= 3 5th Gear Fail Count	
			and CB26 Fail Count				or >= 14 CB26 Fail Count	
					PRNDL State defaulted	= FALSE Boolean		
					inhibit RVT	= FALSE Boolean		
					IMS fault pending indication	= FALSE Boolean		
					TPS validity flag	= TRUE Boolean		
					Hydraulic System Pressurized	= TRUE Boolean		
					Minimum output speed for RVT	>= 0 RPM		
					A OR B			
					(A) Output speed enable	>= 67 RPM		
					(B) Accelerator Pedal enable	>= 0.5004883 Pct		
					Common Enable Criteria			
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					Throttle Position Signal valid	= TRUE Boolean		
					HSD Enabled	= TRUE Boolean		
					Transmission Fluid Temperature	>= -6.65625 ºC		
					Input Speed Sensor fault	= FALSE Boolean		
					Output Speed Sensor fault	= FALSE Boolean		
					Default Gear Option is not present	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Variable Bleed Solenoid (VBS)	P2715	Pressure Control (PC) Solenoid D Stuck On [CB26] (Dynamic)	Primary Offgoing Clutch is exhausted (See Table 13 in Supporting Documents for Exhaust Delay Timers)	= TRUE Boolean				One Trip
			Primary Oncoming Clutch Pressure Command Status	= Maximum pressurized				
			Primary Offgoing Clutch Pressure Command Status	= Clutch exhaust command				
			Range Shift Status	≠ Initial Clutch Control				
			Attained Gear Slip	<= 40 RPM				
			If above coditons are true, increment appropriate Fail 1 Timers Below:					
			fail timer 1 (2-1 shifting with throttle)	>= 0.299804688 Fail Time (Sec)				
			fail timer 1 (2-1 shifting without throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (2-3 shifting with throttle)	>= 0.299804688 Fail Time (Sec)				
			fail timer 1 (2-3 shifting without throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (2-4 shifting with throttle)	>= 0.299804688 Fail Time (Sec)				
			fail timer 1 (2-4 shifting without throttle)	>= 0.5 Fail Time (Sec)				
			fail timer 1 (6-4 shifting with throttle)	>= 0.299804688 Fail Time (Sec)				
			fail timer 1 (6-4 shifting without throttle)	>= 0.5 Fail Time (Sec)				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			fail timer 1 (6-5 shifting with throttle)	>= 0.299804688 Fail Time (Sec)				
			fail timer 1 (6-5 shifting without throttle)	>= 0.5 Fail Time (Sec)				
			If Attained Gear Slip is Less than Above Cal Increment Fail Timers				>= Total Fail Time = (Fail 1 + Fail 2) See Enable Timers for Fail Timer 1, and Reference Supporting Table 15 for Fail Timer 2 sec	
			If fail timer is greater than threshold increment corresponding gear fail counter and total fail counter					
			2nd gear fail counter				>= 3 Fail Counter From 2nd Gear OR	
			6th gear fail counter				>= 3 Fail Counter From 6th Gear OR	
			total fail counter				>= 5 Total Fail Counter	
					TUT Enable temperature	>= -6.65625 °C		
					Input Speed Sensor fault	= FALSE Boolean		
					Output Speed Sensor fault	= FALSE Boolean		
					Command / Attained Gear	≠ 1st Boolean		
					High Side Driver ON	= TRUE Boolean		
					output speed limit for TUT	>= 100 RPM		
					input speed limit for TUT	>= 150 RPM		
					PRNDL state defaulted	= FALSE Boolean		
					IMS Fault Pending	= FALSE Boolean		
					Service Fast Learn Mode	= FALSE Boolean		
					HSD Enabled	= TRUE Boolean		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Variable Bleed Solenoid (VBS)	P2715	Pressure Control (PC) Solenoid D Stuck On [CB26] (Steady State)	Fail Case 1 Case: Steady State 1st Attained Gear slip If the Above is True for Time Intrusive test: (CBR1 clutch exhausted) Gear Ratio Gear Ratio If the above parameters are true	 >= 400 RPM >= Table Based Time Please Refer to Table 4 in supporting documents Enable Time (Sec) <= 2.482177734 >= 2.245849609			>= 1.1 Fail Timer (Sec) >= 5 Fail Count in 1st Gear or >= 5 Total Fail Counts	One Trip
			Fail Case 2 Case: Steady State 3rd Gear Max Delta Output Speed Hysteresis Min Delta Output Speed Hysteresis	 >= Table Based value Please Refer to Table 22 in supporting documents rpm/sec >= Table Based value Please Refer to Table 23 in supporting documents rpm/sec				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			If the Above is True for Time	>= Table Based Time Please Refer to Table 17 in supporting documents Sec				
			Intrusive test: (C35R clutch exhausted)					
			Gear Ratio	<= 2.482177734				
			Gear Ratio	>= 2.245849609				
			If the above parameters are true				>= 1.1 Fail Timer (Sec) >= 3 Fail Count in 3rd Gear or >= 5 Total Fail Counts	
			Fail Case 3 Case: Steady State 4rd Gear					
			Max Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 22 in supporting documents rpm/sec				
			Min Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 23 in supporting documents rpm/sec				
			If the Above is True for Time	>= Table Based Time Please Refer to Table 17 in supporting documents Sec				
			Intrusive test: (C1234 clutch exhausted)					
			Gear Ratio	<= 0.700317383				
			Gear Ratio	>= 0.633666992				
			If the above parameters are true				>= 1.1 Fail Timer (Sec)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
							>= 3 Fail Count in 4th Gear or >= 5 Total Fail Counts	
			Fail Case 4 Case: Steady State 5th Gear					
			Max Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 22 in supporting documents rpm/sec				
			Min Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 23 in supporting documents rpm/sec				
			If the Above is True for Time	>= Table Based Time Please Refer to Table 17 in supporting documents Sec				
			Intrusive test: (C35R clutch exhausted)					
			Gear Ratio	<= 0.700317383				
			Gear Ratio	>= 0.633666992				
			If the above parameters are true				>= 1.1 Fail Timer (Sec)	
							>= 3 Fail Count in 5th Gear or >= 5 Total Fail Counts	
					PRNDL State defaulted	= FALSE Boolean		
					inhibit RVT	= FALSE Boolean		
					IMS fault pending indication	= FALSE Boolean		
					output speed	>= 0 RPM		
					TPS validity flag	= TRUE Boolean		
					HSD Enabled	= TRUE Boolean		
					Hydraulic_System_Pressurized	= TRUE Boolean		
					A OR B			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions			Time Required			Mil Illum.
					(A) Output speed enable	>=	67	Nm				
					(B) Accelerator Pedal enable	>=	0.5004883	Nm				
					Ignition Voltage Lo	>=	8.5996094	Volts				
					Ignition Voltage Hi	<=	31.999023	Volts				
					Engine Speed Lo	>=	400	RPM				
					Engine Speed Hi	<=	7500	RPM				
					Engine Speed is within the allowable limits for	>=	5	Sec				
					if Attained Gear=1st FW Accelerator Pedal enable	>=	5.0003052	Pct				
					if Attained Gear=1st FW Engine Torque Enable	>=	5	Nm				
					if Attained Gear=1st FW Engine Torque Enable	<=	8191.875	Nm				
					Transmission Fluid Temperature	>=	-6.65625	ºC				
					Input Speed Sensor fault	=	FALSE	Boolean				
					Output Speed Sensor fault	=	FALSE	Boolean				
					Default Gear Option is not present	=	TRUE					
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E							
Variable Bleed Solenoid (VBS)	P2720	Pressure Control (PC) Solenoid D Control Circuit Low (CB26 VBS)	The HWIO reports a low voltage (ground short) error flag	= TRUE Boolean					>=	0.3	Fail Time (Sec)	One Trip
									out of	0.375	Sample Time (Sec)	
					P2770 Status is not	=	Test Failed This Key On or Fault Active					
					Ignition Voltage	>=	8.5996094	Volts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					Ignition Voltage <= 31.999023 Volts Engine Speed >= 400 RPM Engine Speed <= 7500 RPM Engine Speed is within the allowable limits for >= 5 Sec			
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Variable Bleed Solenoid (VBS)	P2721	Pressure Control (PC) Solenoid D Control Circuit High (CB26 VBS)	The HWIO reports a high voltage (open or power short) error flag	= TRUE Boolean			>= 0.3 Fail Time (Sec) out of 0.375 Sample Time (Sec)	One Trip
					P2721 Status is not = Test Failed This Key On or Fault Active Ignition Voltage >= 8.5996094 Volts Ignition Voltage <= 31.999023 Volts Engine Speed >= 400 RPM Engine Speed <= 7500 RPM Engine Speed is within the allowable limits for >= 5 Sec			
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Variable Bleed Solenoid (VBS)	P2723	Pressure Control (PC) Solenoid E Stuck Off	Fail Case 1 Case: Steady State 1st Gear Gear slip Intrusive test: commanded 2nd gear If attained Gear ≠ 2nd for Time	>= 400 RPM >= Please refer to Table 3 in Supporting Documents Shift Time (Sec)			>= Please See Table 5 For Neutral Time Cal Neutral Timer (Sec)	One Trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			If Above Conditions have been met, Increment 1st gear fail counter				>= 3 1st Gear Fail Count	
			and C1234 fail counter				or >= 14 C1234 Clutch Fail Count	
			Fail Case 2 Case: Steady State 2nd Gear					
			Gear slip	>= 400 RPM			>= Please See Table 5 For Neutral Time Cal Neutral Timer (Sec)	
			Intrusive test: commanded 3rd gear					
			If attained Gear ≠ 3rd for Time	>= Please refer to Table 3 in Supporting Documents Shift Time (Sec)				
			If Above Conditions have been met, Increment 2nd gear fail counter				>= 3 2nd Gear Fail Count	
			and C1234 fail counter				or >= 14 C1234 Clutch Fail Count	
			Fail Case 3 Case: Steady State 3rd Gear					
			Gear slip	>= 400 RPM			>= Please See Table 5 For Neutral Time Cal Neutral Timer (Sec)	
			Intrusive test: commanded 4th gear					
			If attained Gear ≠ 4th for time	>= Please refer to Table 3 in Supporting Documents Shift Time (Sec)				
			If Above Conditions have been met, Increment 3rd gear fail counter				>= 3 3rd Gear Fail Count	
			and C1234 fail counter				or >= 14 C1234 Clutch Fail Count	
			Fail Case 4 Case: Steady State 4th Gear					
			Gear slip	>= 400 RPM			>= Please See Table 5 For Neutral Time Cal Neutral Timer (Sec)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions			Time Required			Mil Illum.
			Intrusive test: commanded 5th gear									
			If attained Gear = 5th For Time	>= Please refer to Table 3 in Supporting Documents Shift Time (Sec)								
			If Above Conditions have been met, Increment 4th gear fail counter						>=	3	4th Gear Fail Count	
			and C1234 fail counter						>=	14	or C1234 Clutch Fail Count	
					PRNDL State defaulted	=	FALSE	Boolean				
					inhibit RVT	=	FALSE	Boolean				
					IMS fault pending indication	=	FALSE	Boolean				
					TPS validity flag	=	TRUE	Boolean				
					Hydraulic System Pressurized	=	TRUE	Boolean				
					Minimum output speed for RVT	>=	0	RPM				
					A OR B							
					(A) Output speed enable	>=	67	RPM				
					(B) Accelerator Pedal enable	>=	0.5004883	Pct				
					Common Enable Criteria							
					Ignition Voltage Lo	>=	8.5996094	Volts				
					Ignition Voltage Hi	<=	31.999023	Volts				
					Engine Speed Lo	>=	400	RPM				
					Engine Speed Hi	<=	7500	RPM				
					Engine Speed is within the allowable limits for	>=	5	Sec				
					Throttle Position Signal valid	=	TRUE	Boolean				
					HSD Enabled	=	TRUE	Boolean				
					Transmission Fluid Temperature	>=	-6.65625	ºC				
					Input Speed Sensor fault	=	FALSE	Boolean				
					Output Speed Sensor fault	=	FALSE	Boolean				
					Default Gear Option is not present	=	TRUE					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Variable Bleed Solenoid (VBS)	P2724	Pressure Control (PC) Solenoid E Stuck On (Dynamic)	Primary Offgoing Clutch is exhausted (See Table 10 in Supporting Documents for Exhaust Delay Timers)	= TRUE Boolean				One Trip
			Primary Oncoming Clutch Pressure Command Status	= Maximum pressurized Clutch				
			Primary Offgoing Clutch Pressure Command Status	= exhaust command				
			Range Shift Status	≠ Initial Clutch Control				
			Attained Gear Slip	<= 40 RPM				
			If the above conditions are true increment appropriate Fail 1 Timers Below:					
			fail timer 1 (2-6 shifting with throttle)	>= 0.299804688 sec				
			fail timer 1 (2-6 shifting without throttle)	>= 0.5 sec				
			fail timer 1 (3-5 shifting with throttle)	>= 0.299804688 sec				
			fail timer 1 (3-5 shifting without throttle)	>= 0.5 sec				
			fail timer 1 (4-5 shifting with throttle)	>= 0.299804688 sec				
			fail timer 1 (4-5 shifting without throttle)	>= 0.5 sec				
			fail timer 1 (4-6 shifting with throttle)	>= 0.299804688 sec				
			fail timer 1 (4-6 shifting without throttle)	>= 0.5 sec				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions			Time Required			Mil Illum.
			If Attained Gear Slip is Less than Above Cal Increment Fail Timers						>=	Total Fail Time = (Fail 1 + Fail 2) See Enable Timers for Fail Timer 1, and Reference Supporting Table 15 for Fail Timer 2	sec	
			If fail timer is greater than threshold increment corresponding gear fail counter and total fail counter									
			2nd gear fail counter						>=	3	Fail Counter From 2nd Gear	
			3rd gear fail counter						>=	3	Fail Counter From 3rd Gear	
			4th gear fail counter						>=	3	Fail Counter From 4th Gear	
			total fail counter						>=	5	Total Fail Counter	
					TUT Enable temperature	>=	-6.65625	ºC				
					Input Speed Sensor fault	=	FALSE	Boolean				
					Output Speed Sensor fault	=	FALSE	Boolean				
					Command / Attained Gear	≠	1st	Boolean				
					High Side Driver ON	=	TRUE	Boolean				
					output speed limit for TUT	>=	100	RPM				
					input speed limit for TUT	>=	150	RPM				
					PRNDL state defaulted	=	FALSE	Boolean				
					IMS Fault Pending	=	FALSE	Boolean				
					Service Fast Learn Mode	=	FALSE	Boolean				
					HSD Enabled	=	TRUE	Boolean				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Variable Bleed Solenoid (VBS)	P2724	Pressure Control (PC) Solenoid E Stuck On (Steady State)	Fail Case 1 Case: 5th Gear					One Trip
			Max Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 22 in supporting documents rpm/sec				
			Min Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 23 in supporting documents rpm/sec				
			If the Above is True for Time	>= Table Based Time Please Refer to Table 17 in supporting documents Sec				
			Intrusive test: (C35R clutch exhausted)					
			Gear Ratio	<= 1.209594727				
			Gear Ratio	>= 1.094360352				
			If the above parameters are true				>= 1.1 Fail Timer (Sec) >= 3 Fail Count in 5th Gear OR >= 3 Total Fail Counts	
			Fail Case 2 Case: 6th Gear					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
			Max Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 22 in supporting documents rpm/sec				
			Min Delta Output Speed Hysteresis	>= Table Based value Please Refer to Table 23 in supporting documents rpm/sec				
			If the Above is True for Time	>= Table Based Time Please Refer to Table 17 in supporting documents Sec				
			Intrusive test: (CB26 clutch exhausted)					
			Gear Ratio	<= 1.209594727				
			Gear Ratio	>= 1.094360352				
			If the above parameters are true				>= 1.1 Fail Timer (Sec) >= 3 Fail Count in 6th Gear OR >= 3 Total Fail Counts	
					PRNDL State defaulted	= FALSE Boolean		
					inhibit RVT	= FALSE Boolean		
					IMS fault pending indication	= FALSE Boolean		
					output speed	>= 0 RPM		
					TPS validity flag	= TRUE Boolean		
					HSD Enabled	= TRUE Boolean		
					Hydraulic_System_Pressurized	= TRUE Boolean		
					A OR B			
					(A) Output speed enable	>= 67 Nm		
					(B) Accelerator Pedal enable	>= 0.5004883 Nm		
					Ignition Voltage Lo	>= 8.5996094 Volts		
					Ignition Voltage Hi	<= 31.999023 Volts		
					Engine Speed Lo	>= 400 RPM		
					Engine Speed Hi	<= 7500 RPM		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
					Engine Speed is within the allowable limits for	>= 5 Sec		
					if Attained Gear=1st FW Accelerator Pedal enable	>= 5.0003052 Pct		
					if Attained Gear=1st FW Engine Torque Enable	>= 5 Nm		
					if Attained Gear=1st FW Engine Torque Enable	<= 8191.875 Nm		
					Transmission Fluid Temperature	>= -6.65625 ºC		
					Input Speed Sensor fault	= FALSE Boolean		
					Output Speed Sensor fault	= FALSE Boolean		
					Default Gear Option is not present	= TRUE		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0716, P0717, P0722, P0723, P182E ECM: P0101, P0102, P0103, P0106, P0107, P0108, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308, P0401, P042E		
Variable Bleed Solenoid (VBS)	P2729	Pressure Control (PC) Solenoid E Control Circuit Low (C1234 VBS)	The HWIO reports a low voltage (ground short) error flag	= TRUE Boolean			>= 0.3 Fail Time (Sec) out of 0.375 Sample Time (Sec)	One Trip
					P2729 Status is not	= Test Failed This Key On or Fault Active		
					Ignition Voltage	>= 8.5996094 Volt		
					Ignition Voltage	<= 31.999023 Volt		
					Engine Speed	>= 400 RPM		
					Engine Speed	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Variable Bleed Solenoid (VBS)	P2730	Pressure Control (PC) Solenoid E Control Circuit High (C1234 VBS)	The HWIO reports a high voltage (open or power short) error flag	= TRUE Boolean			>= 0.3 Fail Time (Sec) out of 0.375 Sample Time (Sec)	One Trip
					P2730 Status is not	= Test Failed This Key On or Fault Active		
					Ignition Voltage	>= 8.5996094 Volt		
					Ignition Voltage	<= 31.999023 Volt		
					Engine Speed	>= 400 RPM		
					Engine Speed	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Variable Bleed Solenoid (VBS)	P2763	Torque Converter Clutch Pressure High	The HWIO reports a low pressure/high voltage (open or power short) error flag	= TRUE Boolean			>= 4.4 Fail Time (Sec) out of 5 Sample Time (Sec)	Two Trips
					P2763 Status is not	= Test Failed This Key On or Fault Active		
					Ignition Voltage	>= 8.5996094 Volt		
					Ignition Voltage	<= 31.999023 Volt		
					Engine Speed	>= 400 RPM		
					Engine Speed	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					High Side Driver Enabled	= TRUE Boolean		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions	Time Required	Mil Illum.
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0658, P0659 ECM: None		
Variable Bleed Solenoid (VBS)	P2764	Torque Converter Clutch Pressure Control Solenoid Control Circuit Low	The HWIO reports a high pressure/low voltage (ground short) error flag	= TRUE Boolean			>= 4.4 Fail Time (Sec) out of 5 Sample Time (Sec)	One Trip
					P2764 Status is not	= Test Failed This Key On or Fault Active		
					Ignition Voltage	>= 8.5996094 Volt		
					Ignition Voltage	<= 31.999023 Volt		
					Engine Speed	>= 400 RPM		
					Engine Speed	<= 7500 RPM		
					Engine Speed is within the allowable limits for	>= 5 Sec		
					High Side Driver Enabled	= TRUE Boolean		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: P0658, P0659 ECM: None		
Communication	U0073	Controller Area Network Bus Communication Error	CAN Hardware Circuitry Detects a Low Voltage Error	= TRUE Boolean			>= 62 Fail counts (≈ 10 seconds) Out of 70 Sample Counts (≈ 11 seconds)	One Trip
			Delay timer	>= 0.1125 sec				
					Stabilization delay	>= 3 sec		
					Ignition Voltage	>= 8.5996094 Volt		
					Ignition Voltage	<= 31.999023 Volt		
					Power Mode	= Run		
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: None ECM: None		
Communication	U0100	Lost Communications with ECM (Engine Control Module)	CAN messages from ECM are not received by the TCM	= TRUE Boolean			>= 12 sec	One Trip
					Stabilization delay	>= 3 sec		
					Ignition Voltage	>= 8.5996094 Volt		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Malfunction	Enable Conditions			Time Required	Mil Illum.
					Ignition Voltage	<=	31.999023	Volt		
					Power Mode	=	Run			
				Disable Conditions:	MIL not Illuminated for DTC's:	TCM: U0073 ECM: None				

2D Supporting Tables T43

Table 1

Axis	0.00	64.00	128.00	192.00	256.00	320.00	384.00	448.00	512.00	N*m
Curve	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	RPM

Table 2

Axis	-6.67	-6.66	40.00	ºC
Curve	409.59	2.00	2.00	Sec

Table 3

Axis	-6.67	-6.66	40.00	ºC
Curve	409.59	4.00	4.00	Sec

Table 4

Axis	-6.67	-6.66	40.00	ºC
Curve	409.59	2.00	2.00	Sec

Table 5

Axis	-6.67	-6.66	40.00	ºC
Curve	409.59	3.00	3.00	Sec

Table 6

Axis	-6.67	-6.66	40.00	80.00	120.00	ºC
Curve	409.00	3.60	1.60	1.40	1.40	Sec

Table 7

Axis	-6.67	-6.66	40.00	80.00	120.00	ºC
Curve	409.00	3.40	1.40	1.30	1.20	Sec

2D Supporting Tables T43

Table 8

Axis	-6.67	-6.66	40.00	80.00	120.00	ºC
Curve	409.00	3.60	1.60	1.50	1.40	Sec

Table 9

Axis	-6.67	-6.66	40.00	80.00	120.00	ºC
Curve	409.00	3.30	1.30	1.20	1.10	Sec

Table 10

Axis	-6.67	-6.66	40.00	80.00	120.00	ºC
Curve	3.03	1.86	1.00	0.75	0.58	Sec

Table 11

Axis	-6.67	-6.66	40.00	80.00	120.00	ºC
Curve	1.72	1.11	0.60	0.36	0.22	Sec

Table 12

Axis	-6.67	-6.66	40.00	80.00	120.00	ºC
Curve	2.12	1.39	0.84	0.64	0.33	Sec

Table 13

Axis	-6.67	-6.66	40.00	80.00	120.00	ºC
Curve	2.51	0.95	0.50	0.29	0.13	Sec

Table 14

Axis	-6.67	-6.66	40.00	80.00	120.00	ºC
Curve	2.97	0.82	0.47	0.20	0.13	Sec

2D Supporting Tables T43

Table 15

Axis	-40.00	-30.00	-20.00	-10.00	0.00	10.00	20.00	30.00	40.00	ºC
Curve	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Sec

Table 16

Axis	-6.67	-6.66	40.00	ºC
Curve	409.59	2.50	2.50	Sec

Table 17

Axis	-6.67	-6.66	40.00	ºC
Curve	0.40	0.35	0.30	Sec

Table 18

Axis	-40.10	-40.00	-20.00	0.00	30.00	60.00	100.00	149.00	149.10	ºC
Curve	256.00	50.00	45.00	40.00	34.00	25.00	20.00	20.00	256.00	ºC

Table 19

Axis	-40.10	-40.00	-20.00	0.00	30.00	60.00	100.00	149.00	149.10	ºC
Curve	256.00	50.00	45.00	40.00	34.00	25.00	20.00	20.00	256.00	ºC

Table 20

Axis	-40.10	-40.00	-20.00	0.00	30.00	60.00	100.00	149.00	149.10	ºC
Curve	256.00	10.00	8.00	8.00	8.00	8.00	8.00	8.00	256.00	ºC

Table 21

Axis	-40.00	-20.00	40.00	ºC
Curve	5.00	3.00	1.00	Sec

2D Supporting Tables T43

Table 22

Axis	-6.67	-6.66	40.00	ºC
Curve	8191.75	8191.75	8191.75	RPM/Sec

Table 23

Axis	-6.67	-6.66	40.00	ºC
Curve	8191.75	8191.75	8191.75	RPM/Sec

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Fuel Rail Pressure (FRP) Sensor Performance (rationality)	P018B	This DTC detects a fuel pressure sensor response stuck within the normal operating range	Absolute value of fuel pressure change as sensed during intrusive test.	<= 30 kPa	1. FRP Circuit Low DTC (P018C) 2. FRP Circuit High DTC (P018D) 3. FuelPump Circuit Low DTC (P0231) 4. FuelPump Circuit High DTC (P0232) 5. FuelPump Circuit Open DTC (P023F) 6. Reference Voltage DTC (P0641) 7. Fuel Pump Control Module Driver Over-temperature DTC (P064A) 8. Control Module Internal Performance DTC (P0606) 9. Engine run time 10. Emissions fuel level low (PPEI $3FB) 11. Fuel pump control 12. Fuel pump control state 13. Engine fuel flow 14. ECM fuel control system failure (PPEI $1E7)	1. Not active 2. Not active 3. Not active 4. Not active 5. Not active 6. Not active 7. Not active 8. Not active 9. >=5 seconds 10. Not low 11. Enabled 12. Normal or FRP rationality control 13. > 0.047 g/s 14. Not failed	Frequency: Continuous; 12.5 ms loop. 60 seconds between intrusive tests that pass Intrusive test requested if fuel system is clamped for >= 5 seconds or fuel pressure error variance <= typically (0.3 to 0.6) (calculated over a 2.5sec period); otherwise report Duration of intrusive test is fueling related (5 to 12 seconds). Intrusive test is run when fuel flow is below Max allowed fuel flow rate (Typical values in the range of 11 to 50 g/s)	DTC Type B 2 trips
Fuel Rail Pressure (FRP) Sensor Circuit Low Voltage	P018C	This DTC detects if the fuel pressure sensor circuit is shorted low	FRP sensor voltage	< 0.14 V	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type B 2 trips
Fuel Rail Pressure (FRP) Sensor Circuit High Voltage	P018D	This DTC detects if the fuel pressure sensor circuit is shorted high	FRP sensor voltage	> 4.86 V	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Fuel Pump Control Circuit Low Voltage	P0231	This DTC detects if the fuel pump control circuit is shorted to low	Fuel Pump Current	> 14.48A	Ignition switch OR Ignition switch OR Fuel Pump Control AND Ignition Run/Crank Voltage	Run or Crank Accessory enabled 9V < voltage < 32V	72 test failures in 80 test samples if Fuel Pump Current <100A 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Pump Control Circuit High Voltage	P0232	This DTC detects if the fuel pump control circuit is shorted to high	Voltage measured at fuel pump circuit	> 3.86 V	Commanded fuel pump output Fuel pump control enable Time that above conditions are met	0% duty cycle (off) False >=4.0 seconds	36 test failures in 40 test samples; 1 sample/12.5ms Pass/Fail determination made only once per trip	DTC Type B 2 trips
Fuel Pump Control Circuit (Open)	P023F	This DTC detects if the fuel pump control circuit is open	Fuel Pump Current AND Fuel Pump Duty Cycle	<=0.5A >20%	Ignition switch OR Ignition switch OR Fuel Pump Control AND Ignition Run/Crank Voltage	Run or Crank Accessory enabled 9V < voltage < 32V	72 test failures in 80 test samples; 1 sample/12.5ms	DTC Type A 1 trip
Fuel System Control Module Enable Control Circuit	P025A	This DTC detects if there is a fault in the fuel pump control enable circuit	PPEI (Powertrain Platform Electrical Interface) Fuel System Request ($1E7)	≠ Fuel Pump Control Module Enable Control Circuit	Ignition AND PPEI Fuel System Request ($1E7)	Run or Crank valid	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if any software or calibration check sum is incorrect	Calculated Checksum (CRC16)	≠ stored checksum for any of the parts (boot, software, application calibration, system calibration)	Ignition switch OR Ignition switch	Run or Crank Accessory	1 failure if it occurs during the first ROM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background	DTC Type A 1 trip
Control Module Not Programmed	P0602	Indicates that the ECU needs to be programmed	Calibration KeMEMD_b_NoStartCal	= TRUE	Ignition switch OR Ignition switch	Run or Crank Accessory	Runs once at power up	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up	≠ checksum at power-down	Ignition switch OR Ignition switch	Run or Crank Accessory	1 failure Frequency: Once at power-up	DTC Type A 1 trip
Control Module Random Access Memory (RAM)	P0604	Indicates that control module is unable to correctly write and read data to and from RAM	Data read	≠ Data written	Ignition switch OR Ignition switch	Run or Crank Accessory	1 failure if it occurs during the first RAM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background.	DTC Type A 1 trip
Control Module Internal Performance	P0606	Indicates the ECU has detected an internal processor fault or external watchdog fault (PID $2032 discriminates the source of fault)			Ignition switch OR Ignition switch	(Run or Crank) OR Accessory		DTC Type A 1 trip
1. Main Processor Configuration Register Test			1. I/O configuration register faults: •Register contents	 =Incorrect value	1. For all I/O configuration register faults: Calibration •KeMEMD_b_ProcFltCfgRegEnbl	 TRUE	1. 1 failure Frequency: Continuously (12.5ms)	
2. Processor clock test			2. Processor Clock Fault: • EE latch flag in EEPROM OR • RAM latch flag.	 0x5A5A 0x5A	2. For Processor Clock Fault: Calibration •KeMEMD_b_ProcFltCLKDiagEnbl	 TRUE	2. 1 failure Frequency: Continuously (12.5ms)	
3. External watchdog test			3. External Watchdog Fault: • Software control of fuel pump driver	 Control Lost	3. For External Watchdog Fault: Calibration •KeFRPD_b_FPExtWDogDiagEnbl AND •Control Module ROM(P0601) AND •Control Module RAM(P0604)	 TRUE Not active Not active	3. 3 failures out of 15 samples 1 sample/12.5 ms	
Control Module Long Term Memory (EEPROM) Performance	P062F	Indicates that the NVM Error flag has not been cleared	Last EEPROM write	Did not complete	Ignition switch OR Ignition switch	(Run or Crank) OR Accessory	1 test failure Once on controller power-up	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
5Volt Reference Circuit (Short High/Low/Out of Range)	P0641	Detects continuous short or out of range on the #1 5V sensor reference circuit	(Reference voltage AND Output) OR (Reference voltage AND Output) OR (Reference voltage AND Output) OR	(>= 0.5V inactive) (>= 5.5V active) (<= 4.5V active)	Ignition	Run or Crank	15 failures out of 20 samples 1 sample/12.5 ms	DTC Type A 1 trip
			Reference voltage	> 105% nominal OR < 95% nominal (i.e., > 5.25v OR < 4.75v)				
Fuel Pump Control Module Driver 1 Over-temperature	P064A	Detects if an internal fuel pump driver overtemperature condition exists	Pump Driver Temp	> 150C	Ignition switch OR Ignition switch	(Run or Crank) OR Accessory	3 failures out of 15 samples 1 sample/12.5 ms	DTC Type B 2 trips
					KeFRPD_b_FPOverTempDiagEnbl	TRUE		
					Ignition Run_Crank terminal	9V<voltage<32V		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Cylinder Deactivation Exhaust Flow Valve Control Circuit/Open	P12E3	Monitors for open circuit faults in the AFM valve PWM control circuit	Open circuit fault status AFM_VlvCntrlCktOpenFlt	== Faulted	1. Diagnostic enabled (K_b_AFM_VlvCntrlOpenEnbl) AND 2. Diagnostic system disablement not requested (DiagSystemDisable) AND 3. AFM Valve Initialization complete (AFM_ValveInitDlyCmpt) AND 4. AFM exhaust valve control not disabled remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND 5. AFM control circuit Open circuit fault status (AFM_VlvCntrlCktOpenFlt)	1. = TRUE AND 2. <> TRUE AND 3. = TRUE AND 4. <> TRUE AND 5. <> INDETERMINATE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Control Circuit Low	P12E4	Monitors for short-to-ground faults in the AFM valve PWM control circuit	Short-to-ground fault status AFM_VlvCntrlCktGshtFlt	== Faulted	1. Diagnostic enabled (K_b_AFM_VlvCntrlGshtEnbl) AND 2. Diagnostic system disablement not requested (DiagSystemDisable) AND 3. AFM Valve Initialization complete (AFM_ValveInitDlyCmpt) AND 4. AFM exhaust valve control not disabled for remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND 5. AFM control circuit Short-to-ground fault status not indeterminate (AFM_VlvCntrlCktGshtFlt)	1. = TRUE AND 2. <> TRUE AND 3. = TRUE AND 4. <> TRUE AND 5. <> INDETERMINATE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Control Circuit High	P12E5	Monitors for short-to-power faults in the AFM valve PWM control circuit	Short-to-power fault status AFM_VlvCntrlCktPshtFlt	== Faulted	1. Diagnostic enabled (K_b_AFM_VlvCntrlPshtEnbl) AND 2. Diagnostic system disablement not requested (DiagSystemDisable) AND 3. AFM Valve Initialization complete (AFM_ValveInitDlyCmpt) AND 4. AFM exhaust valve control not disabled remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND 5. AFM control circuit Short-to-power fault status not indeterminate (AFM_VlvCntrlCktPshtFlt)	1. = TRUE AND 2. <> TRUE AND 3. = TRUE AND 4. <> TRUE AND 5. <> INDETERMINATE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Cylinder Deactivation Exhaust Flow Valve Feeback Circuit Low Duty Cycle (Bank 1)	P12E7	Monitors for out-of-range low duty cycle values on the AFM valve 1 diagnostic PWM feedback signal	AFM valve 1 diagnostic PWM feedback signal AFM_Valve1FdbkDC	< K_Pct_AFM_Vlv1PstnLoThrsh)	1. Diagnostic enabled (K_b_AFM_Vlv1PstnLoDiagEnbl) AND 2. AFM valve initialization complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit High Duty Cycle (Bank 1)	P12E8	Monitors for out-of-range high duty cycle values on the AFM valve 1 diagnostic PWM feedback signal	AFM valve 1 diagnostic PWM feedback signal AFM_Valve1FdbkDC	> K_Pct_AFM_Vlv1PstnHiThrsh	1. Diagnostic enabled (K_b_AFM_Vlv1PstnHiDiagEnbl) AND 2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Open Position (Bank 1)	P12E9	Monitors the sensed AFM valve 1 position for values that are out-of-range low	AFM_Valve1State	<= ValvePstnOOR_Low)	1. Diagnostic enabled (K_b_AFM_Vlv1PstnOOR_LoEnbl) AND 2. AFM valve initialization period completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable) AND 4. AFM valve 1 position sensor circuit low diagnostic not faulted (AFM_Valve1PstnLoFP) AND 5. AFM valve 1 position sensor circuit high diagnostic not faulted (AFM_Valve1PstnHiFP)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE AND 4. <> TRUE AND 5. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Closed Position (Bank 1)	P12EA	Monitors the sensed AFM valve 1 position for values that are out-of-range high	AFM_Valve1State	>= ValvePstnOOR_High)	1. Diagnostic enabled (K_b_AFM_Vlv1PstnOOR_LoEnbl) AND 2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable) AND	1. = TRUE AND 2. = TRUE AND 3. <> TRUE AND 4. <> TRUE AND 5. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit Low Frequency (Bank 1)	P12EB	Monitors for out-of-range high period (i.e. out-of-range low frequency) values on the AFM valve 1 diagnostic PWM feedback signal	Diagnostic PWM feedback signal_AFM_Valve1DiagFdbkSt	>= DiagFdbkPrdHigh)	1. Diagnostic enabled (K_b_AFM_Vlv1FdbkHiDiagEnbl) AND 2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit High Frequency (Bank 1)	P12EC	Monitors for out-of-range low period (i.e. out-of range high frequency) values on the AFM valve 1 diagnostic PWM feedback signal	Diagnostic PWM feedback signal_AFM_Valve1DiagFdbkSt	< = DiagFdbkPrdLow)	1. Diagnostic enabled (K_b_AFM_Vlv1FdbkLoDiagEnbl) AND 2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit Incorrect Frequency (Bank 1)	P12ED	Monitors for in-range errors that result when the sensed period of the diagnostic	Diagnostic PWM feedback signal_AFM_Valve1DiagFdbkSt	= DiagFdbkPrdInRngErr)	1. Diagnostic enabled (K_b_AFMV1FdbkInvldDiagEnbl) AND 2. AFM valve initialization completed (AFM_ValveInitDlyCmpt)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Stuck Closed (Bank 1)	P12EF	Monitors position feedback to determine if AFM	Position feedback AFM_Valve1State	<> AFM_ValveCmd	1. AFM valve1 stuck diagnostics enabled (K_b_AFM_Vlv1StuckDiagEnbl) 2. Ignition voltage (IgnitionVoltage) AND 3. AFM Valve initialization (AFM_ValveInitDlyCmpt) AND 4. AFM valve control circuit short-to-power diagnostic fault not active (AFM_VlvCntrlPshtFA) AND 5. AFM valve control circuit short-to-ground diagnostic fault not active (AFM_VlvCntrlGshtFA) AND	1. = TRUE AND 2. >= 10.2V AND 3. = TRUE AND 4. <> TRUE AND 5. <> TRUE AND	20 failures out of 40 samples	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					6. AFM valve control circuit open diagnostic fault not active (AFM_VlvCntrlOpenFA) AND	6. <> TRUE AND		
					7. AFM valve1 position sensor circuit low diagnostic fault not active (AFM_Valve1PstnLoFA) AND	7. <> TRUE AND		
					8. AFM valve1 position sensor circuit high diagnostic fault not active (AFM_Valve1PstnHiFA) AND	8. <> TRUE AND		
					9. AFM valve1 position out-of-range low diagnostic fault not active (AFM_Vlv1PstnOOR_LoFA) AND	9. <> TRUE AND		
					10. AFM valve1 position out-of-range high diagnostic fault not active (AFM_Vlv1PstnOOR_HiFA) AND	10. <> TRUE AND		
					11. Diagnostic system disablement (DiagSystemDisable) AND	11. <> TRUE AND		
					12. AFM exhaust valve control not disabled for remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND	12. <> TRUE AND		
					13. AFM valve command (AFM_ValveCmd) AND	13. (= OPEN OR = CLOSED) AND		
					14. AFM valve command not changed (AFM_ValveCmd) AND	14. = AFM_ValveCmdPrev AND		
					15. AFM valve response time (AFM_Valve1ResponseTmr ≥ Ke_t_AFM_Valve1ResponseTm) AND	15. >= 1 sec AND		
					16. AFM valve position not out-of-range (AFM_Valve1State)	16. (<> ValvePstnOOR_Low AND <> ValvePstnOOR_High)		
Cylinder Deactivation Exhaust Flow Valve Stuck Open (Bank 1)	P12F0	Monitors position feedback to determine if AFM valve 1 is stuck in an open position	1. (AFM valve command AND AM_Valve1State) OR 2. (AFM valve command AND AFM_Valve1State) OR	1. (= Open AND =ValveInTransition) OR 2. (= Closed AND = ValvePositionOpen) OR	1. The AFM valve 1 stuck diagnostics are enabled through calibration (K_b_AFM_Vlv1StuckDiagEnbl = TRUE) AND	1. = TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
					2. Ignition voltage is greater than or equal to the minimum value required to enable diagnostic execution (IgnitionVoltage ≥ K_U_AFM_Vlv1StuckMinVolt) AND	2. >= 10.2 V		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					3. Sufficient time has been allowed for initialization of the AFM valve (AFM_ValveInitDlyCmpt = TRUE) AND	3. = TRUE AND		
					4. An AFM valve control circuit short-to-power diagnostic fault is not active (AFM_VlvCntrlPshtFA = FALSE) AND	4. <> TRUE AND		
					5. An AFM valve control circuit short-to-ground diagnostic fault is not active (AFM_VlvCntrlGshtFA = FALSE) AND	5. <> TRUE AND		
					6. An AFM valve control circuit open diagnostic fault is not active (AFM_VlvCntrlOpenFA = FALSE) AND	6. <> TRUE AND		
					7. An AFM valve 1 position sensor circuit low diagnostic fault is not active (AFM_Valve1PstnLoFA = FALSE) AND	7. <> TRUE AND		
					8. An AFM valve 1 position sensor circuit high diagnostic fault is not active (AFM_Valve1PstnHiFA = FALSE) AND	8. <> TRUE AND		
					9. An AFM valve 1 position out-of-range low diagnostic fault is not active (AFM_Vlv1PstnOOR_LoFA = FALSE) AND	9. <> TRUE AND		
					10. An AFM valve 1 position out-of-range high diagnostic fault is not active (AFM_Vlv1PstnOOR_HiFA = FALSE) AND	10. <> TRUE AND		
					11. Diagnostic system disablement is not being requested (DiagSystemDisable = FALSE) AND	11. <> TRUE AND		
					12. Control of the AFM exhaust valve has not been disabled for the remainder of the trip due to an output driver short circuit fault (AFMV_FaultTripDsbl = FALSE) AND	12. <> TRUE AND		
					13. The AFM valve is currently being commanded to the open or closed state (AFM_ValveCmd = Open OR AFM_ValveCmd = Closed) AND	13. (= OPEN OR = CLOSED) AND		
					14. The commanded state of the AFM valve has not changed (AFM_ValveCmd = AFM_ValveCmdPrev) AND	14. <> AFM_ValveCmdPrev AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					15. Sufficient time has been allowed for the AFM valve to respond to a change in the commanded AFM valve state (AFM_Valve1ResponseTmr ≥ Ke_t_AFM_Valve1ResponseTm) AND	15. >= 1 sec AND		
					16. The sensed position of the AFM valve is not out-of-range (AFM_Valve1State ≠ ValvePstnOOR_Low AND AFM_Valve1State ≠ ValvePstnOOR_High)	16. (<> ValvePstnOOR_Low AND <> ValvePstnOOR_High)		
Cylinder Deactivation Exhaust Flow Valve Position Not Learned (Bank 1)	P12F1	Monitors diagnostic feedback from AFM valve 1 to determine if the	AFM valve diagnostic feedback status (AFM_Valve1DiagFdbkSt)	= AlignmentNotComplete	1. Diagnostic enabled (K_b_AFM_Vlv1NotLrndEnbl) AND	1. = TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
					2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND	2. = TRUE AND		
					3. Diagnostic system disablement Not requested (DiagSystemDisable) AND	3. <> TRUE AND		
					4. Diagnostic PWM feedback signal AFM valve1 Not out-of-range low (AFM_Valve1DiagFdbkSt) AND	4. <> DiagFdbkPrdLow AND		
					5. Diagnostic PWM feedback signal AFM valve1 Not out-of-range high (AFM_Valve1DiagFdbkSt) AND	5. <> DiagFdbkPrdHigh AND		
					6. Diagnostic PWM feedback signal Not out-of-range low, Not out-of-range high AND andNot within any calibrated feedback data range (AFM_Valve1DiagFdbkSt) AND	6. <> DiagFdbkPrdInRngErr AND		
					7. AFM valve state (AFM_Valve1DiagFdbkSt)	7. <> ActuatorFaulted		
Cylinder Deactivation Exhaust Flow Valve Actuator Performance (Bank1)	P12F2	Monitors diagnostic feedback from AFM valve 1 to determine if an internal actuator fault is present or if the AFM valve is stuck in the end stop learning mode	AFM valve command (AFM_ValveCmd) AND Position feedback (AFM_Valve1State)	(= Closed AND = ValveInTransition)	1. Diagnostic enabled (K_b_AFM_Vlv1PerfDiagEnbl) AND	1. = TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
					2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND	2. = TRUE AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					3. Diagnostic system disablement Not requested (DiagSystemDisable) AND 4. AFM exhaust valve control Not disabled for remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND 5. Diagnostic PWM feedback signal AFM valve1 not out-of-range low (AFM_Valve1DiagFdbkSt) AND 6. Diagnostic PWM feedback signal AFM valve1 Not out-of-range high (AFM_Valve1DiagFdbkSt) AND 7. Diagnostic PWM feedback signal Not out-of-range low, Not out-of-range high AND Not in any calibrated feedback data range (AFM_Valve1DiagFdbkSt) AND 8. AFM valve fault state (AFM_Valve1DiagFdbkSt)	3. <> TRUE AND 4. <> TRUE AND 5. <> DiagFdbkPrdLow AND 6. <> DiagFdbkPrdHigh AND 7. <> DiagFdbkPrdInRngErr AND 8. <> FaultStIndeterminate		
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit Low Duty Cycle (Bank 2)	P12F4	Monitors for out-of-range low duty cycle values on the AFM valve 2 diagnostic PWM feedback signal	AFM valve 2 diagnostic PWM feedback signal AFM_Valve2FdbkDC	< K_Pct_AFM_Vlv2PstnLoThrsh)	1. Diagnostic enabled (K_b_AFM_Vlv2PstnLoDiagEnbl) AND 2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit High Duty Cycle (Bank 2)	P12F5	Monitors for out-of-range high duty cycle values on the AFM valve 2 diagnostic PWM feedback signal	AFM valve 2 diagnostic PWM feedback signal AFM_Valve2FdbkDC	> K_Pct_AFM_Vlv2PstnHiThrsh)	1. Diagnostic enabled (K_b_AFM_Vlv2PstnHiDiagEnbl) AND 2. AFM valve initialization complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Cylinder Deactivation Exhaust Flow Valve Open Position (Bank 2)	P12F6	Monitors the sensed AFM valve 2 position for values that are out-of-range low	AFM_Valve2State	= ValvePstnOOR_Low	1. Diagnostic enabled (K_b_AFM_Vlv2PstnOOR_LoEnbl) AND 2. AFM valve initialization complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable) AND 4. AFM valve 2 position sensor circuit low diagnostic not faulted (AFM_Valve2PstnLoFP) AND 5. AFM valve2 position sensor circuit high diagnostic unfaulted (AFM_Valve2PstnHiFP)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE AND 4. <> TRUE AND 5. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Closed Position (Bank 2)	P12F7	Monitors the sensed AFM valve 2 position for values that are out-of-range high	AFM_Valve2State	= ValvePstnOOR_High	1. Diagnostic enabled (K_b_AFM_Vlv2PstnOOR_HiEnbl) AND 2. AFM valve initialization complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable) AND 4. AFM valve 2 position sensor circuit low diagnostic unfaulted (AFM_Valve2PstnLoFP) AND 5. AFM valve 2 position sensor circuit high diagnostic unfaulted (AFM_Valve2PstnHiFP)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE AND 4. <> TRUE AND 5. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit Low Frequency (Bank 2)	P12F8	Monitors for out-of-range high period (i.e. out-of-range low frequency) values on the AFM valve 2 diagnostic PWM feedback signal	Diagnostic PWM feedback signal AFM_Valve2DiagFdbkSt	>= DiagFdbkPrdHigh)	1. Diagnostic enabled (K_b_AFM_Vlv2FdbkHiDiagEnbl) AND 2. AFM valve initialization complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit High Frequency (Bank 2)	P12F9	Monitors for out-of-range low period (i.e. out-of-range high frequency) values on the AFM valve 2 diagnostic PWM feedback signal	Diagnostic PWM feedback signal AFM_Valve2DiagFdbkSt	< DiagFdbkPrdLow)	1. Diagnostic enabled through calibration (K_b_AFM_Vlv2FdbkLoDiagEnbl) AND 2. AFM valve initialization period has completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement is not being requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit Incorrect Frequency (Bank 2)	P12FA	Monitors for in-range errors that result when the sensed period of the diagnostic PWM feedback signal for AFM valve 2 is neither out-of-range low nor out-of-range high and does not fall within any of the calibrated ranges defined for diagnostic	Diagnostic PWM feedback signal_AFM_Valve2DiagFdbkSt	= DiagFdbkPrdInRngErr)	1. Diagnostic enabled (K_b_AFMV2FdbkInvldDiagEnbl) AND 2. AFM valve initialization period complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Stuck Closed (Bank 2)	P12FC	Monitors position feedback to determine if AFM valve 2 is stuck in the closed position	AFM valve command AND AFM Valve2 State (AFM_ValveCmd AND AFM_Valve2State)	(= Open AND = ValvePstnClosed)	1. AFM valve2 stuck diagnostics enabled (K_b_AFM_Vlv2StuckDiagEnbl) AND	1. = TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
					2. IgnitionVoltage ≥ K_U_AFM_Vlv2StuckMinVolt AND	2. V >= 10.2 V AND		
					3. AFM valve initialized (AFM_ValveInitDlyCmplt) AND	3. = TRUE AND		
					4. AFM valve control circuit short-to-power diagnostic fault (AFM_VlvCntrlPshtFA) AND	4. <> TRUE AND		
					5. AFM valve control circuit short-to-ground diagnostic fault (AFM_VlvCntrlGshtFA) AND	5. <> TRUE AND		
					6. AFM valve control circuit open diagnostic fault (AFM_VlvCntrlOpenFA) AND	6. <> TRUE AND		
					7. AFM valve2 position sensor circuit low diagnostic fault (AFM_Valve2PstnLoFA) AND	7. <> TRUE AND		
					8. AFM valve2 position sensor circuit high diagnostic fault (AFM_Valve2PstnHiFA) AND	8. <> TRUE AND		
					9. AFM valve2 position out-of-range low diagnostic fault (AFM_Vlv2PstnOOR_LoFA) AND	9. <> TRUE AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					10. AFM valve2 position out-of-range high diagnostic fault (AFM_Vlv2PstnOOR_HiFA) AND	10. <> TRUE AND		
					11. Diagnostic system disablement Not requested (DiagSystemDisable) AND	11. <> TRUE AND		
					12. AFM exhaust valve control Not disabled for remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl)	12. <> TRUE AND		
					13. AFM valve command (AFM_ValveCmd) AND	13. (= Open OR = Closed) AND		
					14. AFM valve command Not changed (AFM_ValveCmd) AND	14. = AFM_ValveCmdPrev AND		
					15. AFM valve response time (AFM_Valve2ResponseTmr) AND	15. >= 1 sec AND		
					16. AFM valve position Not out-of-range (AFM_Valve2State AND AFM_Valve2State)	16. (<> ValvePstnOOR_Low AND <> ValvePstnOOR_High)		
Cylinder Deactivation Exhaust Flow Valve Stuck Open (Bank 2)	P12FD	Monitors position feedback to determine if AFM valve 2 is stuck in an open position	1. (AFM_ValveCmd AND AFM_Valve2State) OR 2. (AFM_ValveCmd AND AFM_Valve2State) OR 3. (AFM_ValveCmd AND AFM_Valve2State)	1. (= Open AND = ValveInTransition) OR 2. (= Closed AND = ValvePstnOpen) OR 3. (= Closed AND = ValveInTransition)	1. AFM valve2 stuck diagnostics enabled (K_b_AFM_Vlv2StuckDiagEnbl) AND	1. = TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
					2. Ignition voltage (IgnitionVoltage) AND	2. V >= 10.2 V AND		
					3. AFM valve initialization time complete (AFM_ValveInitDlyCmpt) AND	3. = TRUE AND		
					4. AFM valve control circuit short-to-power diagnostic fault (AFM_VlvCntrlPshtFA) AND	4. <> TRUE AND		
					5. AFM valve control circuit short-to-ground diagnostic fault (AFM_VlvCntrlGshtFA) AND	5. <> TRUE AND		
					6. AFM valve control circuit open diagnostic fault (AFM_VlvCntrlOpenFA) AND	6. <> TRUE AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					7. AFM valve2 position sensor circuit low diagnostic fault (AFM_Valve2PstnLoFA) AND	7. <> TRUE AND		
					8. AFM valve2 position sensor circuit high diagnostic fault (AFM_Valve2PstnHiFA) AND	8. <> TRUE AND		
					9. AFM valve2 position out-of-range low diagnostic fault (AFM_Vlv2PstnOOR_LoFA) AND	9. <> TRUE AND		
					10. AFM valve2 position out-of-range high diagnostic fault (AFM_Vlv2PstnOOR_HiFA) AND	10. <> TRUE AND		
					11. Diagnostic system disablement (DiagSystemDisable) AND	11. <> TRUE AND		
					12. AFM exhaust valve control not disabled for remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND	12. <> TRUE AND		
					13. AFM valve command (AFM_ValveCmd) AND	13. (= Open OR = Closed) AND		
					14. AFM valve command unchanged (AFM_ValveCmd) AND	14. = AFM_ValveCmdPrev AND		
					15. AFM valve command response time (AFM_Valve2ResponseTmr) AND	15. >= 1 sec AND		
					16. AFM valve position not out-of-range (AFM_Valve2State)	16. (<> ValvePstnOOR_Low AND <> ValvePstnOOR_High)		
Cylinder Deactivation Exhaust Flow Valve Position Not Learned (Bank 2)	P12FE	Monitors diagnostic feedback from AFM valve 2 to determine if the valve end stops have not been learned	AFM Valve Diagnostic Status enumeration (AFM_Valve2DiagFdbkSt)	= AlignmentNotComplete)	1. Diagnostic enabled (K_b_AFM_Vlv2NotLrndEnbl) AND 2. AFM valve initialization complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable) AND 4. AFM Valve2 diagnostic PWM feedback not out-of-range low (AFM_Valve2DiagFdbkSt)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE AND 4. <> DiagFdbkPrdLow AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					5. AFM Valve2 diagnostic PWM feedback signal not out-of-range high (AFM_Valve2DiagFdbkSt) AND 6. AFM Valve2 diagnostic PWM feedback signal Not out-of-range low, Not out-of-range high AND Not in any calibrated feedback data range (AFM_Valve1DiagFdbkSt) AND 7. AFM valve diagnostic feedback state	5. <> DiagFdbkPrdHigh AND 6. <> DiagFdbkPrdInRngErr AND 7. <> Actuator Faulted		
Cylinder Deactivation Exhaust Flow Valve Actuator Performance (Bank2)	P12FF	Monitors diagnostic feedback from AFM valve 2 to determine if an internal actuator fault is present or if the AFM valve is stuck in the end stop learning mode	1. AFM Valve2 Diagnostic Status (AFM_Valve2DiagFdbkSt) OR 2. (AFM Valve2 Diagnostic Status AND AFM Valve Command) OR 3. (AFM Valve2 Diagnostic Status AND AFM Valve	1. = Faulted OR 2. (= OpenEndStopLearned AND <> OpenEndStopLearn) OR 3. (= ClosedEndStopLearned AND <>	1. Diagnostic enabled (K_b_AFM_Vlv2PerfDiagEnbl) AND	1. = TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
					2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND	2. = TRUE AND		
					3. Diagnostic system disablement (DiagSystemDisable) AND	3. <> TRUE AND		
					4. AFM exhaust valve control not disabled for remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND	4. <> TRUE AND		
					5. Diagnostic PWM feedback signal AFM Valve2 not out-of-range low (AFM_Valve2DiagFdbkSt) AND	5. <> DiagFdbkPrdLow AND		
					6. Diagnostic PWM feedback signal AFM Valve2 not out-of-range high (AFM_Valve2DiagFdbkSt) AND	6. <> DiagFdbkPrdHigh AND		
					7. Diagnostic PWM feedback Not out-of-range low, Not out-of-range high AND not within any of the calibrated feedback data range (AFM_Valve2DiagFdbkS) AND	7. <> DiagFdbkPrdInRngErr AND		
					8. AFM valve fault state (AFM_Valve2DiagFdbkSt)	8. <> FaultStIndeterminate		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Transmission Cooling Fan Control Circuit Open_Low	P184C	Detects if the transmission cooling fan control circuit is open or shorted low	Transmission Cooling Fan Circuit status enumeration	== Faulted	1) Diagnostic enabled K_b_TCF_DiagEnbl	1) == TRUE	30 failures out of 48 samples 1sample / 500ms	DTC Type B 2 trips
Transmission Cooling Fan Control Circuit High	P184E	Detects if the transmission cooling fan control circuit is shorted high	Transmission Cooling Fan Circuit status enumeration	== Faulted	1) Diagnostic enabled K_b_TCF_DiagEnbl	1) == TRUE 2] <> TRUE 3] 9v < System V > 32v	30 failures out of 48 samples 1sample / 500ms	DTC Type B 2 trips
Ignition 1 Switch Circuit Low Voltage	P2534	Detects if the Ignition1 Switch circuit is shorted to low or open	Ignition 1 voltage	<= 6 V	Engine	Running	180 failures out of 200 samples 1 sample/25.0 ms	DTC Type A 1 trip
Ignition 1 Switch Circuit High Voltage	P2535	Detects if the Ignition1 Switch circuit is shorted to vehicle supply voltage	Ignition 1 voltage	> 11.7 V	Ignition Run_Crank terminal	Off	180 failures out of 200 samples 1 sample/25.0 ms	DTC Type A 1 trip
Fuel Pump Flow Performance (rationality)	P2635	Detects degradation in the performance of the electronically regulated fuel system	Filtered fuel rail pressure error	<= Low Threshold (tabulated function of desired fuel rail pressure and fuel flow rate -- 15% of requested Target Pressure) OR >= High Threshold (tabulated function of desired fuel rail pressure and fuel flow rate -- 15% of requested Target Pressure) **(See Supporting Tables tab)**			Filtered fuel rail pressure error Time Constant = 12.5 seconds Frequency: Continuous 12.5 ms loop	DTC Type B 2 trips
					1. FRP Circuit Low DTC (P018C)	1. Not active		
					2. FRP Circuit High DTC (P018D)	2. Not active		
					3. Fuel Rail Pressure Sensor Performance DTC (P018B)	3. Not active		
					4. FuelPump Circuit Low DTC (P0231)	4. Not active		
					5. FuelPump Circuit High DTC (P0232)	5. Not active		
					6. FuelPump Circuit Open DTC (P023F)	6. Not active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					7. Reference Voltage DTC (P0641)	7. Not active		
					8. Fuel Pump Control Module Driver Over-temperature DTC's (P064A)	8. Not active		
					9. Control Module Internal Performance DTC (P0606)	9. Not active		
					10. ECM fuel control system failure (PPEI $1E7)	10. Not occurred		
					11. Barometric pressure signal (PPEI $4C1)	11. Valid (for absolute fuel pressure sensor)		
					12. Engine run time	12. >= 30 seconds		
					13. Emissions fuel level (PPEI $3FB)	13. Not low		
					14. Fuel pump control	14. Enabled		
					15. Fuel pump control state	15. Normal		
					16. Battery Voltage	16. 11V<=voltage=<32V		
					17. Fuel flow rate **(See Supporting Tables tab)**	17. > 0.047 g/s **AND** <= Max allowed fuel flow rate as a function of desired rail pressure & Vbatt (Typical values in the range of 11 to 50 g/s)		
					18. Fuel Pressure Control System	18. Is not responding to an over-pressurization due to pressure build during DFCO or a decreasing desired pressure command		
Control Module Communication Bus "A" Off	U0073	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Bus Status	Off	Power mode	Run/Crank	5 failures out of 5 samples (5 seconds)	DTC Type B 2 trips
Lost Communication With ECM/PCM "A"	U0100	Detects that CAN serial data communication has been lost with the ECM	Message $0C9	Undetected	1. Power mode 2. Ignition Run/Crank Voltage 3. U0073	Run/Crank 11V<voltage<32V not active	12 failures out of 12 samples (12 seconds)	DTC Type B 2 trips
Lost Communication With TCM	U0101	Detects that CAN serial data communication has been lost with the TCM	Message $4C9	Undetected	1. Power mode K_b_OffKeyCycleDiagEnbl 2. Ignition Run/Crank Voltage 3. U0073	True (1) 11V<voltage<32V not active	12 failures out of 12 samples (12 seconds)	DTC Type A 1 trips

P2635 Fuel Pump Performance Maximum Fuel Flow map (grams / s)

X-axis= Desired Fuel Pressure (kiloPascals)

Y-axis= Battery voltage (volts)

	200	250	300	350	400	450	500	550	600
4.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
6	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
7.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
9	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
10.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
12	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
13.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
15	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
16.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
18	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
19.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
21	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
22.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
24	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
25.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
27	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
28.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5

P2635 Fuel Pump Performance Filtered Pressure Error Fault Threshold High map (kiloPascals)

X-axis= Target Fuel Pressure (kiloPascals)

Y-axis= Fuel Flow (grams / s)

	200	250	300	350	400	450	500	550	600
0	30	37.5	45	52.5	60	67.5	75	82.5	90
1.5	30	37.5	45	52.5	60	67.5	75	82.5	90
3	30	37.5	45	52.5	60	67.5	75	82.5	90
4.5	30	37.5	45	52.5	60	67.5	75	82.5	90
6	30	37.5	45	52.5	60	67.5	75	82.5	90

P2635 Fuel Pump Performance Filtered Pressure Error Fault Threshold High map (kiloPascals) Continued…..

X-axis= Target Fuel Pressure (kiloPascals)

Y-axis= Fuel Flow (grams / s)

	200	250	300	350	400	450	500	550	600
7.5	30	37.5	45	52.5	60	67.5	75	82.5	90
9	30	37.5	45	52.5	60	67.5	75	82.5	90
10.5	30	37.5	45	52.5	60	67.5	75	82.5	90
12	30	37.5	45	52.5	60	67.5	75	82.5	90
13.5	30	37.5	45	52.5	60	67.5	75	82.5	90
15	30	37.5	45	52.5	60	67.5	75	82.5	90
16.5	30	37.5	45	52.5	60	67.5	75	82.5	90
18	30	37.5	45	52.5	60	67.5	75	82.5	90
19.5	30	37.5	45	52.5	60	67.5	75	82.5	90
21	30	37.5	45	52.5	60	67.5	75	82.5	90
22.5	30	37.5	45	52.5	60	67.5	75	82.5	90
24	30	37.5	45	52.5	60	67.5	75	82.5	90
25.5	30	37.5	45	52.5	60	67.5	75	82.5	90
27	30	37.5	45	52.5	60	67.5	75	82.5	90
28.5	30	37.5	45	52.5	60	67.5	75	82.5	90
30	30	37.5	45	52.5	60	67.5	75	82.5	90
31.5	30	37.5	45	52.5	60	67.5	75	82.5	90
33	30	37.5	45	52.5	60	67.5	75	82.5	90
34.5	30	37.5	45	52.5	60	67.5	75	82.5	90
36	30	37.5	45	52.5	60	67.5	75	82.5	90
37.5	30	37.5	45	52.5	60	67.5	75	82.5	90
39	30	37.5	45	52.5	60	67.5	75	82.5	90
40.5	30	37.5	45	52.5	60	67.5	75	82.5	90
42	30	37.5	45	52.5	60	67.5	75	82.5	90
43.5	30	37.5	45	52.5	60	67.5	75	82.5	90
45	30	37.5	45	52.5	60	67.5	75	82.5	90
46.5	30	37.5	45	52.5	60	67.5	75	82.5	90
48	30	37.5	45	52.5	60	67.5	75	82.5	90

P2635 Fuel Pump Performance Filtered Pressure Error Fault RePass Threshold High map (kiloPascals)

X-axis= Target Fuel Pressure (kiloPascals)

Y-axis= Fuel Flow (grams / s)

	200	250	300	350	400	450	500	550	600
0	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
1.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
3	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
4.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
6	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
7.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
9	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
10.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
12	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
13.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
15	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
16.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
18	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
19.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
21	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
22.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
24	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
25.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
27	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
28.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
30	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
31.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
33	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
34.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
36	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
37.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
39	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
40.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
42	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
43.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
45	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5

P2635 Fuel Pump Performance Filtered Pressure Error Fault RePass Threshold High map (kiloPascals) Continued….

X-axis= Target Fuel Pressure (kiloPascals)

Y-axis= Fuel Flow (grams / s)

	200	250	300	350	400	450	500	550	600
46.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
48	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5

P2635 Fuel Pump Performance Filtered Pressure Error Fault Threshold Low map (kiloPascals)

X-axis= Target Fuel Pressure (kiloPascals)

Y-axis= Fuel Flow (grams / s)

	200	250	300	350	400	450	500	550	600
0	-260	-210	-160	-110	-60	-67.5	-75	-82.5	-90
1.5	-145	-125	-102.5	-81.25	-60	-67.5	-75	-82.5	-90
3	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
4.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
6	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
7.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
9	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
10.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
12	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
13.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
15	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
16.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
18	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
19.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
21	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
22.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
24	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
25.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
27	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
28.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
30	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
31.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
33	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90

P2635 Fuel Pump Performance Filtered Pressure Error Fault Threshold Low map (kiloPascals) Continued….

X-axis= Target Fuel Pressure (kiloPascals)

Y-axis= Fuel Flow (grams / s)

	200	250	300	350	400	450	500	550	600
34.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
36	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
37.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
39	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
40.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
42	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
43.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
45	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
46.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
48	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90

P2635 Fuel Pump Performance Filtered Pressure Error Fault RePass Threshold Low map (kiloPascals)

X-axis= Target Fuel Pressure (kiloPascals)

Y-axis= Fuel Flow (grams / s)

	200	250	300	350	400	450	500	550	600
0	-221	-178.5	-136	-93.5	-51	-57.375	-63.75	-70.125	-76.5
1.5	-123.25	-106.25	-87.125	-69.0625	-51	-57.375	-63.75	-70.125	-76.5
3	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
4.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
6	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
7.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
9	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
10.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
12	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
13.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
15	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
16.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
18	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
19.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
21	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5

P2635 Fuel Pump Performance Filtered Pressure Error Fault RePass Threshold Low map (kiloPascals) Continued….

X-axis= Target Fuel Pressure (kiloPascals)

Y-axis= Fuel Flow (grams / s)

	200	250	300	350	400	450	500	550	600
22.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
24	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
25.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
27	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
28.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
30	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
31.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
33	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
34.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
36	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
37.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
39	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
40.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
42	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
43.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
45	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
46.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
48	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Transmission Range Selector Switch Diagnostics								
Transmission Range Selector Switch "A" Circuit High	P17E3	Transmission Range Selector Switch "A" Diagnostic detects a reading High	Transmission Range Selector Switch "A" Measured Voltage	> High 853 counts (1023 Cnts = 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "A" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "A" Circuit Low	P17E4	Transmission Range Selector Switch "A" Diagnostic detects a reading Low	Transmission Range Selector Switch "A" Measured Voltage	< Low 446 counts (1023 Cnts = 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "A" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "A" Circuit Performance	P17E5	Transmission Range Selector Switch "A" Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Transmission Range Selector Switch "A" Measured Voltage	544 < X < 753 counts (1023 Cnts = 5 Volts)	DTC not set	P17E3 OR P17E4	40 Failures out of 48 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "A" Measured Voltage	Back into acceptable Voltage Range				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Transmission Range Selector Switch "B" Circuit High	P17E6	Transmission Range Selector Switch "B" Diagnostic detects a reading High	Transmission Range Selector Switch "B" Measured Voltage	> High 853 counts (1023 Cnts = 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "B" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "B" Circuit Low	P17E7	Transmission Range Selector Switch "B" Diagnostic detects a reading Low	Transmission Range Selector Switch "B" Measured Voltage	< Low 446 counts (1023 Cnts = 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "B" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "B" Circuit Performance	P17E8	Transmission Range Selector Switch "B" Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEBSED zones.	Transmission Range Selector Switch "B" Measured Voltage	544 < X < 753 counts (1023 Cnts = 5 Volts)	DTC not set	P17E6 OR P17E7	40 Failures out of 48 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "B" Measured Voltage	Back into acceptable Voltage Range				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Transmission Range Selector Switch "C" Circuit High	P17E9	Transmission Range Selector Switch "C" Diagnostic detects a reading High	Transmission Range Selector Switch "C" Measured Voltage	> High 853 counts (1023 Cnts = 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "C" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "C" Circuit Low	P17EA	Transmission Range Selector Switch "C" Diagnostic detects a reading Low	Transmission Range Selector Switch "C" Measured Voltage	< Low 446 counts (1023 Cnts = 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "C" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "C" Circuit Performance	P17EB	Transmission Range Selector Switch "C" Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Transmission Range Selector Switch "C" Measured Voltage	544 < X < 753 counts (1023 Cnts = 5 Volts)	DTC not set	P17E9 OR P17EA	40 Failures out of 48 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "C" Measured Voltage	Back into acceptable Voltage Range				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Transmission Range Selector Switch "D" Circuit High	P17EC	Transmission Range Selector Switch "D" Diagnostic detects a reading High	Transmission Range Selector Switch "D" Measured Voltage	> High 853 counts (1023 Cnts = 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "D" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "D" Circuit Low	P17ED	Transmission Range Selector Switch "D" Diagnostic detects a reading Low	Transmission Range Selector Switch "D" Measured Voltage	< Low 446 counts (1023 Cnts = 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "D" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "D" Circuit Performance	P17EE	Transmission Range Selector Switch "D" Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Transmission Range Selector Switch "D" Measured Voltage	544 < X < 753 counts (1023 Cnts = 5 Volts)	DTC not set	P17EC OR P17ED	40 Failures out of 48 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "D" Measured Voltage	Back into acceptable Voltage Range				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Transmission Range Selector Switch "E" Circuit High	P17EF	Transmission Range Selector Switch "E" Diagnostic detects a reading High	Transmission Range Selector Switch "E" Measured Voltage	> High 853 counts (1023 Cnts = 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "E" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "E" Circuit Low	P17F0	Transmission Range Selector Switch "E" Diagnostic detects a reading Low	Transmission Range Selector Switch "E" Measured Voltage	< Low 446 counts (1023 Cnts = 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "E" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "E" Circuit Performance	P17F8	Transmission Range Selector Switch "E" Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Transmission Range Selector Switch "E" Measured Voltage	544 < X < 753 counts (1023 Cnts = 5 Volts)	DTC not set	P17EF OR P17F0	16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "E" Measured Voltage	Back into acceptable Voltage Range				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Transmission Range Selector Switch "F" Circuit High	P17F9	Transmission Range Selector Switch "F" Diagnostic detects a reading High	Transmission Range Selector Switch "F" Measured Voltage	> High 853 counts (1023 Cnts = 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "F" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "F" Circuit Low	P17FD	Transmission Range Selector Switch "F" Diagnostic detects a reading Low	Transmission Range Selector Switch "F" Measured Voltage	< Low 446 counts (1023 Cnts = 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "F" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "F" Circuit Performance	P17FE	Transmission Range Selector Switch "F" Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Transmission Range Selector Switch "F" Measured Voltage	544 < X < 753 counts (1023 Cnts = 5 Volts)	DTC not set	P17F9 OR P17FD	40 Failures out of 48 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "F" Measured Voltage	Back into acceptable Voltage Range				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Transmission Range Selector Switch "G" Circuit High	P1803	Transmission Range Selector Switch "G" Diagnostic detects a reading High	Transmission Range Selector Switch "G" Measured Voltage	> High 853 counts (1023 Cnts = 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "G" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "G" Circuit Low	P1805	Transmission Range Selector Switch "G" Diagnostic detects a reading Low	Transmission Range Selector Switch "G" Measured Voltage	< Low 446 counts (1023 Cnts = 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "G" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "G" Circuit Performance	P1806	Transmission Range Selector Switch "G" Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Transmission Range Selector Switch "G" Measured Voltage	544 < X < 753 counts (1023 Cnts = 5 Volts)	DTC not set	P1803 OR P1805	40 Failures out of 48 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "G" Measured Voltage	Back into acceptable Voltage Range				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Transmission Range Selector Switch "H" Circuit High	P1807	Transmission Range Selector Switch "H" Diagnostic detects a reading High	Transmission Range Selector Switch "H" Measured Voltage	> High 853 counts (1023 Cnts = 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "H" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "H" Circuit Low	P180C	Transmission Range Selector Switch "H" Diagnostic detects a reading Low	Transmission Range Selector Switch "H" Measured Voltage	< Low 446 counts (1023 Cnts = 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "H" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "H" Circuit Performance	P180D	Transmission Range Selector Switch "H" Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Transmission Range Selector Switch "H" Measured Voltage	544 < X < 753 counts (1023 Cnts = 5 Volts)	DTC not set	P1807 OR P180C	40 Failures out of 48 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "H" Measured Voltage	Back into acceptable Voltage Range				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Transmission Range Selector Switch "J" Circuit High	P180E	Transmission Range Selector Switch "J" Diagnostic detects a reading High	Transmission Range Selector Switch "J" Measured Voltage	> High 853 counts (1023 Cnts = 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "J" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "J" Circuit Low	P180F	Transmission Range Selector Switch "J" Diagnostic detects a reading Low	Transmission Range Selector Switch "J" Measured Voltage	< Low 446 counts (1023 Cnts = 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "J" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "J" Circuit Performance	P1812	Transmission Range Selector Switch "J" Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Transmission Range Selector Switch "J" Measured Voltage	544 < X < 753 counts (1023 Cnts = 5 Volts)	DTC not set	P180E OR P180F	40 Failures out of 48 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "J" Measured Voltage	Back into acceptable Voltage Range				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Transmission Range Selector Switch "L" Circuit High	P186B	Transmission Range Selector Switch "L" Diagnostic detects a reading High	Transmission Range Selector Switch "L" Measured Voltage	> High 853 counts (1023 Cnts = 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "L" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "L" Circuit Low	P186C	Transmission Range Selector Switch "L" Diagnostic detects a reading Low	Transmission Range Selector Switch "L" Measured Voltage	< Low 446 counts (1023 Cnts = 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "L" Measured Voltage	Back into acceptable Voltage Range				
Transmission Range Selector Switch "L" Circuit Performance	P186D	Transmission Range Selector Switch "L" Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Transmission Range Selector Switch "L" Measured Voltage	544 < X < 753 counts (1023 Cnts = 5 Volts)	DTC not set	P186B OR P186C	40 Failures out of 48 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Transmission Range Selector Switch "L" Measured Voltage	Back into acceptable Voltage Range				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Park Button Diagnostics								
Transmission Park Position Sensor/Switch A Circuit High	P07B4	The Park Button Circuit Diagnostic detects a reading High	Park Position Measured Voltage	> High 853 counts (1023 Cnts = 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Park Position Measured Voltage	Back into acceptable Voltage Range				
Transmission Park Position Sensor/Switch A Circuit Low	P07B3	The Park Button Circuit Diagnostic detects a reading Low	Park Position Measured Voltage	< Low 446 counts (1023 Cnts = 5 Volts)			16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Park Position Measured Voltage	Back into acceptable Voltage Range				
Transmission Park Position Sensor/Switch A Circuit Performance	P07B5	The Park Button Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Park Position Measured Voltage	544 < X < 753 counts (1023 Cnts = 5 Volts)	DTC not set	P07B3 OR P07B4	40 Failures out of 48 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Park Position Measured Voltage	Back into acceptable Voltage Range				
Transmission Park Position Sensor/Switch B Circuit High	P07BA	The Park Button Circuit Diagnostic detects a reading High	Park Position Measured Voltage	> High 853 counts (1023 Cnts = 5 Volts)	Diagnostic Enable Calibration	=TRUE	16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Park Position Measured Voltage	Back into acceptable Voltage Range				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Transmission Park Position Sensor/Switch B Circuit Low	P07B9	The Park Button Circuit Diagnostic detects a reading Low	Park Position Measured Voltage	< Low 446 counts (1023 Cnts = 5 Volts)	Diagnostic Enable Calibration	=TRUE	16 Failures out of 20 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Park Position Measured Voltage	Back into acceptable Voltage Range				
Transmission Park Position Sensor/Switch B Circuit Performance	P07BB	The Park Button Circuit Diagnostic detects a reading that is outside of the PRESSED and RELEASED zones.	Park Position Measured Voltage	544 < X < 753 counts (1023 Cnts = 5 Volts)	Diagnostic Enable Calibration DTC not set	=TRUE P07BA P07B9	40 Failures out of 48 Samples (SIB is 5 msec loop)	DTC Type B, Two Trips
		DTC Pass	Park Position Measured Voltage	Back into acceptable Voltage Range				
SIB Controller Fault Diagnostics								

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Transmission Range Selector Control Module Memory Checksum Error	P17D8	This DTC will be stored if any software or calibration check sum is incorrect. Modeled after GMs DTC P0601	Calculated Checksum	≠ stored checksum for any of the parts (boot, software, application calibration, system calibration)	Ignition OR Accessory	Run or Run/Crank ON	1 failure if it occurs during the first ROM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background	DTC Type A 1 trip
		Circuit Monitor mismatch occurs	Switch circuit calculated values	≠ switch circuit monitor values	Ignition OR Accessory	Run or Run/Crank ON	Test runs during calculation of switch circuit values	
Transmission Range Selector Control Module Read Only Memory (ROM) Error	P17D9	Reports a failure if the Built in self test for ROM checksum or the ROM Error correcting code (ECC) check fails.	Checksum at power-up	≠ checksum at power-down	Ignition OR Accessory	Run or Run/Crank ON	1 failure Frequency: Once at power-up	DTC Type A 1 trip
			ROM ECC	= fault	Ignition OR Accessory	Run or Run/Crank ON	1 failure Frequency: Runs continuously in the background	
Transmission Range Selector Control Module Internal Random Access Memory (RAM) Error	P17DA	Indicates that control module is unable to correctly write and read data to and from RAM. Modeled after GMs DTC	Data read	≠ Data written	Ignition OR Accessory	Run or Run/Crank ON	1 failure if it occurs during the first RAM test of the ignition cycle, otherwise 5 Frequency: Runs continuously in the background	DTC Type A 1 trip

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Transmission Range Selector Control Module Processor	P17DB	Indicates the ECU has detected an internal processor fault. This DTC is dependent on the microprocessor and includes self testing not listed. Modeled after GMs DTC P0606			Ignition Accessory	Run or Run/Crank OR ON		DTC Type A 1 trip
		1. Microprocessor ALU Integrity Diagnostic Monitor Algorithm	Calculated key from rolling seed	≠ expected key			1 failure Test runs continuously (20ms loop or less)	
		2. Main Processor Configuration Register Test	Processor register	≠ expected processor register value			1 failure Test runs continuously (20ms loop or less)	
		3: Seed and Key fault (Set by ECM when seeds and keys do not match)					1 failure Test runs continuously (25ms loop or less)	
		4. Stack overflow	Unused stack memory above maximum stack used	≠ initialized special pattern			1 failure Test run by OS on task switches	
		5. Program Counter exception error	Illegal instruction loaded into program counter				1 failure	
		6. Watchdog Fails to reset	If a fault that should cause a reset fails to cause a reset.				1 failure	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Power Moding Diagnostics								
Transmission Range Selector Control Module System Voltage Low	P17DD	Sets when the low voltage system voltage is below a threshold	Battery Voltage	<= 10 Volts	Engine Controller Run Crank Terminal Status - CAN Message	= 1 indicating RUN/CRANK	5 seconds in a 6 second window	Type C
Transmission Range Selector Control Module System Voltage Performance	P17DF	Sets when voltage system voltage signal is erratic.	Battery Voltage Measured Delta Over 10 ms	> 3 Volts	Engine Controller Run Crank Terminal Status - CAN Message	= 1 indicating RUN/CRANK	16 failures out of 40 Samples (SIB is 5 msec loop)	Type C
Transmission Range Selector Control Module System Voltage High	P17DE	Sets when the low voltage system voltage is above a threshold	Battery Voltage	> 16 Volts	Engine Controller Run Crank Terminal Status - CAN Message	= 1 indicating RUN/CRANK	5 seconds in a 6 second window	Type C
Transmission Range Selector Control Module Ignition On/Start Switch Circuit Low	P17E0	Detects if the Ignition1 Switch circuit is shorted to low or open	Ignition 1 voltage	<= 6 V	Engine Controller Run Crank Terminal Status - CAN Message	= 1 indicating RUN/CRANK	4.5 sec in 5.5 second window	Type B 2 trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Transmission Range Selector Control Module Ignition On/Start Switch Circuit High	P17E1	Detects if the Ignition1 Switch circuit is shorted to vehicle supply voltage	Ignition 1 voltage	> 11.7 V	Engine Controller Run Crank Terminal Status - CAN Message	= 0 indicating NOT RUN/CRANK	4.5 sec in 5.5 second window	Type B 2 trips
Transmission Range Selector Control Module Ignition Accessory Circuit Low	P17E2	Detects if the Accessory Position circuit is shorted to low or open	Accessory voltage	<= 6 V	-	-	4.5 sec in 5.5 second window	DTC Type C
Communication Diagnostics								
Transmission Range Selection Signal Message Counter Incorrect	P17D7	ARC & PV reported SIB for $1E8 signal from the ECM on Powertrain Sensor CAN Bus	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1 OR The primary signal value does not equal the protection value	Current ARC ≠ Previous ARC +1 Primary Value ≠ Protection Value	Ignition	Run or Run/Crank	1 second	DTC Type B 2 trips
Transmission Range Selector Control Module Powertrain Sensor CAN Bus Off	U240E	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Powertrain Sensor Bus Status	Off	Ignition	Run or Run/Crank	1 second	DTC Type B 2 trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Transmission Range Selector Control Module Powertrain Expansion CAN Bus Off	U240D	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Powertrain Expansion Bus Status	Off	Ignition	Run or Run/Crank	1 second	DTC Type B 2 trips
Transmission Range Selector Control Module Lost Communication with Engine Control Module on Powertrain Sensor CAN Bus	U18C6	Detects that CAN serial data communication has been lost with the ECM.	Powertrain Sensor Bus Message $1E2 OR $1E8	Undetected	Ignition 2. Ignition Run/Crank Voltage	Run or Run/Crank 11V<RCVolt <32V	1 second	DTC Type B 2 trips
LED Diagnostics								
Shifter Interface Board Range Indicator Failed OR Remote PRNDL Display Internal Electronic Failure	B071F	Detects an indicator LED circuit with a latent fault where an indicator LED could light with a single fault	When sequencing transitors Circuit Feedback Current	> 520 uA (worst case)	Ignition	Run or Run/Crank	detected within 50 ms at first key up	DTC Type C