Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Actuator Solenoid Circuit Open – Bank 1	P0010	Diagnoses the VVT system high side driver circuit for circuit faults.	The ECM detects that voltage is high during driver off state (indicates short to power or open circuit)	Short to power: ≤ 0.5 Ω impedance between signal and controller power Open Circuit: ≥ 200 K Ω impedance between signal and controller ground	System supply voltage is within limits Output driver is commanded on, Ignition switch is in crank or run position	> 11.0 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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	System Voltage Engine Running Power Take Off (PTO) active Desired cam position Desired AND Measured cam position Desired cam position variation No Active DTCs Bundle: **IntakeVVT_Enabled**	> 11.0 Volts = TRUE = FALSE > 0 deg > (**P0011_CamPosErrorLimIc1**) deg AND < (**P0011_PerfMaxIc1**) deg < 7.50 Deg for (**P0011_P05CC_StablePositionTimeIc1**) sec P0010 P2088 P2089 = TRUE (Reference Supporting Tables: **P0011_P0021_P05CC_P05CD_HiEngSpdHiDsblIc** **P0011_P0021_P05CC_P05CD_HiEngSpdLoEnblIc** **P0011_P0021_P05CC_P05CD_LoRpmHiEnblIc** **P0011_P0021_P05CC_P05CD_LoRpmLoDsblIc** **P0011_P0021_P05CC_P05CD_LoPresHiEnblIc**	100.00 failures out of 1,000.00 samples 100 ms /sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P0011_P0021_P05CC_P05CD_LoPresLoDsblIc P0011_P0021_P05CC_P05CD_EngOilPressEnblIc P0011_P0021_P05CC_P05CD_P0014_P0024_P05CE_P05CF_ColdStartEngRunning Reference Fault Bundles: **CrankIntakeCamCorrFA IntakeCamSensorTFTKO CrankSensorTFTKO CamLctnIntFA**)		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP)- Camshaft Position (CMP) Correlation Bank 1 Sensor A	P0016	Detects cam to crank misalignment by monitoring if cam sensor pulse for bank 1 sensor A occurs during the incorrect crank position	2 cam sensor pulses more than -11.0 crank degrees before or 11.0 crank degrees after nominal position in one cam revolution.		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	 P0335, P0336 P0340,P0341 5VoltReferenceA_FA 5VoltReferenceB_FA < 1.0 seconds	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

15 OBDG11 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank 1 Sensor 1	P0030	Diagnoses the Heater Output 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.	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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank1 Sensor1	P0031	Diagnoses the Heater Output 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.	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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank1 Sensor1	P0032	Diagnoses the Heater Output 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.	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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank 1 Sensor 2	P0036	Diagnoses the Heater Output 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.	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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank1 Sensor2	P0037	Diagnoses the Heater Output 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.	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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank1 Sensor2	P0038	Diagnoses the Heater Output 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.	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

15 OBDG11 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank 2 Sensor 1	P0050	Diagnoses the Heater Output 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.	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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank2 Sensor1	P0051	Diagnoses the Heater Output 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.	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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank2 Sensor1	P0052	Diagnoses the Heater Output 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.	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 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.	Heater Resistance outside of the expected range of	2.8 < Ω < 9.5	No Active DTC's Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P2610 IAT_SensorFA < 8.0 ºC > 28,800 seconds -30.0 < ºC < 45.0 < 32.0 volts < 0.04 seconds	Once per valid cold start	Type B, 2 Trips

15 OBDG11 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor 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.	Heater Resistance outside of the expected range of	2.8 < Ω < 9.5	No Active DTC's Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P2610 IAT_SensorFA < 8.0 ºC > 28,800 seconds -30.0 < ºC < 45.0 < 32.0 volts < 0.04 seconds	Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank 2 Sensor 2	P0056	Diagnoses the Heater Output 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.	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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank2 Sensor2	P0057	Diagnoses the Heater Output 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.	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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank2 Sensor2	P0058	Diagnoses the Heater Output 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.	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

15 OBDG11 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor 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.	Heater Resistance outside of the expected range of	3.8 < Ω < 10.4	No Active DTC's Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P2610 IAT_SensorFA < 8.0 ºC > 28,800 seconds -30.0 < ºC < 45.0 < 32.0 volts < 0.09 seconds	Once per valid cold start	Type B, 2 Trips

15 OBDG11 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor 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.	Heater Resistance outside of the expected range of	3.8 < Ω < 10.4	No Active DTC's Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P2610 IAT_SensorFA < 8.0 ºC > 28,800 seconds -30.0 < ºC < 45.0 < 32.0 volts < 0.09 seconds	Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 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: **Delta MAP Threshold f(TPS)** Table, f(TPS). See supporting tables: **Delta MAF Threshold f(TPS)** Table, f(RPM). See supporting tables: **Maximum MAF f (RPM)** Table, f(Volts). See supporting tables: **Maximum MAF f (Volts)**	Engine Speed	> 800 RPM Run/Crank voltage > 6.41	Continuously fail MAP and MAF portions of diagnostic for 0.1875 s Continuous in MAIN processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Radiator Coolant Temp Sensor Circuit Low Voltage	P00B3	This DTC detects a short to ground in the RCT signal circuit or the RCT sensor.	RCT Resistance (@ 150ºC)	< 45 Ohms	Engine run time OR IAT min	> 0.0 seconds ≤ 150.0 °C	5 failures out of 25 samples 1 sec/ sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 signal circuit or the RCT sensor.	RCT Resistance (@ -60ºC)	> 419,000 Ohms	Engine run time OR IAT min	> 10.0 seconds ≥ -7.0 °C	5 failures out of 25 samples 1 sec/ sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Radiator Coolant Temp - Engine Coolant Temp (ECT) Correlation (DCRD)	P00B6	This DTC detects a difference between ECT and RCT after a soak condition.	A failure will be reported if any of the following occur: 1) Absolute difference between ECT at power up & RCT at power up is ≥ an IAT based threshold table lookup value(fast fail). 2) Absolute difference between ECT at power up & RCT at power up is > by 19.3 ºC and a block heater has not been detected. 3) ECT at power up > RCT at power up by 19.3 ºC and the time spent cranking the engine without starting is greater than or equal to 10.0 seconds with the LowFuelConditionDiag	See the table named: **P00B6_Fail if power up ECT exceeds RCT by these values** in the Supporting tables section = False	No Active DTC's Engine Off Soak Time Propulsion Off Soak Time 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	VehicleSpeedSensor_FA IAT_SensorCircuitFA THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA IgnitionOffTimeValid TimeSinceEngineRunningValid > 28,800 seconds > 0 seconds = Not occurred = False = False ≥ -7 ºC = False ================== > 19.3 ºC < 10.0 Seconds ================== > 400 Seconds with > 14.9 MPH and 0.50 times the seconds with vehicle speed below	1 failure 500 msec/ sample Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					below 1b as follows: 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	1b ≥ 3.3 ºC > 1 ºC Within < 30 Seconds =================== > 1800 Seconds ≤ -7.0 ºC		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow System Performance (naturally aspirated)	P0101	Determines if the MAF sensor is stuck within the normal operating range	Filtered Throttle Model Error AND ABS(Measured Flow – Modeled Air Flow) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered	<= 300 kPa*(g/s) > 20 grams/sec > 20.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) No Active DTCs: No Pending DTCs:	>= 465 RPM <= 4,600 RPM >= -7 Deg C <= 129 Deg C >= -20 Deg C <= 100 Deg C >= 0.50 Filtered Throttle Model Error multiplied by **TPS Residual Weight Factor based on RPM** Modeled Air Flow Error multiplied by **MAF Residual Weight Factor based on RPM** and **MAF Residual Weight Factor based on MAF Est** MAP Model 2 Error multiplied by **MAP2 Residual Weight Factor based on RPM** See Residual Weight Factor tables. MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 low or a open in either the signal circuit or the MAF sensor	MAF Output	<= 1,950 Hertz (~ 2.60 gm/sec)	Engine Run Time Engine Speed Ignition Voltage Above criteria present for a period of time	> 1.0 seconds >= 300 RPM >= 8.0 Volts >= 1.0 seconds	400 failures out of 500 samples 1 sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow Sensor Circuit High Frequency	P0103	Detects a high frequency output from the MAF sensor	MAF Output	>= 13,200 Hertz (~ 1047.9 gm/sec)	Engine Run Time Engine Speed Ignition Voltage Above criteria present for a period of time	> 1.0 seconds >= 300 RPM >= 8.0 Volts >= 1.0 seconds	400 failures out of 500 samples 1 sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Manifold Absolute Pressure Sensor Performance (naturally aspirated)	P0106	Determines if the MAP sensor is stuck within the normal operating range	Filtered Throttle Model Error AND ABS(Measured MAP – MAP Model 1) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered	<= 300 kPa*(g/s) > 20.0 kPa > 20.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) No Active DTCs: No Pending DTCs:	>= 465 RPM <= 4,600 RPM >= -7 Deg C <= 129 Deg C >= -20 Deg C <= 100 Deg C >= 0.50 Filtered Throttle Model Error multiplied by **TPS Residual Weight Factor based on RPM** MAP Model 1 Error multiplied by **MAP1 Residual Weight Factor based on RPM** MAP Model 2 Error multiplied by **MAP2 Residual Weight Factor based on RPM** See Residual Weight Factor tables. MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP	Continuous Calculations are performed every 12.5 msec	Type B, 2 Trips
			Manifold Pressure OR	< 50.0 kPa	Time between current ignition cycle and the last		4 failures out of 5 samples	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Manifold Pressure	> 115.0 kPa	time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	> 409.6 seconds EngineModeNotRunTimer Error MAP_SensorFA AAP_SnsrFA MAP_SensorCircuitFP AAP_SnsrCktFP	1 sample every 12.5 msec	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Manifold Absolute Pressure Sensor Circuit Low	P0107	Detects a continuous short to low or open in either the signal circuit or the MAP sensor.	MAP Voltage	< 3.0 % of 5 Volt Range (This is equal to 0.15 Volts or 3.5 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Manifold Absolute Pressure Sensor Circuit High	P0108	Detects an open sensor ground or continuous short to high in either the signal circuit or the MAP sensor.	MAP Voltage	> 90.0 % of 5 Volt Range (This is equal to 4.50 Volts, or 115.1 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips

15 OBDG11 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit Performance (no humidity or manifold temperature sensors)	P0111	Detects an IAT sensor that has stuck in range by comparing to engine coolant temperature at startup	ABS(Power Up IAT - Power Up ECT)	> 40 deg C	Time between current ignition cycle and the last time the engine was running Power Up ECT No Active DTCs:	> 28,800 seconds < 60 deg C ECT_Sensor_Ckt_FA IAT_SensorCircuitFA	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 IAT signal circuit or the IAT sensor	Raw IAT Input	< 48 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 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 IAT signal circuit or the IAT sensor	Raw IAT Input	> 404,973 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 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 IAT signal circuit or IAT sensor	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 DegC 10 consecutive IAT samples	Continuous		4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature (ECT) Sensor Performance	P0116	This DTC detects ECT temp sensor stuck in mid range.	A failure will be reported if any of the following (1-3) occur after the following soak conditions, Engine off time > 28,800 seconds Propulsion system off time > 0 seconds 1) ECT at power up > IAT at power up by an IAT based table lookup value (fast fail). 2) ECT at power up > IAT at power up by 19.3 Deg C and a block heater has not been detected. 3) ECT at power up > IAT at power up by 19.3 Deg C and the time spent cranking the engine without starting is greater than 10.0 seconds with the LowFuelConditionDiag	See the table named: **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: 1d) IAT drops from power up IAT	VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA IgnitionOffTimeValid = Not occurred = False = False ≥ -7 ºC = False ================== > 19.3 ºC < 10.0 seconds ================== > 400 seconds > 14.9 MPH 0.00 times the seconds with vehicle speed below 1b ≥ 3.3 ºC	1 failure 500 msec/ sample Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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	≥ 1 ºC Within ≤ 30 seconds ================== > 1800 seconds ≤ -7 ºC		

Component/ System	Fault Code	Monitor 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 signal circuit or the ECT sensor.	ECT Resistance (@ 150ºC)	< 45 Ohms			5 failures out of 6 samples 1 sec/ sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 signal circuit or the ECT sensor.	ECT Resistance (@ -60ºC)	> 419,000 Ohms	Engine run time OR IAT min	> 10.0 seconds ≥ -7.0 °C	5 failures out of 6 samples 1 sec/ sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature (ECT) Sensor Circuit Intermittent	P0119	Circuit Continuity This DTC detects large step changes in the ECT signal circuit or the ECT sensor. Allowable high and low limits are calculated for the next sample based on the previous sample.	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.	13.0 seconds -70.0 Deg C 180.0 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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Throttle Position Sensor Performance (naturally aspirated)	P0121	Determines if the Throttle Position Sensor input is stuck within the normal operating range	Filtered Throttle Model Error AND ABS(Measured Flow – Modeled Air Flow) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered	> 300 kPa*(g/s) > 20 grams/sec <= 20.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) No Active DTCs: No Pending DTCs:	>= 465 RPM <= 4,600 RPM > -7 Deg C < 129 Deg C > -20 Deg C < 100 Deg C >= 0.50 Filtered Throttle Model Error multiplied by **TPS Residual Weight Factor based on RPM** Modeled Air Flow Error multiplied by **MAF Residual Weight Factor based on RPM** and **MAF Residual Weight Factor based on MAF Est** See Residual Weight Factor tables. MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
TPS1 Circuit Low	P0122	Detects a continuous or intermittent short or open in TPS1 circuit	TPS1 Voltage <	0.3250		Run/Crank voltage > 6.41 No 5V reference error or fault for # 4 5V reference circuit (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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
TPS1 Circuit High	P0123	Detects a continuous or intermittent short or open in TPS1 circuit	TPS1 Voltage >	4.750		Run/Crank voltage > 6.41 No 5V reference error or fault for # 4 5V reference circuit (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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature Below Stat Regulating Temperature) (time based method for Dual temp sensor applications	P0128	This DTC detects if the engine coolant temperature rises too slowly due to an ECT or Cooling system fault	Engine run time is accumulated when airflow is ≥ 25 grams per sec during Range #1 or #2: ================== Range #1 (Primary) ECT reaches Commanded temperature minus 11 °C when IAT min is < 55 °C and ≥ 10 °C. ================== Range #2 (Alternate) ECT reaches Commanded temperature minus 31 °C when IATmin is < 10 °C and ≥ -7 °C. ==================	See the two tables named: **P0128_Maximum Accumulated Time for IAT and Start-up ECT conditions (Primary Test)** and **P0128_Maximum Accumulated Time for IAT and Start-up ECT conditions (Alternate Test)** in the Supporting tables section	No Active DTC's Engine not run time Engine run time Fuel Condition == Range #1 == (Primary) Test ECT at start run Average AirflowT-Stat Heater duty commanded cycle ================== == Range #2 == (Alternate) Test ECT at start run Average AirflowT-Stat Heater duty commanded cycle ==================	MAF_SensorFA IAT_SensorFA THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA ≥ 1,800 seconds 10 ≤ Eng Run Tme ≤ 1,370 seconds Ethanol ≤ 87 % ================== -40 ≤ ECT ≤ 70 °C ≥ 25.0 gps ≤ 0 % ================== -40 ≤ ECT ≤ 60 °C ≥ 25.0 gps ≤ 0 % ==================	1 failure to set DTC 1 sec/ sample Once per ignition key cycle	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 circuit is shorted to low.	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 Diag Equivalence Ratio Air Per Cylinder Fuel Control State Closed Loop Active All Fuel Injectors for active Cylinders Fuel Condition Fuel State All of the above met for	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 < 32.0 = Not active = Not active = Not active = Not active = False 0.9922 < ratio < 1.0137 50 < mgram < 700 = Closed Loop = TRUE Enabled (On) Ethanol ≤ 87 % DFCO not active > 5.0 seconds	285 failures out of 350 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 circuit is shorted to high.	Oxygen Sensor Signal	> 1,050 mvolts	== Open Test Criteria == No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Fuel Condition =================== No Active DTC's Low Fuel Condition Diag Fuel Condition Initial delay after Open Test Criteria met (cold start condition) Initial delay after Open Test Criteria met (not cold start condition) Equivalence Ratio Air Per Cylinder Fuel Control State	=================== TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA 10.0 < Volts < 32.0 = All Cylinders active = Complete > 5 seconds > 225 seconds ≤ 87 % Ethanol =================== MAP_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA = False ≤ 87 % Ethanol > 40.0 seconds when engine soak time > 28,800 seconds > 40.0 seconds when engine soak time ≤ 28,800 seconds 0.9922 ≤ ratio ≤ 1.0137 50 ≤ mgram ≤ 700 not = Power Enrichment	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					All of the above met for	> 2.0 seconds		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Slow Response Bank 1 Sensor 1) (For use with ESPD	P0133	This DTC determines if the O2 sensor response time is degraded.	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 < 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.	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 Diag 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 EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131, P0132, P0134 10.0 < Volts < 32.0 = Not active = Not active = Not active = Not active = False = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S1, B2S1 (if applicable)	Sample time is 60 seconds Frequency: Once per trip	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						in Supporting Tables tab.		
					O2 Heater on for	≥ 60 seconds		
					Learned Htr resistance	= Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's")		
					Engine Coolant	> 50 ºC		
					IAT	> -40 ºC		
					Engine run Accum	> 30 seconds		
					Time since any AFM status change	> 0.0 seconds		
					Time since Purge On to Off change	> 0.0 seconds		
					Time since Purge Off to On change	> 0.0 seconds		
					Engine airflow	20 ≤ grams/second ≤ 55		
					Engine speed	1,200 <= RPM <= 3,000		
					Fuel Condition	< 87 % Ethanol		
					Baro	> 70 kpa		
					Air Per Cylinder	≥ 200 mGrams		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					LTM fuel cell	= Enabled		
					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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Insufficient Activity Bank 1 Sensor 1	P0134	This DTC determines if the O2 sensor circuit is open.	Oxygen Sensor Signal	> 1,700 mvolts	No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Fuel Condition	TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA 10.0 < Volts < 32.0 = All Cylinders active = Complete > 5 seconds > 225 seconds ≤ 87 % Ethanol	200 failures out of 250 samples. Frequency: Continuous 100 msec loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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.	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 < 32.0 = Complete = Not active > zero > 120 seconds	8 failures out of 10 samples Frequency: 1 tests per trip 5 seconds delay between tests and 1 second execution rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 circuit is shorted to low.	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 Diag Equivalence Ratio Air Per Cylinder Fuel Control State Closed Loop Active All Fuel Injectors for active Cylinders Fuel Condition Fuel State All of the above met for	TPS_ThrottleAuthorityDefaultedMAP_SensorFAAIR System FAEthanol Composition Sensor FAEvapPurgeSolenoidCircuit_FAEvapFlowDuringNonPurge_FAEvapVentSolenoidCircuit_FAEvapSmallLeak_FAEvapEmissionSystem_FAFuelTankPressureSnsrCkt_FAFuelInjectorCircuit_FA = Not active = Not active = Not active = Not active 10.0 < Volts < 32.0 = Not active = Not active = Not active = Not active = False 0.9922 ≤ ratio ≤ 1.0137 50 ≤ mgrams ≤ 700 = Closed Loop = TRUE Enabled (On) Ethanol <= 87 % DFCO not active > 5.0 seconds	320 failures out of 400 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 circuit is shorted to high.	Oxygen Sensor Signal	> 1,050 mvolts	== Open Test Criteria == No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Fuel Condition ================== No Active DTC's Low Fuel Condition Diag Fuel Condition Initial delay after Open Test Criteria met (cold start condition) Initial delay after Open Test Criteria met (not cold start condition) Equivalence Ratio Air Per Cylinder Fuel Control State	================== TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA 10.0 < Volts < 32.0 = All Cylinders active = Complete > 5 seconds ≤ 87 Ethanol ================== MAP_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA = False ≤ 87 % Ethanol > 40.0 seconds when engine soak time > 28,800 seconds > 40.0 seconds when engine soak time ≤ 28,800 seconds 0.9922 ≤ ratio ≤ 1.0137 50 ≤ mgrams ≤ 700 not = Power Enrichment	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					All of the above met for	> 2.0 seconds		

Component/ System	Fault Code	Monitor 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	This DTC determines if the post catalyst O2 sensor has Slow Response in a predefined Rich to Lean voltages range during Rich to Lean transition. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	The EWMA of the Post O2 sensor normalized integral value OR The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 8.3 units > 75.0 grams (upper voltage threshold is 500 mvolts and lower voltage threshold is 200 mvolts)	No Active DTC's	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA	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
					B1S2 DTC's Not Active this key cycle	P013B, P013E, P013F, P2270 or P2271		
					System Voltage	10.0 < Volts < 32.0		
					Learned heater resistance	= Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's")		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab.		
					Low Fuel Condition Diag	= False		
					Post fuel cell (Decel)	= enabled		
					Crankshaft Torque	< 1,000.0 Nm		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					DTC's Passed ================== After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).	P2270 (and P2272 if applicable) P013E (and P014A if applicable) ==================		

Component/ System	Fault Code	Monitor 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	This DTC determines if the post catalyst O2 sensor has Slow Response in a predefined Lean to Rich voltages range during Lean to Rich transition. The diagnostic is an intrusive test which increases the delivered A/F ratio to achieve the required rich threshold.	The EWMA of the Post O2 sensor normalized integral value OR The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 8.3 units > 150 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 ICAT MAT Burnoff delay Green O2S Condition Green Cat System Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013E, P013F, P2270 or P2271 10.0 < Volts < 32.0 = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab. = Not Valid, System is not valid until accumulated airflow is greater than	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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						720,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C. (Note: This feature is only enabled when the vehicle is new and cannot be enabled in service).		
					Low Fuel Condition Diag	= False		
					Post fuel cell	= enabled		
					DTC's Passed	P2270 (and P2272 if applicable) P013E (and P014A if applicable) P013A (and P013C if applicable) P2271 (and P2273 if applicable) P013F (and P014B if applicable)		
					=================== After above conditions are met: Fuel Enrich mode continued.	==================		
					================= During this test the following must stay TRUE or the test will abort: 0.95 ≤ Fuel EQR ≤ 1.10			

Component/ System	Fault Code	Monitor 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	This DTC determines if the post catalyst O2 sensor has Slow Response in a predefined Rich to Lean voltages range during Rich to Lean transition. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	The EWMA of the Post O2 sensor normalized integral value OR The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 8.3 units > 75.0 grams (upper voltage threshold is 500 mvolts and lower voltage threshold is 200 mvolts)	No Active DTC's	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA	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
					B2S2 DTC's Not Active this key cycle	P013D, P014A, P014B, P2272 or P2273		
					System Voltage	10.0 < Volts < 32.0		
					Learned heater resistance	= Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's")		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 in Supporting Tables tab.		
					Low Fuel Condition Diag	= False		
					Post fuel cell (Decel)	= enabled		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Crankshaft Torque DTC's Passed ================== After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).	< 1,000.0 Nm P2270 (and P2272 if applicable) P013E (and P014A if applicable) ==================		

Component/ System	Fault Code	Monitor 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	This DTC determines if the post catalyst O2 sensor has Slow Response in a predefined Lean to Rich voltages range during Lean to Rich transition. The diagnostic is an intrusive test which increases the delivered A/F ratio to achieve the required rich threshold.	The EWMA of the Post O2 sensor normalized integral value OR The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 8.3 units > 150 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 ICAT MAT Burnoff delay Green O2S Condition Green Cat System Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013C, P014A, P014B, P2272 or P2273 10.0 < Volts < 32.0 = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 in Supporting Tables tab. = Not Valid, System is not valid until accumulated airflow is greater than	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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						720,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C. (Note: This feature is only enabled when the vehicle is new and cannot be enabled in service).		
					Low Fuel Condition Diag Post fuel cell	= False = enabled		
					DTC's Passed	P2270 (and P2272 if applicable) P013E (and P014A if applicable) P013A (and P013C if applicable) P2271 (and P2273 if applicable) P013F (and P014B if applicable)		
					=================== After above conditions are met: Fuel Enrich mode continued. ================= During this test the following must stay TRUE or the test will abort: 0.95 ≤ Fuel EQR ≤ 1.10	==================		

Component/ System	Fault Code	Monitor 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	This DTC determines if the post catalyst O2 sensor has an initial delayed response to an A/F change from Rich to Lean. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	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 greater or equal to	> 500 mvolts > 78 grams > 0 secs > 10 grams	No Active DTC's B1S2 DTC's Not Active this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Post fuel cell (Decel)	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013B, P013F, P2270 or P2271 10.0 < Volts < 32.0 = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab. = False = enabled	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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Crankshaft Torque DTC's Passed Number of fueled cylinders ================== After above conditions are met: DFCO mode entered (wo driver initiated pedal input).	< 1,000.0 Nm P2270 (and P2272 if applicable) ≤ 6 cylinders ==================		

Component/ System	Fault Code	Monitor 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	This DTC determines if the post catalyst O2 sensor has an initial delayed response to an A/F change from Lean to Rich. The diagnostic is an intrusive test which increases the delivered A/F ratio to achieve the required rich threshold.	Post O2 sensor voltage AND The Accumulated mass air flow monitored during the Delayed Response Test	< 350 mvolts > 1,185 grams	No Active DTC's B1S2 DTC's Not Active this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Green Cat System Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013B, P013E, P2270 or P2271 10.0 < Volts < 32.0 = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab. = Not Valid, System is not valid until accumulated airflow is greater than	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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						720,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C. (Note: This feature is only enabled when the vehicle is new and cannot be enabled in service).		
					Low Fuel Condition Diag Post fuel cell	= False = enabled		
					DTC's Passed	P2270 (and P2272 if applicable) P013E (and P014A if applicable) P013A (and P013C if applicable) P2271 (and P2273 if applicable)		
					Number of fueled cylinders	≥ 1 cylinders		
					=================== After above conditions are met: Fuel Enrich mode entered. ================= During this test the following must stay TRUE or the test will abort: 0.95 ≤ Fuel EQR ≤ 1.10	==================		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Insufficient Activity Bank 1 Sensor 2) (For Dual Bank Exhaust Only	P0140	This DTC determines if the O2 sensor circuit is open.	Oxygen Sensor Signal	> 1,700 mvolts	No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Fuel Condition	TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA 10.0 < Volts < 32.0 = All Cylinders active = Complete > 5 seconds > 225 seconds ≤ 87 % Ethanol	200 failures out of 250 samples. Frequency: Continuous 100 msec loop	Type B, 2 Trips

15 OBDG11 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor 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.	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 < 32.0 = Complete = Not active > zero > 120 seconds	8 failures out of 10 samples Frequency: 1 tests per trip 5 seconds delay between tests and 1 second execution rate.	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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	This DTC determines if the post catalyst O2 sensor has an initial delayed response to an A/F change from Rich to Lean. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	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 greater or equal to	> 500 mvolts > 78 grams > 0 secs > 10 grams	No Active DTC's B2S2 DTC's Not Active this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Post fuel cell (Decel)	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013C, P013D, P014B, P2272 or P2273 10.0 < Volts < 32.0 = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 in Supporting Tables tab. = False = enabled	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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Crankshaft Torque DTC's Passed Number of fueled cylinders =================== After above conditions are met: DFCO mode entered (wo driver initiated pedal input).	< 1,000.0 Nm P2270 (and P2272 if applicable) ≤ 6 cylinders ==================		

Component/ System	Fault Code	Monitor 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	This DTC determines if the post catalyst O2 sensor has an initial delayed response to an A/F change from Lean to Rich. The diagnostic is an intrusive test which increases the delivered A/F ratio to achieve the required rich threshold.	Post O2 sensor AND The Accumulated mass air flow monitored during the Delayed Response Test	< 350 mvolts > 1,185 grams.	No Active DTC's B2S2 DTC's Not Active this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Green Cat System Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FAFuelInjectorCircuit_FAFuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013C, P013D, P014A, P2272 or P2273 10.0 < Volts < 32.0 = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 in Supporting Tables tab. = Not Valid, System is not valid until accumulated airflow is greater than	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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						720,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C. (Note: This feature is only enabled when the vehicle is new and cannot be enabled in service).		
					Low Fuel Condition Diag Post fuel cell	= False = enabled		
					DTC's Passed	P2270 (and P2272 if applicable) P013E (and P014A if applicable) P013A (and P013C if applicable) P2271 (and P2273 if applicable)		
					Number of fueled cylinders	≥ 1 cylinders		
					=================== After above conditions are met: Fuel Enrich mode entered. ================= During this test the following must stay TRUE or the test will abort: 0.95 ≤ Fuel EQR ≤ 1.10	==================		

Component/ System	Fault Code	Monitor 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 circuit is shorted to low.	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 Diag Equivalence Ratio Air Per Cylinder Fuel Control State Closed Loop Active All Fuel Injectors for active Cylinders Fuel Condition Fuel State All of the above met for	TPS_ThrottleAuthority DefaultedMAP_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 < 32.0 = Not active = Not active = Not active = Not active = False 0.9922 ≤ equiv. ratio ≤ 1.0137 50 ≤ APC ≤ 700 mgrams = Closed Loop = TRUE Enabled (On) ≤ 87 % Ethanol DFCO not active > 5.0 seconds	285 failures out of 350 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 circuit is shorted to high.	Oxygen Sensor Signal	> 1,050 mvolts	== Open Test Criteria == No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Fuel Condition ================== No Active DTC's Low Fuel Condition Diag Fuel Condition Initial delay after Open Test Criteria met (cold start condition) Initial delay after Open Test Criteria met (not cold start condition) Equivalence Ratio Air Per Cylinder	================== TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA 10.0 < Volts < 32.0 = All Cylinders active = Complete > 5 seconds > 225 seconds <= 87 % Ethanol ================== MAP_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA = False ≤ 87 % Ethanol > 85.0 seconds when engine soak time > 28,800 seconds > 85.0 seconds when engine soak time ≤ 28,800 seconds 0.9922 ≤ ratio ≤ 1.0137 50 ≤ mgrams ≤ 700	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Fuel Control State All of the above met for	not = Power Enrichment > 2 seconds		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Slow Response Bank 2 Sensor 1) (For use with ESPD	P0153	This DTC determines if the O2 sensor response time is degraded.	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.	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 Diag 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 EthanolCompositionSensor_FA EngineMisfireDetected_FA = P0151, P0152 or P0154 10.0 < Volts < 32.0 = Not active = Not active = Not active = Not active = False = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S1, B2S1 in Supporting	Sample time is 60 seconds Frequency: Once per trip	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						Tables tab.		
					O2 Heater on for	≥ 60 seconds		
					Learned Htr resistance	= Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's")		
					Engine Coolant	> 50 ºC		
					IAT	> -40 ºC		
					Engine run Accum	> 30 seconds		
					Time since any AFM status change	> 0.0 seconds		
					Time since Purge On to Off change	> 0.0 seconds		
					Time since Purge Off to On change	> 0.0 seconds		
					Engine airflow	20 ≤ grams/second ≤ 55		
					Engine speed	1,200 ≤ RPM ≤ 3,000		
					Fuel Condition	< 87 % Ethanol		
					Baro	> 70 kpa		
					Air Per Cylinder	>= 200 mGrams		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					LTM fuel cell	= Enabled		
					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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Insufficient Activity Bank 2 Sensor 1	P0154	This DTC determines if the O2 sensor circuit is open.	Oxygen Sensor Signal	> 1,700 mvolts	No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Fuel Condition	TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA 10.0 < Volts < 32.0 = All Cylinders active = Complete > 5 seconds > 225 seconds ≤ 87 % Ethanol	200 failures out of 250 samples. Frequency: Continuous 100 msec loop	Type B, 2 Trips

15 OBDG11 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor 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.	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 < 32.0 = Complete = Not active > zero > 120 seconds	8 failures out of 10 samples Frequency: 1 tests per trip 5 seconds delay between tests and 1 second execution rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 circuit is shorted to low.	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 Diag Equivalence Ratio Air Per Cylinder Fuel Control State Closed Loop Active All Fuel Injectors for active Cylinders Fuel Condition Fuel State All of the above met for	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 < 32.0 = Not active = Not active = Not active = Not active = False 0.9922 ≤ ratio ≤ 1.0137 50 ≤ mgrams ≤ 700 = Closed Loop = TRUE Enabled (On) ≤ 87 % Ethanol DFCO not active > 5.0 seconds	320 failures out of 400 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 circuit is shorted to high.	Oxygen Sensor Signal	> 1,050 mvolts	== Open Test Criteria == No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Fuel Condition ================== No Active DTC's Low Fuel Condition Diag Fuel Condition Initial delay after Open Test Criteria met (cold start condition) Initial delay after Open Test Criteria met (not cold start condition) Equivalence Ratio Air Per Cylinder Fuel Control State	================== TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA 10.0 < Volts < 32.0 = All Cylinders active = Complete > 5 seconds > 225 seconds ≤ 87 % Ethanol ================== MAP_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA = False ≤ 87 % Ethanol > 85.0 seconds when engine soak time > 28,800 seconds > 85.0 seconds when engine soak time ≤ 28,800 seconds 0.9922 ≤ ratio ≤ 1.0137 50 ≤ mgrams ≤ 700 not = Power Enrichment	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					All of the above met for	> 2 seconds		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Delayed Response Rich to Lean Bank 1 Sensor 1	P015A	This DTC determines if the pre catalyst O2 sensor has an initial delayed response to an A/F change from Rich to Lean. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	The EWMA of the Pre O2 sensor normalized R2L time delay value OR [The Accumulated time monitored during the R2L Delayed Response Test (Gross failure). AND Pre O2 sensor voltage is	> 0.4 EWMA (sec) ≥ 1.8 Seconds > 550 mvolts	No Active DTC's System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Diag 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, P0134 10.0 < Volts < 32.0 = Not active = Not active = Not active = Not active = False = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for	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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						the following locations: B1S1, B2S1 (if applicable) in Supporting Tables tab.		
					O2 Heater (pre sensor) on for	≥ 60 seconds		
					Learned Htr resistance	= Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's")		
					Engine Coolant	> 50 ºC		
					IAT	> -40 ºC		
					Engine run Accum	> 30 seconds		
					Engine Speed to initially enable test	1,100 ≤ RPM ≤ 2,500		
					Engine Speed range to keep test enabled (after initially enabled)	1,050 ≤ RPM ≤ 2,650		
					Engine Airflow	3 ≤ gps ≤ 20		
					Vehicle Speed to initially enable test	40.4 ≤ MPH ≤ 82.0		
					Vehicle Speed range to keep test enabled (after initially enabled)	36.0 ≤ MPH ≤ 87.0		
					Closed loop integral	0.74 ≤ C/L Int ≤ 1.08		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater (post sensor) on Time	≥ 80.0 sec		
					Predicted Catalyst temp	600 ≤ ºC ≤ 900		
					Fuel State	= DFCO possible		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					================== 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 initiated pedal input).	================== ================== ≥ 690 mvolts = DFCO active ≤ 6 cylinders ==================		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Delayed Response Lean to Rich Bank 1 Sensor 1	P015B	This DTC determines if the pre catalyst O2 sensor has an initial delayed response to an A/F change from Lean to Rich. The diagnostic is an intrusive test which runs in an enriched fuel mode to achieve the required response.	The EWMA of the Pre O2 sensor normalized L2R time delay value OR [The Accumulated time monitored during the L2R Delayed Response Test (Gross failure). AND Pre O2 sensor voltage is OR At end of Cat Rich stage the Pre O2 sensor output is	> 0.4 EWMA (sec) ≥ 1.8 Seconds < 350 mvolts < 690 mvolts	No Active DTC's System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Diag 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, P0134 10.0 < Volts < 32.0 = Not active = Not active = Not active = Not active = False = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for	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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						the following locations: B1S1, B2S1 (if applicable) in Supporting Tables tab.		
					O2 Heater (pre sensor) on for	≥ 60 seconds		
					Learned Htr resistance	= Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's")		
					Engine Coolant	> 50 ºC		
					IAT	> -40 ºC		
					Engine run Accum	> 30 seconds		
					Engine Speed to initially enable test	1,100 ≤ RPM ≤ 2,500		
					Engine Speed range to keep test enabled (after initially enabled)	1,050 ≤ RPM ≤ 2,650		
					Engine Airflow	3 ≤ gps ≤ 20		
					Vehicle Speed to initially enable test	40.4 ≤ MPH ≤ 82.0		
					Vehicle Speed range to keep test enabled (after initially enabled)	36.0 ≤ MPH ≤ 87.0		
					Closed loop integral	0.74 ≤ C/L Int ≤ 1.08		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater (post sensor) on Time	≥ 80.0 sec		
					Predicted Catalyst temp	600 ≤ ºC ≤ 900		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Fuel State Number of fueled 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 :	= DFCO inhibit ≥ 2 cylinders ================== ================== 6 ≤ gps ≤ 20 ≤ 1.5 gps		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Delayed Response Rich to Lean Bank 2 Sensor 1	P015C	This DTC determines if the pre catalyst O2 sensor has an initial delayed response to an A/F change from Rich to Lean. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	The EWMA of the Pre O2 sensor normalized R2L time delay value OR [The Accumulated time monitored during the R2L Delayed Response Test (Gross failure). AND Pre O2 sensor voltage is above]	> 0.4 EWMA (sec) ≥ 1.8 Seconds > 550 mvolts	No Active DTC's System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Diag 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, P0134 10.0 < Volts < 32.0 = Not active = Not active = Not active = Not active = False = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for	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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						the following locations: B1S1, B2S1 in Supporting Tables tab.		
					O2 Heater (pre sensor) on for	≥ 60 seconds		
					Learned Htr resistance	= Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's")		
					Engine Coolant	> 50 ºC		
					IAT	> -40 ºC		
					Engine run Accum	> 30 seconds		
					Engine Speed to initially enable test	1,100 ≤ RPM ≤ 2,500		
					Engine Speed range to keep test enabled (after initially enabled)	1,050 ≤ RPM ≤ 2,650		
					Engine Airflow	3 ≤ gps ≤ 20		
					Vehicle Speed to initially enable test	40.4 ≤ MPH ≤ 82.0		
					Vehicle Speed range to keep test enabled (after initially enabled)	36.0 ≤ MPH ≤ 87.0		
					Closed loop integral	0.74 ≤ C/L Int ≤ 1.08		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater (post sensor) on Time	≥ 80.0 sec		
					Predicted Catalyst temp	600 ≤ ºC ≤ 900		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 initiated pedal input).	= DFCO possible ================ =============== ≥ 690 mvolts = DFCO active ≤ 6 cylinders ===============		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Delayed Response Lean to Rich Bank 2 Sensor 1	P015D	This DTC determines if the pre catalyst O2 sensor has an initial delayed response to an A/F change from Lean to Rich. The diagnostic is an intrusive test which runs in an enriched fuel mode to achieve the required response.	The EWMA of the Pre O2 sensor normalized L2R time delay value OR [The Accumulated time monitored during the L2R Delayed Response Test (Gross failure). AND Pre O2 sensor voltage is below] OR At end of Cat Rich stage the Pre O2 sensor output is	> 0.4 EWMA (sec) ≥ 1.8 Seconds < 350 mvolts < 690 mvolts	No Active DTC's System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Diag 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, P0134 10.0 < Volts < 32.0 = Not active = Not active = Not active = Not active = False = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for	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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						the following locations: B1S1, B2S1 in Supporting Tables tab.		
					O2 Heater (pre sensor) on for	≥ 60 seconds		
					Learned Htr resistance	= Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's")		
					Engine Coolant	> 50 ºC		
					IAT	> -40 ºC		
					Engine run Accum	> 30 seconds		
					Engine Speed to initially enable test	1,100 ≤ RPM ≤ 2,500		
					Engine Speed range to keep test enabled (after initially enabled)	1,050 ≤ RPM ≤ 2,650		
					Engine Airflow	3 ≤ gps ≤ 20		
					Vehicle Speed to initially enable test	40.4 ≤ MPH ≤ 82.0		
					Vehicle Speed range to keep test enabled (after initially enabled)	36.0 ≤ MPH ≤ 87.0		
					Closed loop integral	0.74 ≤ C/L Int ≤ 1.08		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater (post sensor) on Time	≥ 80.0 sec		
					Predicted Catalyst temp	600 ≤ ºC ≤ 900		
					Fuel State	= DFCO inhibit		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Number of fueled 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 :	≥ 2 cylinders ================= ================= 6 ≤ gps ≤ 20 ≤ 1.5 gps		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Insufficient Activity Bank 2 Sensor 2	P0160	This DTC determines if the O2 sensor circuit is open.	Oxygen Sensor Signal	> 1,700 mvolts	No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Fuel Condition	TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA 10.0 < Volts < 32.0 = All Cylinders active = Complete > 5 seconds > 225 seconds ≤ 87 % Ethanol	200 failures out of 250 samples. Frequency: Continuous 100 msec loop	Type B, 2 Trips

15 OBDG11 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor 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.	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 < 32.0 = Complete = Not active > zero > 120 seconds	8 failures out of 10 samples Frequency: 1 tests per trip 5 seconds delay between tests and 1 second execution rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel System Too Lean Bank 1	P0171	Determines if the fuel control system is in a lean condition, based on the filtered long-term and short-term fuel trim.	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	Engine speed BARO 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 EGR Diag. Catalyst Diag. Post O2 Diag.	375 <rpm< 7,000 > 70 kPa -40 <°C< 150 10 <kPa< 255 -20 <°C< 150 1.0 <g/s< 510.0 > 10 % or if fuel sender is faulty the diagnostic will bypass the fuel level criteria. > 33.0 seconds of data must accumulate on each trip, with at least 23.0 seconds of data in the current fuel trim cell before a pass or fail decision can be made. (Please see "**Long-Term Fuel Trim Cell Usage**" in Supporting Tables for a list of cells utilized for diagnosis) Enabled Enabled (Please see "**Closed Loop Enable Criteria**" and "**Long Term FT Enable Criteria**" in Supporting Tables.) Intrusive Test Not Active Intrusive Test Not Active Intrusive Test Not Active	Frequency: 100 ms Continuous Loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Device Control EVAP Diag. No active DTC:	Not Active “tank pull down” Not Active IAC_SystemRPM_FA MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR System FA EvapExcessPrgePsbl_FA Ethanol Comp Snsr FA FuelInjectorCkt_FA EngMisfireDetected_FA EGRValvePerf_FA EGRValveCkt_FA MAP_EngVacuumStatus AmbPresDfltdStatus TC_BoostPresSnsrFA O2Snsr_B1_Snsr_1_FA		

Component/ System	Fault Code	Monitor 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. 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. Intrusive Test: If the filtered Purge Long Term Fuel Trim metric > 0.715 , 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 <= 0.715 , purge is ramped off to determine if excess purge vapor is the cause of the rich condition. Performing intrusive tests too frequently may also affect EVAP and EPAIII emissions,	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) Segment Def'n: Segments can last up to 30 seconds and are separated by the lesser of 20 seconds of purge-on time or enough time to	<= 0.710 <= 2.000 <= 0.715 <= 0.710 <= 2.000		Secondary Parameters and Enable Conditions are identical to those for P0171, with the exception that fuel level is not considered.	Frequency: 100 ms Continuous Loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		and the execution frequency of other diagnostics.	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 purge excess vapors from the canister. During this period, fuel trim will pass if the filtered Purge Long Term Fuel Trim metric > 0.715 for at least 200 seconds, indicating that the canister has been purged.					

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel System Too Lean Bank 2	P0174	Determines if the fuel control system is in a lean condition, based on the filtered long-term and short-term fuel trim.	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	Engine speed BARO 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 EGR Diag. Catalyst Diag. Post O2 Diag. Device Control	375 <rpm< 7,000 > 70 kPa -40 <°C< 150 10 <kPa< 255 -20 <°C< 150 1.0 <g/s< 510.0 > 10 % or if fuel sender is faulty the diagnostic will bypass the fuel level criteria. > 33.0 seconds of data must accumulate on each trip, with at least 23.0 seconds of data in the current fuel trim cell before a pass or fail decision can be made. (Please see "**Long-Term Fuel Trim Cell Usage**" in Supporting Tables for a list of cells utilized for diagnosis) Enabled Enabled (Please see "**Closed Loop Enable Criteria**" and "**Long Term FT Enable Criteria**" in Supporting Tables.) Intrusive Test Not Active Intrusive Test Not Active Intrusive Test Not Active Not Active	Frequency: 100 ms Continuous Loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					EVAP Diag. No active DTC:	“tank pull down” Not Active IAC_SystemRPM_FA MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR System FA EvapExcessPrgePsbl_FA Ethanol Comp Snsr FA FuelInjectorCkt_FA EngMisfireDetected_FA EGRValvePerf_FA EGRValveCkt_FA MAP_EngVacuumStatus AmbPresDfltdStatus TC_BoostPresSnsrFA O2Snsr_B2_Snsr_1_FA		

Component/ System	Fault Code	Monitor 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. 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. Intrusive Test: If the filtered Purge Long Term Fuel Trim metric > 0.715 , 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 <= 0.715 , purge is ramped off to determine if excess purge vapor is the cause of the rich condition. Performing intrusive tests too frequently may also affect EVAP and EPAIII emissions,	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) Segment Def'n: Segments can last up to 30 seconds and are separated by the lesser of 20 seconds of purge-on time or enough time to	<= 0.710 <= 2.000 <= 0.715 <= 0.710 <= 2.000		Secondary Parameters and Enable Conditions are identical to those for P0174, with the exception that fuel level is not considered.	Frequency: 100 ms Continuous Loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		and the execution frequency of other diagnostics.	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 purge excess vapors from the canister. During this period, fuel trim will pass if the filtered Purge Long Term Fuel Trim metric > 0.715 for at least 200 seconds, indicating that the canister has been purged.					

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 Open Circuit (PFI) - 3 DTC Implmentation	P0201	This DTC Diagnoses Injector 1 low side driver circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground or open circuit	Open circuit: ≥ 200 K Ω impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11 Volts >= 5 Seconds >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0261 may also set (Injector 1 Short to Ground)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 Open Circuit (PFI) - 3 DTC Implmentation	P0202	This DTC Diagnoses Injector 2 low side driver circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground or open circuit	Open circuit: ≥ 200 K Ω impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11 Volts >= 5 Seconds >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0264 may also set (Injector 2 Short to Ground)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 Open Circuit (PFI) - 3 DTC Implmentation	P0203	This DTC Diagnoses Injector 3 low side driver circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground or open circuit	Open circuit: ≥ 200 K Ω impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11 Volts >= 5 Seconds >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0267 may also set (Injector 3 Short to Ground)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 4 Open Circuit (PFI) - 3 DTC Implmentation	P0204	This DTC Diagnoses Injector 4 low side driver circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground or open circuit	Open circuit: ≥ 200 K Ω impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11 Volts >= 5 Seconds >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0270 may also set (Injector 4 Short to Ground)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 5 Open Circuit (PFI) - 3 DTC Implmentation	P0205	This DTC Diagnoses Injector 5 low side driver circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground or open circuit	Open circuit: ≥ 200 K Ω impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11 Volts >= 5 Seconds >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0273 may also set (Injector 5 Short to Ground)

15 OBDG11 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 6 Open Circuit (PFI) - 3 DTC Implmentation	P0206	This DTC Diagnoses Injector 6 low side driver circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground or open circuit	Open circuit: ≥ 200 K Ω impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11 Volts >= 5 Seconds >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0276 may also set (Injector 6 Short to Ground)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 7 Open Circuit (PFI) - 3 DTC Implmentation	P0207	This DTC Diagnoses Injector 7 low side driver circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground or open circuit	Open circuit: ≥ 200 K Ω impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11 Volts >= 5 Seconds >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0279 may also set (Injector 7 Short to Ground)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 8 Open Circuit (PFI) - 3 DTC Implmentation	P0208	This DTC Diagnoses Injector 8 low side driver circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground or open circuit	Open circuit: ≥ 200 K Ω impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11 Volts >= 5 Seconds >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0282 may also set (Injector 8 Short to Ground)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
TPS2 Circuit Low	P0222	Detects a continuous or intermittent short or open in TPS2 circuit	TPS2 Voltage <	0.250		Run/Crank voltage > 6.41 No 5V reference error or fault for # 4 5V reference circuit (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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
TPS2 Circuit High	P0223	Detects a continuous or intermittent short or open in TPS2 circuit	TPS2 Voltage >	4.590		Run/Crank voltage > 6.41 No 5V reference error or fault for # 4 5V reference circuit (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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 Low side circuit shorted to ground (PFI)	P0261	This DTC Diagnoses Injector 1 low side driver circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground or open circuit	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11 Volts >= 5 Seconds >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0201 may also set (Injector 1 Open Circuit)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 Low side circuit shorted to power (PFI)	P0262	This DTC Diagnoses Injector 1 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 within range for a duration Engine Running	>= 11 Volts >= 5 Seconds >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 Low side circuit shorted to ground (PFI)	P0264	This DTC Diagnoses Injector 2 low side driver circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground or open circuit	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11 Volts >= 5 Seconds >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0202 may also set (Injector 2 Open Circuit)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 Low side circuit shorted to power (PFI)	P0265	This DTC Diagnoses Injector 2 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 within range for a duration Engine Running	>= 11 Volts >= 5 Seconds >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 Low side circuit shorted to ground (PFI)	P0267	This DTC Diagnoses Injector 3 low side driver circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground or open circuit	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11 Volts >= 5 Seconds >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0203 may also set (Injector 3 Open Circuit)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 Low side circuit shorted to power (PFI)	P0268	This DTC Diagnoses Injector 3 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 within range for a duration Engine Running	>= 11 Volts >= 5 Seconds >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 4 Low side circuit shorted to ground (PFI)	P0270	This DTC Diagnoses Injector 4 low side driver circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground or open circuit	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11 Volts >= 5 Seconds >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0204 may also set (Injector 4 Open Circuit)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 4 Low side circuit shorted to power (PFI)	P0271	This DTC Diagnoses Injector 4 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 within range for a duration Engine Running	>= 11 Volts >= 5 Seconds >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 5 Low side circuit shorted to ground (PFI)	P0273	This DTC Diagnoses Injector 4 low side driver circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground or open circuit	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11 Volts >= 5 Seconds >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0205 may also set (Injector 5 Open Circuit)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 5 Low side circuit shorted to power (PFI)	P0274	This DTC Diagnoses Injector 5 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 within range for a duration Engine Running	>= 11 Volts >= 5 Seconds >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips

15 OBDG11 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 6 Low side circuit shorted to ground (PFI)	P0276	This DTC Diagnoses Injector 6 low side driver circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground or open circuit	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11 Volts >= 5 Seconds >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0206 may also set (Injector 6 Open Circuit)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 6 Low side circuit shorted to power (PFI)	P0277	This DTC Diagnoses Injector 6 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 within range for a duration Engine Running	>= 11 Volts >= 5 Seconds >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 7 Low side circuit shorted to ground (PFI)	P0279	This DTC Diagnoses Injector 7 low side driver circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground or open circuit	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11 Volts >= 5 Seconds >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0207 may also set (Injector 7 Open Circuit)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 7 Low side circuit shorted to power (PFI)	P0280	This DTC Diagnoses Injector 7 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 within range for a duration Engine Running	>= 11 Volts >= 5 Seconds >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 8 Low side circuit shorted to ground (PFI)	P0282	This DTC Diagnoses Injector 8 low side driver circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground or open circuit	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	Powertrain Relay Voltage within range for a duration Engine Running	>= 11 Volts >= 5 Seconds >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0208 may also set (Injector 8 Open Circuit)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 8 Low side circuit shorted to power (PFI)	P0283	This DTC Diagnoses Injector 8 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 within range for a duration Engine Running	>= 11 Volts >= 5 Seconds >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 Cylinder 5 Misfire Detected Cylinder 6 Misfire Detected Cylinder 7 Misfire Detected Cylinder 8 Misfire Detected	P0300 P0301 P0302 P0303 P0304 P0305 P0306 P0307 P0308	These DTC's will determine if a random or a cylinder specific misfire is occurring by monitoring various terms derived from crankshaft velocity. The rate of misfire over an interval is compared to both emissions and catalyst damaging thresholds. The pattern of crankshaft acceleration after the misfire is checked to differentiate between real misfire and other sources of crank shaft noise.	Deceleration Value 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 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.	[(>**IdleSCD_Decel** AND > **IdleSCD_Jerk**) OR (>**SCD_Decel** AND > **SCD_Jerk**) OR (>**IdleCylModeDecel** AND > **IdleCylModeJerk)** OR (>**CylMode_Decel** AND > **CylMode_Jerk**) OR (>**RevMode_Decel**) OR WHILE in Cylinder Deactivation mode: (> **AFM_Decel**)] - see details on Supporting Tables Tab (P0300 Section)	Engine Run Time Engine Coolant Temp Or If ECT at startup Then ECT 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 -7 ºC < ECT < 130 ºC < -7 ºC 21 ºC < ECT < 130 ºC 9.00 < volts < 32.00 < 85.00 % per 25 ms < 85.00 % 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 any Catalyst Exceedence = (1) 200 rev block as data supports for catalyst damage. Failure reported with (1 or 3) Exceedences in FTP, or (1) Exceedence outside FTP.	Type B, 2 Trips (Mil Flashes with Catalyst damage level of Misfire)
			Misfire Percent Emission Failure Threshold	≥ 0.81 % P0300				
			Misfire Percent Catalyst Damage	> **Catalyst_Damage_ Misfire_Percentage** in Supporting Tables	(at low speed/loads, one cylinder may not cause cat damage)			

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			When engine speed and load are less than the FTP cals (3) catalyst damage exceedences are allowed.	whenever secondary conditions are met. ≤ 0 FTP rpm AND ≤ 0 FTP % load	Engine Speed Engine Load Misfire counts	> 1,200 rpm AND > 20 % load AND < 180 counts on one cylinder	Continuous	
				disable conditions:	Engine Speed	350 < rpm < ((Engine Over Speed Limit) - 400 Engine speed limit is a function of inputs like Gear and temperature see **EngineOverSpeedLimit** in supporting tables	4 cycle delay	
					No active DTCs:	TPS_FA EnginePowerLimited MAF_SensorTFTKO MAP_SensorTFTKO IAT_SensorTFTKO ECT_Sensor_Ckt_TFTKO 5VoltReferenceB_FA CrankSensorTFTKO CrankSensorFA CamLctnIntFA CamLctnExhFA CamSensorAnyLctnTFTKO AnyCamPhaser_FA AnyCamPhaser_TFTKO AmbPresDfltdStatus	4 cycle delay	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 speed and engine load region	***Undetectable region*** from Malfunction Criteria	4 cycle delay	
					Abusive Engine Over Speed	> 8,192 rpm	0 cycle delay	
					Below zero torque (except CARB approved 3000 rpm to redline triangle.)	< **ZeroTorqueEngLoad** in Supporting Tables	4 cycle delay	
					Below zero torque: TPS Vehicle Speed	 ≤ 1 % > 30 mph	4 cycle delay	
					EGR Intrusive test	Active	0 cycle delay	
					Manual Trans	Clutch shift	4 cycle delay	
					Accel Pedal Position AND Automatic transmission shift	> 95.00 %	7 cycle delay	
					Driveline Ring Filter active			

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 oscillations: (Rough road etc) Off Idle, number of consecutive decelerating cylinders after "misfire": (Number of decels can vary with misfire detection equation) TPS Engine Speed Veh Speed	> 3 % > 950 rpm > 3 mph		
					Consecutive decels while in SCD Mode Cyl Mode Rev Mode	> **Abnormal SCD Mode** > **Abnormal Cyl Mode** > **Abnormal Rev Mode** in Supporting Tables		
					Misfire Crankshaft Pattern Recognition checks each "misfire" candidate in 100 engine Cycle test to see if it looks like real misfire, or some disturbance like rough road. The check is			

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					based on a multiplier times the ddt_jerk value used to detect misfire at that speed and load. At the end of 100 engine cycle test, the ratio of unrecog/recognized is checked to confirm if real misfire is present.			
					Pattern Recog Enabled:	Enabled		
					Engine Speed	900 < rpm < 3,000		
					Veh Speed	> 0.6 mph		
					"misfire" unrecognized if: Crankshaft snap after:			
					isolated "misfire"	> **Min_PatternMultiplier**		
					repetative "misfire"	> **Max_PatternMultiplier** in Supporting Tables		
					Ratio of Unrecog/Recog	> 0.60	discard test	
					Rough Road:			
					Non-Crankshaft based:	Enabled		
					Rough Road Source	Wheel Speed processed in ABS		
					IF Rough Road Source = WheelSpeedInECM			
					ABS/TCS		discard test	
					Wheel speed noise	active		
					VSES	> WSSRoughRoadThres		
						active		
					IF Rough Road Source = "FromABS"			
					ABS/TCS		discard test	
					RoughRoad	active		
					VSES	detected		
						active		
					IF Rough Road Source = "TOSS"			

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					TOSS dispersion AND No Active DTCs	 >**TOSSRoughRoadThres** in supporting tables Transmission Output Shaft Angular Velocity Validity TransmissionEngagedState_FA (Auto Trans only) Clutch Sensor FA (Manual Trans only)	discard test 4 cycle delay	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position System Variation Not Learned	P0315	Monitor for valid crankshaft error compensation factors	Sum of Compensation factors. Each Cylinder pair shares one compensation factor. A perfect factor would be 1.0000. Unlearned factors are defaulted out of range so the sum of factors would be out of range.	≥ 4.0040 OR ≤ 3.9960	OBD Manufacturer Enable Counter	MEC = 0	0.50 seconds Frequency Continuous100 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor 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: 1. Excessive knock or 2. Abnormal engine noise or 3. Flat signal	Common Enable Criteria (Applies to all 3 parts of the performance diag) Specific Enable Criteria and Thresholds for 3 individual parts of the performance diag:		Diagnostic Enabled? Engine Run Time Engine Speed Engine Air Flow ECT IAT	Yes ≥ 2.0 seconds ≤ 8,500 RPM ≥ 10 mg/cylinder and ≤ 2,000 mg/cylinder ≥ -40 deg's C ≥ -40 deg's C	First Order Lag Filters with Weight Coefficients	Type B, 2 Trips
			- - - - - - - - - - - - - - - - - -	- - - - - - - - - - - - - - - - -	- - - - - - - - - - - - - - - - - -	- - - - - - - - - - - - - - - - - -	- - - - - - - - - - - -	
			1. Excessive Knock Diag: Filtered Knock Intensity VaKNKD_k_PerfCylKnockIntFilt (where 'Knock Intensity' = 0 with no knock; and > 0 & proportional to knock magnitude with knock)	> 1.70 (no units)	Engine Speed Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle)	≥ 1,500 RPM ≥ 84 Revs	Excessive Knk Weight Coefficient = 0.0480 Updated each engine event	
			- - - - - - - - - - - - - - - - - -	- - - - - - - - - - - - - - - - -	- - - - - - - - - - - - - - - - - -	- - - - - - - - - - - - - - - - - -	- - - - - - - - - - - -	
			2. Abnormal Noise Diag: Filtered FFT Intensity (where 'FFT Intensity' = Non-knocking, background noise)	< **AbnormalNoise_Threshold** (Supporting Table)	Individual Cylinders enabled for Abnormal Noise Engine Speed Cumlative Number of Engine Revs Above Min Eng Speed (per key	**AbnormalNoise_CylsEnabled** (Supporting Table) ≥ 8,500 RPM ≥ 84 Revs	Abn Noise Weight Coefficient = 0.0480 Updated each engine event	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			- - - - - - - - - - - - - - - - - - - 3. Flat Signal Diag: Filtered Signal Delta (Current FFT Intensity - Ave_Intensity_No-Knock) VaKNKD_k_PerfCylFlatFiltInt	- - - - - - - - - - - - - - - - - < 0.008 (no units)	cycle) - - - - - - - - - - - - - - - - - - - Engine Speed Cumlative Number of Engine Revs Above Min Eng Speed (per keycycle)	- - - - - - - - - - - - - - - - - - - ≥ 8,500 RPM ≥ 400 Revs	- - - - - - - - - - - - - Flat Signal Weight Coefficient = 0.010 Updated each engine event	

Component/ System	Fault Code	Monitor 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 There are two possible methods used: 1. 20 kHz 2. Normal Noise See **Supporting Tables** for method definition: **P0325_P0330_OpenMethod** Typical implementations: A. Use 20 kHz method at all 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	**Open Circuit Method chosen** (2 possible methods: 20 kHz or Normal Noise): **Thresholds for OpenMethod = 20 kHZ** Filtered FFT Output **Thresholds for OpenMethod = NormalNoise:** Filtered FFT Output	Supporting Table: **OpenMethod** (See Supporting Tables) **OpenCktThrshMin >(20 kHz) AND < OpenCktThrshMax (20 kHz)** **OpenCktThrshMin >(Normal Noise) AND < 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 ECT IAT	Yes ≥ 2.0 seconds ≥ 400 RPM and ≤ 8,500 RPM ≥ 100 revs ≥ 10 mg/cylinder and ≤ 2,000 mg/cylinder ≥ -40 deg's C ≥ -40 deg's C	First Order Lag Filter with Weight Coefficient Weight Coefficient = 0.0100 Updated each engine event	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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, due to 1. Excessive knock or 2. Abnormal engine noise or 3. Flat signal	Common Enable Criteria (Applies to all 3 parts of the performance diag)		Diagnostic Enabled? Engine Run Time Engine Speed Engine Air Flow ECT IAT	Yes ≥ 2.0 seconds ≤ 8,500 RPM ≥ 10 mg/cylinder and ≤ 2,000 mg/cylinder ≥ -40 deg's C ≥ -40 deg's C		Type B, 2 Trips
			Specific Enable Criteria and Thresholds for 3 individual parts of the performance diag:				First Order Lag Filters with Weight Coefficients	
			1. Excessive Knock Diag: Filtered Knock Intensity (where 'Knock Intensity' = 0 with no knock; and > 0 & proportional to knock magnitude with knock)	> 1.50 (no units)	Engine Speed Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle)	≥ 1,500 RPM ≥ 167 Revs	Excessive Knk Weight Coefficient = 0.0060 Updated each engine event	
			2. Abnormal Noise Diag: Filtered FFT Intensity: (where 'FFT Intensity' = Non-knocking, background noise)	< **AbnormalNoise_Threshold** (Supporting Table)	Individual Cylinders enabled for Abnormal Noise Engine Speed Cumlative Number of Engine Revs Above Min	**AbnormalNoise_CylsEnabled** (Supporting Table) ≥ 2,500 RPM ≥ 167 Revs	Abnormal Noise Weight Coefficient = 0.0060 Updated each engine event	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			- - - - - - - - - - - - - - - - - - - 3. Flat Signal Diag: Filtered Signal Delta (Current FFT Intensity - Ave_Intensity_No-Knock)	- - - - - - - - - - - - - - - - - - < 0.008 (no units)	Eng Speed (per key cycle) - - - - - - - - - - - - - - - - - - - Engine Speed Cumlative Number of Engine Revs Above Min Eng Speed (per keycycle)	- - - - - - - - - - - - - - - - - - - ≥ 8,500 RPM ≥ 100 Revs	- - - - - - - - - - - - - Flat Signal Weight Coefficient = 0.010 Updated each engine event	

15 OBDG11 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor 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	Sensor Input or Return Signal Line	< 8.0 Percent (of 5 V reference)	Diagnostic Enabled? Engine Speed	Yes > 0 RPM and < 8,500 RPM	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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	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 B, 2 Trips

Component/ System	Fault Code	Monitor 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 There are two possible methods used: 1. 20 kHz 2. Normal Noise See **Supporting Tables** for method definition: **P0325_P0330_OpenMethod** Typical implementations: A. Use 20 kHz method at all 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	Open Circuit Method chosen (2 possible methods: 20 kHz or Normal Noise): **Thresholds for OpenMethod = 20 kHZ** Filtered FFT Output **Thresholds for OpenMethod = NormalNoise**: Filtered FFT Output	Supporting Table: **OpenMethod** (See Supporting Tables) **> OpenCktThrshMin (20 kHz) AND < OpenCktThrshMax (20 kHz)** **> OpenCktThrshMin (Normal Noise) AND < 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 ECT IAT	Yes ≥ 2.0 seconds ≥ 400 RPM and ≤ 8,500 RPM ≥ 100 revs ≥ 10 mg/cylinder and ≤ 2,000 mg/cylinder ≥ -40 deg's C ≥ -40 deg's C	First Order Lag Filter with Weight Coefficient Weight Coefficient = 0.0100 Updated each engine event	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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, due to 1. Excessive knock or 2. Abnormal engine noise on a per bank basis or 3. Flat signal	Common Enable Criteria (Applies to all 3 parts of the performance diag)		Diagnostic Enabled? Engine Run Time Engine Speed Engine Air Flow ECT IAT	Yes ≥ 2.0 seconds ≤ 8,500 RPM ≥ 10 mg/cylinder and ≤ 2,000 mg/cylinder ≥ -40 deg's C ≥ -40 deg's C		Type B, 2 Trips
			Specific Enable Criteriaand Thresholds for 3 individual parts of the performance diag:				First Order Lag Filters with Weight Coefficients	
			1. Excessive Knock Diag: Filtered Knock Intensity (where 'Knock Intensity' = 0 with no knock; and > 0 & proportional to knock magnitude with knock)	> 1.50 (no units)	Engine Speed Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle)	≥ 1,500 RPM ≥ 167 Revs	Excessive knk Weight Coefficient = 0.0060 Updated each engine event	
			2. Abnormal Noise Diag: Filtered FFT Intensity: (where 'FFT Intensity' = Non-knocking, background noise)	< **AbnormalNoise_Threshold** (Supporting Table)	Individual Cylinders enabled for Abnormal Noise Engine Speed Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle)	**AbnormalNoise_CylsEnabled** (Supporting Table) ≥ 2,500 RPM ≥ 167 Revs	Abnormal Noise Weight Coefficient = 0.0060 Updated each engine event	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			- - - - - - - - - - - - - - - - - - - 3. Flat Signal Diag: Filtered Signal Delta (Current FFT Intensity - Ave_Intensity_No-Knock)	- - - - - - - - - - - - - - - - - - < 0.008 (no units)	- - - - - - - - - - - - - - - - - - - Engine Speed Cumlative Number of Engine Revs Above Min Eng Speed (per keycycle)	- - - - - - - - - - - - - - - - - - - ≥ 8,500 RPM ≥ 100 Revs	- - - - - - - - - - - - - Flat Signal Weight Coefficient = 0.010 Updated each engine event	

Component/ System	Fault Code	Monitor 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	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 B, 2 Trips

Component/ System	Fault Code	Monitor 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	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 B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP) Sensor A Circuit	P0335	Determines if a fault exists with the crank position sensor signal	Time since last crankshaft position sensor pulse received	>= 4.0 seconds	Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow	 = FALSE = FALSE = FALSE > 3.0 grams/second))	Continuous every 100 msec	Type B, 2 Trips
			No crankshaft pulses received	>= 0.3 seconds	Engine is Running Starter is not engaged No DTC Active:	 5VoltReferenceB_FA	Continuous every 12.5 msec	
			No crankshaft pulses received		Engine is Running OR Starter is engaged No DTC Active:	 5VoltReferenceA_FA 5VoltReferenceB_FA P0340 P0341	2 failures out of 10 samples One sample per engine revolution	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP) Sensor A Performance	P0336	Determines if a performance fault exists with the crank position sensor signal	Time in which 10 or more crank re-synchronizations occur	< 10.0 seconds	Engine Air Flow Cam-based engine speed No DTC Active:	>= 3.0 grams/second > 450 RPM 5VoltReferenceB_FA P0335	Continuous every 250 msec	Type B, 2 Trips
			No crankshaft synchronization gap found	>= 0.4 seconds	Engine is Running Starter is not engaged No DTC Active:	5VoltReferenceB_FA	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 (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow	= FALSE = FALSE = FALSE > 3.0 grams/second))	Continuous every 100 msec	
			Crank pulses received in one engine revolution OR Crank pulses received in one engine revolution	< 51 > 65	Engine is Running OR Starter is engaged No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA P0340 P0341	8 failures out of 10 samples One sample per engine revolution	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor A	P0340	Determines if a fault exists with the cam position bank 1 sensor A signal	Time since last camshaft position sensor pulse received OR Time that starter has been engaged without a camshaft sensor pulse	>= 5.5 seconds >= 4.0 seconds	Starter engaged AND (crank pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow	= FALSE = FALSE = FALSE > 3.0 grams/second))	Continuous every 100 msec	Type B, 2 Trips
			Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Engine is running Starter is not engaged No DTC Active:	5VoltReferenceA_FA	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:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Continuous every MEDRES event	
			The number of camshaft pulses received during 100 engine cycles	= 0	Crankshaft is synchronized No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor A	P0341	Determines if a performance fault exists with the cam position bank 1 sensor A signal	The number of camshaft pulses received during first 24 MEDRES events is OR (There are 24 MEDRES events per engine cycle)	< 4 > 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:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensorFA	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:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensorFA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #1 CIRCUIT - for 3 DTC implementation only	P0351	Diagnoses Cylinder #1 Ignition Control (EST) output driver circuit for an Open Circuit fault.	High impedance during driver high state (indicates open circuit)	$\geq$ 30 kΩ impedance between signal and controller ground	Engine running Ignition Voltage	 > 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #2 CIRCUIT - for 3 DTC implementation only	P0352	Diagnoses Cylinder #2 Ignition Control (EST) output driver circuit for an Open Circuit fault.	High impedance during driver high state (indicates open circuit)	$\geq$30 kΩ impedance between signal and controller ground	Engine running Ignition Voltage	> 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #3 CIRCUIT - for 3 DCT implementation only	P0353	Diagnoses Cylinder #3 Ignition Control (EST) output driver circuit for an Open Circuit fault.	High impedance during driver high state (indicates open circuit)	$\geq$ 30 kΩ impedance between signal and controller ground	Engine running Ignition Voltage	 > 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

15 OBDG11 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #4 CIRCUIT - for 3 DTC implementati on only	P0354	Diagnoses Cylinder #4 Ignition Control (EST) output driver circuit for an Open Circuit fault.	High impedance during driver high state (indicates open circuit)	$\geq$ 30 kΩ impedance between signal and controller ground	Engine running Ignition Voltage	 > 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #5 CIRCUIT - for 3 DTC implementation only	P0355	Diagnoses Cylinder #5 Ignition Control (EST) output driver circuit for an Open Circuit fault.	High impedance during driver high state (indicates open circuit)	$\geq$ 30 kΩ impedance between signal and controller ground	Engine running Ignition Voltage	 > 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #6 CIRCUIT - for 3 DTC implementation only	P0356	Diagnoses Cylinder #6 Ignition Control (EST) output driver circuit for an Open Circuit fault.	High impedance during driver high state (indicates open circuit)	$\geq$ 30 kΩ impedance between signal and controller ground	Engine running Ignition Voltage	 > 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #7 CIRCUIT - for 3 DTC implementation only	P0357	Diagnoses Cylinder #7 Ignition Control (EST) output driver circuit for an Open Circuit fault.	High impedance during driver high state (indicates open circuit)	$\geq$ 30 kΩ impedance between signal and controller ground	Engine running Ignition Voltage	 > 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #8 CIRCUIT - for 3 DTC implementation only	P0358	Diagnoses Cylinder #8 Ignition Control (EST) output driver circuit for an Open Circuit fault.	High impedance during driver high state (indicates open circuit)	$\geq$ 30 kΩ impedance between signal and controller ground	Engine running Ignition Voltage	 > 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 StorageThe 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. General Enable Criteria In addition to the p-codes listed under P2270, the following DTC's shall also not be set:	> 0.46 < 0.10 12 O2S_Bank_1_Sensor_1_FA O2S_Bank_1_Sensor_2_FA O2S_Bank_2_Sensor_1_FA O2S_Bank_2_Sensor_2_FA	1 test attempted per valid decel period Minimum of 1 test per trip Maximum of 8 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 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 the 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. These conditions and their related values are listed in the "Secondary						

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Parameters" and "Enable Conditions" section of this document for P2270 (O2 Sensor Signal Stuck Lean Bank 1 Sensor 2)						

Component/ System	Fault Code	Monitor 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 StorageThe 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 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. General Enable Criteria In addition to the p-codes listed under P2272, the following DTC's shall also not be set:	> 0.46 < 0.10 12 O2S_Bank_1_Sensor_1_FA O2S_Bank_1_Sensor_2_FA O2S_Bank_2_Sensor_1_FA O2S_Bank_2_Sensor_2_FA	1 test attempted per valid decel period Minimum of 1 test per trip Maximum of 8 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 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_WorstPassing OSCTableB2** and **P0430_BestFailingOS CTableB2** in the 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. These conditions and their related values are listed in the "Secondary						

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		Parameters" and "Enable Conditions" section of this document for P2272 (O2 Sensor Signal Stuck Lean Bank 2 Sensor 2)						

Component/ System	Fault Code	Monitor 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)	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) Table** 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.	> 0.70 (EWMA Fail Threshold), ≤ 0.35 (EWMA Re-Pass Threshold)	Fuel Level Drive Time Drive length ECT 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 Ambient Air Temperature to be valid: 1. Cold Start	10 % ≤ Percent ≤ 90 % ≥ 900 seconds ≥ 9.7 miles ≥ 63 °C ≥ 70 kPa ≥ 10.0 miles ≤ refer to **P0442: Engine Off Time Before Vehicle Off Maximum as a Function of Estimated Ambient Temperature Table** in Supporting Tables. ≥ 17 hours ≥ 10 hours 0 °C≤Temperature≤ 34 °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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		the pressure drops (-62.27) 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 62.27 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.			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. Please see **P0442: Estimate of Ambient Temperature Valid Conditioning Time Table** in Supporting Tables. OR 4. Not a Cold Start and greater than a Short Soak Previous time since engine off AND Vehicle Speed AND Mass Air Flow	≤ 8 °C ≤ 7,200 seconds ≤ 7,200 seconds ≥ 10.0 mph ≥ 10 g/sec > 7,200 seconds ≥ 10.0 mph ≥ 10 g/sec		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Must expire maximum value in Estimate of Ambient Temperature Valid Conditioning Time. Please see **P0442: Estimate of Ambient Temperature Valid Conditioning Time Table** in Supporting Tables. 1. High Fuel Volatility During the volatility phase, pressure in the fuel tank is integrated vs. 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	< -5		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 during the EONV test OR 7. Key up during EONV test	0.50 seconds		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No active DTCs:	MAF_SensorFA ECT_Sensor_FA IAT_SensorFA VehicleSpeedSensor_FA IgnitionOffTimeValid AmbientAirDefault P0443 P0446 P0449 P0452 P0453 P0455 P0496		

Component/ System	Fault Code	Monitor 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 - For 3 DTC Implementation Only)	P0443	Diagnoses the canister purge solenoid low side driver circuit for circuit faults	Voltage low during driver off state (indicates open circuit)	Open circuit: ≥ 200 K Ω impedence between signal and controller ground	PT Relay Voltage	Voltage ≥ 11 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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission (EVAP) Vent System Performance (No ELCP - Conventional EVAP Diagnostic)	P0446	This DTC will determine if a restriction is present in the vent solenoid, vent filler, vent hose or EVAP canister. This test runs with normal purge and vent valve is open.	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, 2 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 ≥ 14 liters	Fuel Level System Voltage Startup IAT Startup ECT BARO No active DTCs:	10 % ≤ Percent ≤ 90 % 11 volts ≤ Voltage ≤ 32 volts 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C ≥ 70 kPa MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454	Once per Cold Start Time is dependent on driving conditions Maximum time before test abort is 1,000 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 - For 3 DTC Implementation Only)	P0449	Diagnoses the vent solenoid low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	Open circuit: ≥ 200 K Ω impedence between signal 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 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.	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 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)	P0452	This DTC will detect a Fuel Tank Pressure (FTP) sensor signal that is too low out of range.	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 ~ 1,681 Pa)	Time delay after sensor power up for sensor warm-up is	0.10 seconds	640 failures out of 800 samples 12.5 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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)	P0453	This DTC will detect a Fuel Tank Pressure (FTP) sensor signal that is too high out of range.	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 % of Vref or ~ -4,172 Pa)	Time delay after sensor power up for sensor warm-up is	0.10 seconds	640 failures out of 800 samples 12.5 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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.	If an abrupt change in tank vacuum is detected the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that a refueling event occurred. If a refueling is confirmed, then the test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem. An abrupt change is defined as a change in vacuum: in the span of 1.0 seconds. But in 12.5 msec. A refueling event is confirmed if the fuel level has a persistent change of for 30 seconds during a 600 second refueling rationality test.	> 112 Pa < 249 Pa > 10 %	This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes and the canister vent solenoid is closed		This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period.The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete.The test will report a failure if 2 out of 3 samples are failures. 12.5 ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor 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)	P0455	This DTC will detect a weak vacuum condition (large leak or purge blockage) in the EVAP system. Purge valve is controlled (to allow purge flow) and vent valve is commanded closed.	Purge volume while Tank vacuum After setting the DTC for the first time, 2 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.	> 64 liters ≤ 2,740 Pa ≥ 2,740 Pa	Fuel Level System Voltage BARO Purge Flow No active DTCs: Cold Start Test If ECT > IAT, Startup temperature delta (ECT-IAT): Cold Test Timer 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 % 11 volts ≤ Voltage ≤ 32 volts ≥ 70 kPa ≥ 3.75 % MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454 ≤ 8 °C ≤ 1,000 seconds 4 °C≤Temperature≤ 30 °C ≤ 35 °C	Once per cold start Time is dependent on driving conditions Maximum time before test abort is 1,000 seconds Weak Vacuum Follow-up Test With large leak detected, the follow-up test is limited to 1,300 seconds. Once the MIL is on, the follow-up test runs indefinitely.	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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	Diagnoses the canister purge solenoid low side driver circuit for circuit faults	Voltage low during driver off state (indicates short to ground)	Short to ground: ≤ 0.5 Ω impedence between signal and controller ground	PT Relay Voltage	Voltage ≥ 11 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 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	Diagnoses the canister purge solenoid low side driver circuit for circuit faults	Voltage high during driver on state (indicates short to power)	Short to power: ≤ 0.5 Ω impedence between signal and controller power	PT Relay Voltage	Voltage ≥ 11 volts	20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 fuel sender stuck in range in the primary fuel tank.	Delta fuel volume change over an accumulated 87 miles.	< 5 liters	Engine Running No active DTCs:	 VehicleSpeedSensor_FA	250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 fuel sender stuck out of range low in the primary fuel tank.	Fuel level Sender % of 5V range	< 10 %			100 failures out of 125 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 fuel sender stuck out of range high in the primary fuel tank.	Fuel level Sender % of 5V range	> 60 %			100 failures out of 125 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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.	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.	 > 10 % > 10 %	This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period.The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete.The test will report a failure if 2 out of 3 samples are failures. 100 ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor 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)	P0496	This DTC will determine if the purge solenoid is leaking to engine manifold vacuum. This test will run with the purge valve closed and the vent valve closed.	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 Table** in Supporting Tables.	Fuel Level System Voltage BARO Startup IAT Startup ECT Engine Off Time No active DTCs:	10 % ≤ Percent ≤ 90 % 11 volts ≤ Voltage ≤ 32 volts ≥ 70 kPa 4 °C≤Temperature≤ 30 °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	Once per cold start Cold start: max time is 1,000 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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)	P0498	Diagnoses the vent solenoid low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short to ground)	Short to ground: ≤ 0.5 Ω impedence between signal 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 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)	P0499	Diagnoses the vent solenoid low side driver circuit for circuit faults. If the P0499 is active, an intrusive test is performed with the vent solenoid commanded closed for 15 seconds.	Voltage low during driver on state (indicates short to power)	Short to power: ≤ 0.5 Ω impedence between signal and controller power			20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Low Engine Speed Idle System	P0506	This DTC will determine if a low idle exists	Filtered Engine Speed Error	> 89.00 rpm	Baro	> 70 kPa	Diagnostic runs in every 12.5 ms loop	Type B, 2 Trips
			filter coefficient	0.00275	Coolant Temp	> KeSPDD_T_EnblECT_Min (60 °C) and < KfECTI_T_EngCoolHotHiThresh (128 °C) Must verify KfECTI_T_EngCoolHotLoThresh (125) is less than KfECTI_T_EngCoolHotHiThresh (128)	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		
					Commanded RPM delta	≤ 25 rpm		
					Idle time	> 10 sec		
					For manual transmissions: Clutch Pedal Position or Clutch Pedal Position	> 88.00 pct < 20.00 pct		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						PTO not active Transfer Case not in 4WD LowState Off-vehicle device control (service bay control) must not be active. following conditions not TRUE: (VeTESR_e_EngSpdReqIntvType = CeTESR_e_EngSpdMinLimit AND VeTESR_e_EngSpdReqRespType = CeTESR_e_NoSuggestion) Clutch is not depressed		
					No active DTCs	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		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA FuelLevelDataFault LowFuelConditionDiagnostic Clutch Sensor FA AmbPresDfltdStatus P2771		
					All of the above met for Idle time	> 10 sec The diagnostic does not run during autostop as engine is shutdown during that time (occurs in a hybrid or 12v start stop vehicle)		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
High Engine Speed Idle System	P0507	This DTC will determine if a high idle exists	Filtered Engine Speed Error	< -178.00 rpm	Baro	> 70 kPa	Diagnostic runs in every 12.5 ms loop	Type B, 2 Trips
			filter coefficient	0.00275	Coolant Temp	> KeSPDD_T_EnblECT_Min (60 °C) and < KfECTI_T_EngCoolHotHiThresh (128 °C) Must verify KfECTI_T_EngCoolHotLoThresh (125) is less than KfECTI_T_EngCoolHotHiThresh (128)	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 kph		
					Commanded RPM delta	≤ 25 rpm		
					For manual transmissions: Clutch Pedal Position or Clutch Pedal Position	> 88.00 pct < 20.00 pct		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						PTO not active Transfer Case not in 4WD LowState Off-vehicle device control (service bay control) must not be active. following conditions not TRUE: (VeTESR_e_EngSpdReqIntvType = CeTESR_e_EngSpdMinLimit AND VeTESR_e_EngSpdReqRespType = CeTESR_e_NoSuggestion) Clutch is not depressed		
					No active DTCs	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		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						FuelLevelDataFaultLow FuelConditionDiagnostic Clutch SensorFA AmbPresDfltdStatus P2771		
					All of the above met for Idle time	> 10 sec		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Oil Pressure (EOP) Sensor Performance	P0521	Determines if the Engine Oil Pressure (EOP) Sensor is stuck or biased in range	**Single Stage Oil Pump EOP Sensor Test with Engine Running** If enabled: <u>To fail a currently failing test:</u> The filtered, weighted difference between measured EOP and predicted EOP (a function of engine speed and engine oil temp.): <u>To pass a currently passing test:</u> The filtered, weighted difference between measured EOP and predicted EOP (a function of engine speed and engine oil temp.):	< -50.0 kPa OR > 50.0 kPa > -47.0 kPa AND < 47.0 kPa	Diagnostic status Oil Pressure Sensor In Use Quality or weighting factor 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. Regions where diagnosis is possible have a quality or weighting factor value that is a function of engine speed, engine oil temperature, predicted oil pressure, and engine load stability. (**RPM_Weighting_Factor** * **Oil_Temp_Weighting_Factor** * **Eng_Load_Stability_Weighting_Factor** * **Eng_Oil_Pred_Weighting_Factor**) with a first order filter coefficient of 0.01 (See Details on P0521 Supporting Tables Tab) **RPM_Weighting_Factor** **RPM_Weighting_Factor_X_Axis**	Enabled Yes >= 0.30 weighting	Performed every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Oil_Temp_Weighting_Factor **Oil_Temp_Weighting_Factor_Axis** **Eng_Load_Stability_Weighting_Factor** **Eng_Load_Stability_Weighting_Factor_Axis** **Eng_Oil_Pred_Weighting_Factor** **Eng_Oil_Pred_Weighting_Factor_Axis** No active DTC's	Fault bundles: EngOilPressureSensorCktFA CrankSensorFA ECT_Sensor_FA MAF_SensorFA IAT_SensorFA		

Component/ System	Fault Code	Monitor 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	(Engine Oil Pressure Sensor Circuit Voltage) ÷ 5 Volts) *100	< 5.00 percent	Engine Speed Enable Engine Speed Disable Oil Pressure Sensor In Use Diagnostic status	> 400 rpm < 350 rpm Yes Enabled	50 failures out of 63 samples Performed every 6.25 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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	(Engine Oil Pressure Sensor Circuit Voltage) ÷ 5 Volts) *100	> 85.00 percent	Oil Pressure Sensor In Use Diagnostic status	Yes Enabled	204 failures out of 255 samples Performed every 6.25 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Air Conditioning High Side Pressure Sensor (HSPS) Circuit Low Voltage	P0532	Determines if the Air Conditioning High Side Pressure Sensor circuit voltage is too low	(AC High Side Pressure Sensor Circuit Voltage) ÷ 5 Volts) *100	< 2 percent	AC HSP Sensor Present Diagnostic status	Yes Enabled	80 failures out of 100 samples Performed every 25 msec	Type C, No MIL

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Air Conditioning High Side Pressure Sensor (HSPS) Circuit High Voltage	P0533	Determines if the Air Conditioning High Side Pressure Sensor circuit voltage is too high	AC High Side Pressure Sensor Circuit Voltage) ÷ 5 Volts) *100	> 98 percent	AC HSP Sensor Installed Diagnostic status	Yes Enabled	80 failures out of 100 samples Performed every 25 msec	Type C, No MIL

Component/ System	Fault Code	Monitor 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 illegal range	Cruise Control analog circuit voltage must be in an "illegal range" or "between ranges" for greater than a calibratable period of time for cruise switch states that are received over serial data		CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 0.500 seconds	MIL: Type C, No MIL

Component/ System	Fault Code	Monitor 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 for architecture where cruise switch states are received over serial data		CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 90.000 seconds	MIL: Type C, No MIL

Component/ System	Fault Code	Monitor 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 for architecture where cruise switch states are received over serial data		CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 90.000 seconds	MIL: Type C, No MIL

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Input Circuit	P0575	Detects rolling count or protection value errors in Cruise Control Switch Status serial data signal	If x of y rolling count / protection value faults occur, disable cruise for duration of fault		Cruise Control Switch Serial Data Error Diagnostic Enable	1.00	10 / 16 counts	MIL: Type C, No MIL

Component/ System	Fault Code	Monitor 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 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 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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up does not match checksum at power-down				Diagnostic runs at powerup Diagnostic reports a fault if 1 failure occurs	Type A, 1 Trips

Component/ System	Fault Code	Monitor 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	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 >	0.47088 s			When dual store updates occur.	

Component/ System	Fault Code	Monitor 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 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	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 >= 6.41 or Run/Crank voltage >= 11.00 , 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 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_ConfigRegTestEnbld is: 1 . (If 0, this test is disabled) time from initialization >= 0.4875 seconds	50 ms	
			memory and complement memory do not agree				0.19 seconds	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Software background task first pass time to complete exceeds			Run/Crank voltage > 6.41	360.000 seconds	
			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	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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			controller initialization. Counter >=					
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		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(Loop Time). See supporting tables: **Program Sequence Watch Enable f(Loop Time)** (If 0, this Loop Time test is disabled)	Fail Table, f(Loop Time). See supporting tables: **PSW Sequence Fail f (Loop Time)** / Sample Table, f (Loop Time)See supporting tables: **PSW Sequence Sample f(Loop Time)** counts 50 ms/count in	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							the ECM main processor	
			MAIN processor determines a seed has not changed within a specified time period within the 50ms task.	Previous seed value equals current seed value.		KePISD_b_SeedUpdKeyStorFltEnbl == 1 Value of KePISD_b_SeedUpdKeyStorFltEnbl is: 1 . (If 0, this test is disabled)	Table, f(Loop Time). See supporting tables: **Last Seed Timeout f (Loop Time)**	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Relay Control Circuit Low Voltage	P0628	Diagnoses the fuel pump relay control high side driver circuit for circuit faults	Voltage low during driver on state (indicates short to ground)	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	Run/Crank Voltage Engine Speed	Voltage ≥ 11 volts ≥ 0 RPM	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module EEPROM Error	P062F	Indicates that the NVM Error flag has not been cleared	The next write to NVM will not succeed or the assembly calibration integrity check failed.		Ignition State	= unlock/accessory, run, or crank	1 test failure Diagnostic runs once at powerup	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 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	ECM Vref1 < or ECM Vref1 > or the difference between ECM filtered Vref1 and Vref1 >	4.8750 5.1250 0.0495		Run/Crank voltage > 6.41	19 / 39 counts or 0.1875 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Malfunction Indicator Lamp (MIL) Control Circuit (ODM) Open - For 3 DTC implementation only	P0650	Diagnoses the malfunction indicator lamp 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	Run/Crank Voltage Remote Vehicle Start is not active	Voltage ≥ 11 volts	50 failures out of 63 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 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	ECM Vref2 < or ECM Vref2 > or the difference between ECM filtered Vref2 and Vref2 >	4.8750 5.1250 0.0495		Run/Crank voltage > 6.41	19 / 39 counts or 0.1875 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Powertrain Relay Control (ODM) Open - For 3 DTC implementation only	P0685	Diagnoses the powertrain relay control low side driver circuit for circuit faults	Voltage low during driver off state (indicates open circuit)	Open Circuit: ≥ 200 K Ω ohms impedance between signal and controller ground	Run/Crank Voltage	Voltage ≥ 11 volts	8.00 failures out of 10.00 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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Powertrain Relay Control (ODM) Low	P0686	Diagnoses the powertrain 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	Run/Crank Voltage	Voltage ≥ 11 volts	8.00 failures out of 10.00 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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Powertrain Relay Control (ODM) High	P0687	Diagnoses the powertrain 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	Run/Crank Voltage	Voltage ≥ 11 volts	8.00 failures out of 10.00 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Powertrain Relay Feedback Circuit High	P0690	This DTC is a check to determine if the Powertrain relay is functioning properly.	Powertrain Relay Voltage	>= 4.0 volts will increment the fail counter	Powertrain relay commanded “OFF” No active DTCs:	>= 2.00 seconds PowertrainRelayStateOn_FA	50.00 failures out of 63.00 samples 100ms / Sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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	ECM Vref3 < or ECM Vref3 > or the difference between ECM filtered Vref3 and Vref3 >	4.8750 5.1250 0.0495		Run/Crank voltage > 6.41	19 / 39 counts or 0.1875 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor 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	ECM Vref4 < or ECM Vref4 > or the difference between ECM filtered Vref4 and Vref4 >	4.8750 5.1250 0.0495		Run/Crank voltage > 6.41	19 / 39 counts or 0.1875 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor 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 used only for the '20 kHz' method of the Open Circuit Diagnostic	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 < 3,500 RPM ≥ 200 Revs ≥ 10 mg/cylinder and ≤ 2,000 mg/cylinder	First Order Lag Filter with Weight Coefficient Weight Coefficient = 0.0100 Updated each engine event	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 used only for the '20 kHz' method of the Open Circuit Diagnostic	FFT Diagnostic Output	**> P06B6_P06B7_OpenTestCktThrshMin** **AND** **< P06B6_P06B7_OpenTestCktThrshMax** **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 < 3,500 RPM ≥ 200 Revs ≥ 10 mg/cylinder and ≤ 2,000 mg/cylinder	First Order Lag Filter with Weight Coefficient Weight Coefficient = 0.0100 Updated each engine event	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 line to determine when the TCM has detected a MIL illuminating fault.	Transmission Emissions-Related DTC set			Time since power-up ≥ 3 seconds	Continuous	Type A, No MIL

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Inlet Airflow System Performance (naturally aspirated)	P1101	Determines if there are multiple air induction problems affecting airflow and/or manifold pressure.	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	<= 300 kPa*(g/s) > 20 grams/sec > 20.0 kPa) > 20.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) No Active DTCs:	>= 465 RPM <= 4,600 RPM > -7 Deg C < 129 Deg C > -20 Deg C < 100 Deg C >= 0.50 Filtered Throttle Model Error multiplied by **TPS Residual Weight Factor based on RPM** Modeled Air Flow Error multiplied by **MAF Residual Weight Factor based on RPM** and **MAF Residual Weight Factor Based on MAF Est** MAP Model 1 Error multiplied by **MAP1 Residual Weight Factor based on RPM** MAP Model 2 Error multiplied by **MAP2 Residual Weight Factor based on RPM** See Residual Weight Factor tables. MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No Pending DTCs:	IAT_SensorFA EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Metal Over temperature Active	P1258	The objective of the algorithm is to protect the engine in the event of engine metal overtemperature, mainly due to loss of coolant	Engine Coolant For a period	>= 129 °C >= 10 seconds	Engine Run Time If feature was active and it set the coolant sensor fault then feature will be enabled on coolant sensor fault pending on the next trip.	>= 10 Seconds	Fault present for >= 0 seconds	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
ABS Rough Road malfunction	P1380	This diagnostic detects if the ABS controller is indicating a fault, and misfire is present. When this occurs, misfire will continue to run. If Misfire P0300 then sets while the ABS fault is present, P1380 will set as a diagnostic aid.	GMLan Message: "Wheel Sensor Rough Road Magnitude Validity"	= FALSE	Vehicle Speed Engine Speed Engine LoadRunCrankActive Active DTC	VSS ≥ 5 mph rpm < 8,192 load < 60 = TRUE P0300, MIL Request	40 failures out of 80 samples 250 ms /sample Continuous	Type C, No MIL "Special Type C"

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Engine Speed Request Circuit	P150C	Determines if engine speed request from the TCM is valid	Serial Communication rolling count value	+ 1 from previous $19D message (PTEI3)	Diagnostic enable bit	1	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips
			Transmission engine speed protection	not equal to 2's complement of transmission engine speed request + Transmission alive rolling count	Engine run time	0.50 sec		
					# of Protect Errors	10 protect errors out of 10 samples		
					# of Alive Rolling Errors	6 rolling count errors out of 10 samples		
					No idle diagnostic 506/507 code	IAC_SystemRPM_FA		
					No Serial communication loss to TCM	(U0101)		
					Engine Running	= TRUE		
					Power mode	Run Crank Active		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Steady State Actuation Fault	P1516	Detect an inablity to maintain a steady state throttle position	The absolute difference between desired and indicated throttle position is >	2.00 percent		Run/Crank voltage > 6.41 Ignition voltage failure is false (P1682) TPS minimum learn is not active and Throttle is being Controlled Throttle is considered in a steadystate condition when the desired throttle position over a 12.5 ms period is < 0.25 percent for a settling time period > 4.00 s	0.49 ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Switch State Undertermined	P155A	Detects when cruise switch state cannot be determined, such as low voltage conditions	cruise switch state remains undetermined for greater than a calibratable time				fail continuously for greater than 15.5 seconds	MIL: Type C, No MIL

Component/ System	Fault Code	Monitor 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 & the Powertrain Relay Ignition Voltage	|Run/Crank – PT Relay Ignition| >	3.00 Volts		Powertrain commanded on AND (Run/Crank voltage > Table, f(IAT). See supporting tables: **PT Relay Pull-in Run/Crank Voltage f(IAT)** OR PT Relay Ignition voltage > 5.50) AND Run/Crank voltage > 5.50 .	240 / 480 counts or 0.1750 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Redundant Memory Performance	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.	Desired Throttle Area calculated does not equal its redundant calculation	N/A	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	Type A, 1 Trips
			Equivance Ratio torque compensation exceeds threshold	-100.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Absolute difference between Equivance Ratio torque compensation and its dual store out of bounds given by threshold	100.00 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	100.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor 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	118.03 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	8.09 degrees		Engine speed >0rpm	Up/down timer 158 ms continuous, 0.5 down time multipier	
			Torque Learn offset is out of bounds given by threshold range	High Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				Low Threshold 0.00 Nm			multipier	
			One step ahead calculation of air-per-cylinder and two step ahead is greater than threshold	80.00 mg		Engine speed > 515 rpm	Up/down timer 458 ms continuous, 0.5 down time multipier	
			Difference between Unmanaged Spark and PACS Spark is greater than threshold	8.10 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	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							multipier	
			Zero pedal axle torque is out of bounds given by threshold range	High Threshold 1,503.00 Nm Low Threshold -65,535.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Creep Coast Axle Torque is out of bounds given by threshold range	High Threshold 1,503.00 Nm Low Threshold -65,535.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Absolute difference of Friction torque and its redundant calculation is out of bounds given by threshold range	100.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							multipier	
			Arbitrated Air-Per-Cylinder filter coefficient is out of bounds given by threshold range	High Threshold 1.000 Low Threshold 0.074	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Launch spark is active but the launch spark redundant path indicates it should not be active	N/A		Engine speed < 7,900.00 or 8,000.00 rpm (hysteresis pair)	Up/down timer 158 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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Preload Throttle Area and its dual store 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	
			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	High Threshold: 1.10	Ignition State	Accessory, run or crank	255 / 6 counts; 25.0msec/count	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			range	T/C Range Hi 0.10 T/C Range Lo Low Threshold: 1.10 T/C Range Hi 0.10 T/C Range Lo				
			TOS to wheel speed conversion factor and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	255 / 6 counts; 25.0msec/count	
			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	Up/down timer 158 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						active		
			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	32 / 0 counts; 25.0msec/count	
			Transfer case neutral and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	8 / 16 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 multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Predicted torque for uncorrected zero pedal determination is greater than calculated limit.	Table, f(Engine, Oil Temp). See supporting tables + 100.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Engine Predicted Request Without Motor is greater than its redundant calculation plus threshold	99.00 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	99.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Positive Torque Offset is greater than its redundant calculation plus threshold OR Positive Torque Offset is less than its redundant calculation minus threshold	100.00 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	100.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Commanded Hybrid Predicted Crankshaft Request is greater than its redundant calculation plus threshold	4,096.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Commanded Hybrid Immediate Crankshaft Request is less than its redundant calculation minus threshold	4,096.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Regeneration Brake Assist is not within a specified range	Brake Regen Assist < 0 Nm or Brake Regen Assist >	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous,	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				0.00 Nm			0.5 down time multipier	
			Cylinder Spark Delta Correction exceeds the absolute difference as compared to Unadjusted Cylinder Spark Delta	8.10 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 2. Sum of Cylinder Torque Offset exceeds sum threshold	1. 100.00 Nm 2. 100.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Engine Capacity Minimum Immediate Without Motor is greater than its dual store plus threshold	100.00 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	
			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	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Commanded Immediate Engine Request is greater than its redundant calculation plus threshold	100.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing (event based) calculation does not equal its redundant calculation	N/A		Engine speed greater than 0rpm	Up/down timer 158 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing timing (event	N/A		Engine speed greater than 0rpm	Up/down timer 158	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			based) calculation does not equal its redundant calculation				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: **Speed Control External Load f(Oil Temp, RPM)** + 100.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 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: **Speed Control External Load f(Oil Temp, RPM)** + 100.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Difference between Driver Requested Immediate	1,503.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Torque primary path and its secondary exceeds threshold				ms continuous, 0.5 down time multipier	
			Driver Immediate Request is less than its redundant calculation minus threshold	1,503.00 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 OR Commanded Immediate Request is less than its redundant calculation minus threshold	1,503.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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	187.88 Nm		Cruise has been engaged for more than 4.00 seconds	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Desired engine torque request greater than redundant calculation plus threshold	99.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Engine min capacity above threshold	100.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 75 ms continuous, 0.5 down time multipier	
			No fast unmanaged retarded spark above the applied spark plus the threshold	Table, f(RPM,APC). See supporting tables: **Delta Spark Threshold f (RPM,APC)**		Engine speed greater than 0rpm	Up/down timer 175 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 104 ms continuous, 0.5 down time multipier	
			1. Absolute difference of redundant calculated engine speed above threshold	500 RPM		Engine speed greater than 0 RPM	Up/down timer 158 ms continuous, 0.5	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							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 175 ms continuous, 0.5 down time multipier	
			Engine oil temperature and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 250 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Desired throttle position greater than redundant calculation plus threshold	8.41 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	100.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Desired filtered throttle torque exceeds the threshold plus the higher of desired throttle torque or modeled throttle torque	100.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							multipier	
			Torque feedback proportional term is out of allowable range or its dual store copy does not match	High Threshold 50.00 Nm Low Threshold -50.00 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 copy do not match	High Threshold 93.75 Nm Low Threshold -100.00 Nm Rate of change threshold	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				6.25 Nm/loop				
			Difference of Final Torque feedback proportional plus integral term and its redundant calculation is out of bounds given by threshold range	High Threshold 100.00 Nm Low Threshold - 100.00 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 its redundant calculation is out of bounds given by threshold range	High Threshold 0.50 % Low Threshold - 0.50 %	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Difference of torque model coefficients and its redundant calculation is out of bounds given by threshold range	High Threshold 0.0001300 Low Threshold - 0.0001300	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 100.00 Nm Low Threshold - 100.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Accessory drive friction torque is out of bounds given by threshold range	High Threshold 100.00 Nm Low Threshold	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				0.00 Nm				
			AC friction torque is greater than commanded by AC control software or less than threshold limit	High Threshold 55.00 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Difference of Oil temperature delta friction torque and its redundant calculation is out of bounds given by threshold range	High Threshold 100.00 Nm Low Threshold -100.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Generator friction torque is out of bounds given by threshold range	High Threshold 100.00 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Supercharger friction torque is out of bounds given by threshold range	High Threshold 100.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				Low Threshold 0.00 Nm				
			Filtered Torque error magnitude or its increase rate of change is out of allowable range or its dual store copy do not match	High Threshold 100.00 Nm Low Threshold -100.00 Nm Rate of change threshold 6.25 Nm/loop		Engine speed >0rpm MAF, MAP and Baro DTCs are false	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Torque error compensation is out of bounds given by threshold range	High Threshold 100.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				Low Threshold 0.00 Nm			multipier	
			Delta Torque Baro compensation is out of bounds given by threshold range	High Threshold 10.92 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			1. Difference of reserve torque value and its redundant calculation exceed threshold OR 2. Reserve request does not agree with operating conditions or Difference of final predicted torque and its redundant calculation	1. 99.00 Nm 2. N/A 3. 99.00 Nm 4. 99.00		1. & 2.: Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 100.00 Nm	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			exeed threshold OR 3. Rate of change of reserve torque exceeds threshold, increasing direction only OR 4. Reserve engine torque above allowable capacity threshold	Nm	3. & 4.: Ignition State	3. & 4.: Accessory, run or crank		
			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: **Delta MAP Threshold f(Desired Engine Torque)**		Engine speed >0rpm	Up/down timer 158 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	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							ms continuous, 0.5 down time multipier	
			Driver Predicted Request is greater than its redundant calculation plus threshold OR Driver Predicted Request is less than its redundant calculation minus threshold	1,503.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			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	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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)** + 100.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Commanded Predicted Axle Torque and its dual store do not match	1 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Steady State Estimated Engine Torque and its dual store are not equal	N/A		AFM not changing from Active to Inactive and preload torque not changing and one loop after React command Engine speed >0rpm	Up/down timer 1,988 ms continuous, 0.5 down time multipier	
			Difference of Weighting factor for number of cylinders fueled and its	0.26		Engine run flag = TRUE > 10.00 s	Up/down timer 175 ms continuous,	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			redundant calculation is above threshold				0.5 down time multipier	
			Difference of minimum spark advance limit and its redundant calculation is out of bounds given by threshold range	8.09 degrees	Ignition State	Accessory, run or crank	Up/down timer 158 ms continuous, 0.5 down time multipier	
			Difference of commanded spark advance and adjusted delivered is out of bounds given by threshold range	8.09 degrees		Engine speed >0rpm	Up/down timer 158 ms continuous, 0.5 down time multipier	
			Absolute difference between Estimated Engine Torque and its dual store are above a threshold	100.00 Nm		Engine speed >0rpm	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Absolute difference between Estimated Engine Torque without reductions due to torque control and its dual store are above a threshold	100.00 Nm		Engine speed >0rpm	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of desired spark advance for managed torque and its redundant calculation is out of bounds given by threshold range	8.09 degrees		Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 100.00 Nm	Up/down timer 458 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	100.00 Nm		Engine speed >0rpm	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			One step ahead calculation of air-per-cylinder greater than two step ahead calculation by threshold for time	Threshold: Dynamically calculated based on current engine conditions Fault Pending Threshold: 100 ms		Engine speed > 515 rpm	Up/down timer 458 ms continuous, 0.5 down time multipier	
			Rate limited cruise axle torque request and its dual store do not match within a threshold	187.88 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	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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			OR 2. Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions and its dual store do not equal OR 3. Absolute difference of Calculated accelerator pedal position and its dual store do not equal					
			Commanded axle torque is greater than its redundant calculation by threshold	1,503.00 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	-65,535.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous,	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							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	
			AC friction torque is greater than commanded by AC control software	55.00 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	8.09 degrees		Engine speed >0rpm	Up/down timer 158	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			equivalence ratio and its redundant cacluation is greater than a threshold				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	6 / 10 counts; 25.0msec/count	
			Absolute difference of the predicted motor torque ACS and its redundant cacluation is greater than a threshold	0.01 Nm			Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Absolute difference of maximum throttle area and its redundant cacluation is greater than a threshold	15 mm2			Up/down timer 104 ms continuous, 0.5 down time multipier	
			Absolute difference of Desired TIAP and its redundant cacluation is greater than a threshold	25.00 kPa			Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Actuator Solenoid Circuit Low– Bank 1	P2088	Diagnoses the VVT system high side driver circuit for circuit faults.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.	Short to ground: ≤ 0.5 Ω to a voltage source within the Vehicle Ground Voltage Range relative to PWRGND	System supply voltage Output driver is commanded on Ignition switch is in crank or run position	> 11.0 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Actuator Solenoid Circuit High – Bank 1	P2089	Diagnoses the VVT system high side driver circuit for circuit faults.	The ECM detects that voltage is high during driver off state (indicates short to power or open circuit)	Short to power: ≤ 0.5 Ω impedance between signal and controller power 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	> 11.0 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Post Catalyst Fuel Trim System Low Limit Bank 1 (Too Rich)	P2096	Determines if the post catalyst O2 sensor based fuel control system has utilized all or most of it's low limit authority, indicating a rich emissions/exhaust gas condition. Note: If the post catalyst O2 voltage is too rich, the post catalyst O2 integral offset control is decreased. This results in lean bias fuel control in an attempt to correct the rich condition. A perfectly balanced control system (no rich or lean bias required) is represented by an integral offset value of "0" and a post catalyst O2 sensor that is within it's optimal operating range (neither rich nor lean). An integral offset value < 0 is indicative of the control system reacting to a rich post catalyst O2 sensor. If the failure is such that the control system utilizes all or most of its available authority, then P2096 will set.	Rich Fail counter High Vapor Feature: The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions are present. This HV condition is indicated when the purge valve is open AND percent vapor is >= 18 % for >= 5.0 seconds. Diagnosis resumes if the purge valve is closed OR the percent vapor is <= 15 % for >= 20.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary.	>= 300 counts per 375 sample counts Note: Counters increment at a rate of 10 per second when enable conditions are met. If the fail count threshold is reached, a fail is reported and the diagnostic will not report again until the next trip. If the sample count threshold is reached before a fail is reported, a pass is reported, the counters are reset to 0, and evaluation starts again.	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 Long Term Secondary Fuel Trim Enabled (see "**Long Term Secondary Fuel Trim Enable Criteria**" in Supporting Tables) High Vapor Conditions No Fault Active for:	 No No Yes Yes Yes >= 70 kPa >= 0.0 g/s <= 10,000.0 >= 0 kPa <= 200 >= -20 deg. C <= 45 >= -20 deg. C Not Active Not Active Not Present AmbientAirDefault AIR System FA Ethanol Composition Sensor FA ECT_Sensor_FA EGRValveCircuit_FA EGRValvePerformance_FA IAT_SensorFA CamSensorAnyLocationFA EvapEmissionSystem_FA EvapFlowDuringNonPurge_FA FuelTankPressureSnsrCkt_FA	Frequency: Continuous Monitoring in 100ms loop. Counters increment when enable conditions are met. When sample count threshold is reached or fail threshold is reached, counters are reset to 0 and start over.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						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 O2S_Bank_1_Sensor_2_FA		
					The above general enable conditions must be true for:	> 0.0 seconds		
					Minimum accumulated counts in each cell required before counters will increment for that cell:			
					Deceleration	300		
					Idle	300		
					Cruise	300		
					Light Acceleration	300		
					Heavy Acceleration	300		
					(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).			
					For the cells identified as			

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					enabled (i.e. those containing a "Yes" at the beginning of the Enable Conditions column), the fail counter will increment if the sample counter increments AND Post oxygen sensor control integral offset (in mV) is Deceleration Idle Cruise Light Acceleration Heavy Acceleration AND Post O2 Voltage is Deceleration Idle Cruise Light Acceleration Heavy Acceleration (Note: A value in any of the above operating "cells" that is greater than 900mV is an indication that the diagnostic is not capable of diagnosing in that cell).	<= -140 (control min.= -150) -140 (control min.= -150) -390 (control min.= -400) -390 (control min.= -400) -390 (control min.= -400) > 800 mV 800 mV 780 mV 780 mV 780 mV		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Post Catalyst Fuel Trim System High Limit Bank 1 (Too Lean)	P2097	Determines if the post catalyst O2 sensor based fuel control system has utilized all or most of it's high limit authority, indicating a lean emissions/exhaust gas condition. Note: If the post catalyst O2 voltage is too lean, the post catalyst O2 integral offset control is increased. This results in rich bias fuel control in an attempt to correct the lean condition. A perfectly balanced control system (no rich or lean bias required) is represented by an integral offset value of "0" and a post catalyst O2 sensor that is within it's optimal operating range (neither rich nor lean). An integral offset value > 0 is indicative of the control system reacting to a lean post catalyst O2 sensor. If the failure is such that the control system utilizes all or most of its available authority, then P2097 will set.	Lean Fail counter High Vapor Feature: The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions are present. This HV condition is indicated when the purge valve is open AND percent vapor is >= 18 % for >= 5.0 seconds. Diagnosis resumes if the purge valve is closed OR the percent vapor is <= 15 % for >= 20.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary.	>= 300 counts per 375 sample counts Note: Counters increment at a rate of 10 per second when enable conditions are met. If the fail count threshold is reached, a fail is reported and the diagnostic will not report again until the next trip. If the sample count threshold is reached before a fail is reported, a pass is reported, the counters are reset to 0, and evaluation starts again.	Same as P2096 except for the following: For the cells identified as enabled (i.e. those containing a "Yes" at the beginning of the Enable Conditions for P2096), the fail counter will increment if the sample counter increments AND Post oxygen sensor control integral offset (in mV) is Deceleration Idle Cruise Light Acceleration Heavy Acceleration AND Post O2 Voltage is Deceleration Idle Cruise Light Acceleration Heavy Acceleration (Note: A value in any of the above operating "cells" that is less than 100mV is an indication that the diagnostic is not capable of diagnosing in that cell).	>= 130 (control max.= 150) 130 (control max.= 150) 380 (control max.= 400) 380 (control max.= 400) 380 (control max.= 400) < 660 mV 660 mV 660 mV 660 mV 660 mV	Frequency: Continuous Monitoring in 100ms loop. Counters increment when enable conditions are met. When sample count threshold is reached or fail threshold is reached, counters are reset to 0 and start over.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Post Catalyst Fuel Trim System Low Limit Bank 2 (Too Rich)	P2098	Determines if the post catalyst O2 sensor based fuel control system has reached it's low limit authority, indicating a rich emissions/exhaust gas condition. Note: If the post catalyst O2 voltage is too rich, the post catalyst O2 integral offset control is decreased. This results in lean bias fuel control in an attempt to correct the rich post O2 voltage.Determines if the post catalyst O2 sensor based fuel control system has utilized all or most of it's low limit authority, indicating a rich emissions/exhaust gas condition. Note: If the post catalyst O2 voltage is too rich, the post catalyst O2 integral offset control is decreased. This results in lean bias fuel control in an attempt to correct the rich condition. A perfectly balanced control system (no rich or lean bias required) is represented by an integral offset value of	Rich Fail counter High Vapor Feature: The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions are present. This HV condition is indicated when the purge valve is open AND percent vapor is >= 18 % for >= 5.0 seconds. Diagnosis resumes if the purge valve is closed OR the percent vapor is <= 15 % for >= 20.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary.	>= 300 counts per 375 sample counts Note: Counters increment at a rate of 10 per second when enable conditions are met. If the fail count threshold is reached, a fail is reported and the diagnostic will not report again until the next trip. If the sample count threshold is reached before a fail is reported, a pass is reported, the counters are reset to 0, and evaluation starts again.	Same as P2096 except for the following: Bank1 Fault Active criteria are replaced by the equivalent Bank2 Fault Active criteria. The diagnostic is enabled during: Deceleration Idle Cruise Light Acceleration Heavy Acceleration Minimum accumulated counts in each cell required before counters will increment for that cell: 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). For the cells identified as enabled (i.e. those containing a "Yes" at the beginning of the Enable Conditions column), the fail counter will increment	 No No Yes Yes Yes 300 300 300 300 300	Frequency: Continuous Monitoring in 100ms loop. Counters increment when enable conditions are met. When sample count threshold is reached or fail threshold is reached, counters are reset to 0 and start over.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		"0" and a post catalyst O2 sensor that is within it's optimal operating range (neither rich nor lean). An integral offset value < 0 is indicative of the control system reacting to a rich post catalyst O2 sensor. If the failure is such that the control system utilizes all or most of its available authority, then P2098 will set.			if the sample counter increments AND Post oxygen sensor control integral offset is Deceleration Idle Cruise Light Acceleration Heavy Acceleration AND Post O2 Voltage is Deceleration Idle Cruise Light Acceleration Heavy Acceleration (Note: A value in any of the above operating "cells" that is greater than 900mV is an indication that the diagnostic is not capable of diagnosing in that cell).	<= -140 (control min.= -150) -140 (control min.= -150) -390 (control min.= -400) -390 (control min.= -400) -390 (control min.= -400) > 800 mV 800 mV 780 mV 780 mV 780 mV		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Post Catalyst Fuel Trim System High Limit Bank 2 (Too Lean)	P2099	Determines if the post catalyst O2 sensor based fuel control system has utilized all or most of it's high limit authority, indicating a lean emissions/exhaust gas condition. Note: If the post catalyst O2 voltage is too lean, the post catalyst O2 integral offset control is increased. This results in rich bias fuel control in an attempt to correct the lean condition. A perfectly balanced control system (no rich or lean bias required) is represented by an integral offset value of “0” and a post catalyst O2 sensor that is within it's optimal operating range (neither rich nor lean). An integral offset value > 0 is indicative of the control system reacting to a lean post catalyst O2 sensor. If the failure is such that the control system utilizes all or most of its available authority, then P2099 will set.	Lean Fail counter High Vapor Feature: The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions are present. This HV condition is indicated when the purge valve is open AND percent vapor is >= 18 % for >= 5.0 seconds. Diagnosis resumes if the purge valve is closed OR the percent vapor is <= 15 % for >= 20.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary.	>= 300 counts per 375 sample counts Note: Counters increment at a rate of 10 per second when enable conditions are met. If the fail count threshold is reached, a fail is reported and the diagnostic will not report again until the next trip. If the sample count threshold is reached before a fail is reported, a pass is reported, the counters are reset to 0, and evaluation starts again.	Same as P2098 except for the following: Bank1 Fault Active criteria are replaced by the equivalent Bank2 Fault Active criteria. For the cells identified as enabled (i.e. those containing a "Yes" at the beginning of the Enable Conditions column for P2098), the fail counter will increment if the sample counter increments AND Post oxygen sensor control integral offset is Deceleration Idle Cruise Light Acceleration Heavy Acceleration AND Post O2 Voltage is Deceleration Idle Cruise Light Acceleration Heavy Acceleration (Note: A value in any of the above operating "cells" that is less than 100mV is an indication that the diagnostic is not capable of diagnosing in that cell).	>= 130 (control max.= 150) 130 (control max.= 150) 380 (control max.= 400) 380 (control max.= 400) 380 (control max.= 400) < 660 mV 660 mV 660 mV 660 mV 660 mV	Frequency: Continuous Monitoring in 100ms loop. Counters increment when enable conditions are met. When sample count threshold is reached or fail threshold is reached, counters are reset to 0 and start over.	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 error2) Throttle control is driving the throttle in the incorrect direction3) Throttle control exceeds the reduced power limit	Difference between measured throttle position and modeled throttle position > OR Difference between modeled throttle position and measured throttle position >	8.41 percent 8.41 percent	TPS minimum learn is not active and Throttle is being Controlled and (Engine Running or Ignition Voltage > or Ignition Voltage >) Ignition voltage failure is false (P1682)	Run/Crank voltage > 6.41 Ignition voltage failure is false (P1682) TPS minimum learn is not active and Throttle is being Controlled AND ((Engine Running AND Ignition Voltage > 5.50) OR Ignition Voltage > 11.00)	15 counts; 12.5 ms/count in the primary processor	Type A, 1 Trips
			Throttle Position >	39.26 percent		Powertrain Relay voltage > 6.41 TPS minimum learn is active	11 counts; 12.5 ms/count in the primary processor	
			Throttle Position >	38.26 percent		Powertrain Relay voltage > 6.41 Reduced Power is True	11 counts; 12.5 ms/count in the primary processor	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Accelerator Pedal Position (APP) Sensor 1 Lo	P2122	Detect a continuous or intermittent short or open in the APP sensor #1 on Main processor	APP1 Voltage <	0.4625		Run/Crank voltage > 6.41 No 5V reference error or fault for # 4 5V reference circuit (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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Accelerator Pedal Position (APP) Sensor 1 Hi	P2123	Detect a continuous or intermittent short or open in the APP sensor #1 on Main processor	APP1 Voltage >	4.7500		Run/Crank voltage > 6.41 No 5V reference error or fault for # 4 5V reference circuit (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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Accelerator Pedal Position (APP) Sensor 2 Lo	P2127	Detect a continuous or intermittent short or open in the APP sensor #2 on Main processor	APP2 Voltage <	0.3250		Run/Crank voltage > 6.41 No 5V reference error or fault for # 4 5V reference circuit (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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Accelerator Pedal Position (APP) Sensor 2 Hi	P2128	Detect a continuous or intermittent short or open in the APP sensor #2 on Main processor	APP2 Voltage >	2.6000		Run/Crank voltage > 6.41 No 5V reference error or fault for # 4 5V reference circuit (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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Throttle Position (TP) Sensor 1-2 Correlation	P2135	Detects a continuous or intermittent correlation fault between TPS sensors #1 and #2 on Main processor	Difference between TPS1 displaced and TPS2 displaced >	6.999 % offset at min. throttle position with a linear threshold to 9.673 % at max. throttle position		Run/Crank voltage > 6.41 No TPS sensor faults (P0122, P0123, P0222, P0223) No 5V reference error or fault for # 4 5V reference circuit (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 > 6.41 No TPS sensor faults (P0122, P0123, P0222, P0223) No 5V reference error or fault for # 4 5V reference circuit (P06A3)	79 / 159 counts or 58 counts continuous; 3.125 ms/count in the main processor	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Accelerator Pedal Position (APP) Sensor 1-2 Correlation	P2138	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 > 6.41 No APP sensor faults (P2122, P2123,P2127, P2128) No 5V reference errors or faulst for # 3 & # 4 5V reference circuits (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 > 6.41 No APP sensor faults (P2122, P2123,P2127, P2128) No 5V reference errors or faulst for # 3 & # 4 5V reference circuits (P06A3, P0697)	19 / 39 counts intermittent or 15 counts continuous, 12.5 ms/count in the main processor	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Minimum Throttle Position Not Learned	P2176	TP sensors were not in the minmum learn window after multiple attempts to learn the minimum.	During TPS min learn on the Main processor, TPS Voltage > AND Number of learn attempts >	0.9350 10 counts		Run/Crank voltage > 6.41 TPS minimum learn is active	2.0 secs	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling System Performance	P2181	This DTC detects thermostat malfunction (i.e. stuck open)	This diagnostic can be calibrated to fail in one of two methods based on the following calibration. This application has been calibrated as a Type 0 . Type 0 - Airflow Method: Engine Coolant Temp (ECT) is ≤ commanded temperature minus 11 Deg C and normalized ratio is ≤ than 1.25 . When above is present for more than 0 seconds, fail counts start. == Ratio Definition:=== Current temp difference between ECT and RCT minus PwrUp difference divided by total airgrams. Note: Minimum total airgrams is 500.0 grams. Type 1 - Energy Method: Engine Coolant Temp (ECT) is ≤ commanded temperature minus 11 Deg C and normalized ratio is ≤ than 0.01 . When above is present for more than 0 seconds, fail counts start. == Ratio Definition:=== Current temp difference between ECT and RCT minus PwrUp difference divided by predicted energy.		No Active DTC's Engine not run time Engine run time Fuel Condition ECT at Power Up IAT min T-Stat Heater duty cycle commanded Type 0: Airflow range to accumulate Type 1: Minumum energy to enable	MAF_SensorFA IAT_SensorFA THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA ≥ 1,800 seconds 90 ≤ Time ≤ 1,370 seconds Ethanol ≤ 87 % -40.0 ≤ ECT ≤ 70.0 °C -7 °C ≤ IAT ≤ 55 °C. ≤ 0 % 25.0 ≤ Airflow ≤ 450.0 gps 10.0 kJ	60 failures out of 90 samples 1 sec/ sample Once per ignition key cycle	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Bank 1 Air-Fuel Ratio Imbalance	P219A	This monitor determines if a cylinder-to-cylinder air-fuel ratio imbalance is present on bank 1.	Filtered Ratio > Note: The input to this metric is the pre catalyst oxygen sensor voltage. This 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). Multiple samples are collected in making a decision. The observed Variance is dependant on engine speed and load and so each result is normalized for speed and load 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 (Supporting Table "**Variance Threshold Bank1**") and subtracting it from the measured Variance. The result is then divided by a normalizer calibration from another 17 x 17 table	1.50 If the diagnostic has reported a failure on the prior trip, the Filtered Ratio must fall below 1.44 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 1.50 .	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 Filtered APC delta between samples	no lower than 11.0 Volts for more than 0.2 seconds > 10.0 percent AND no fuel level sensor fault > -20 degrees C > 120.0 seconds No 875 to 3,250 RPM < 100 RPM 10 to 1,000 g/s < 3 g/s < 3.20 g/s 200 to 680 mg/cylinder < 25 mg/cylinder < 8.00 percent	Minimum of 1 test per trip, up to 18 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, 7.20 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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			(Supporting Table "**Normalizer Bank1**"). This quotient is then multiplied by a quality factor calibration from a 17 x 17 table (Supporting Table "**Quality Factor Bank1**"). 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 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		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 "**Quality Factor Bank1**"). 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: AIR pump not on CASE learn not active EGR - no device control, no intrusive diagnostics EVAP - no device control, no intrusive diagnostics Engine OverSpeed	 0 to 40 degrees 2 to 200 percent 0 to 25 degrees 0 to 25 degrees >= 0.99 >= 2.0 seconds (Please see "**Closed Loop Enable Criteria**" and "**Long Term FT Enable Criteria**" in Supporting Tables)	made within 5 minutes of operation. For RSR or FIR, 36 tests must complete before the diagnostic can report.	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			above calculations since cam phasing has been shown to have an impact on overall signal quality. This application Does Not Use this feature.		Protection Not Active Idle speed control normal PTO Not Active Injector base pulse width above min limit 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:	= Valid (the O2 heater resistance has learned since NVM reset) >= 1.50 >= 1.50 0.00 0.00 EngineMisfireDetected_FA MAP_SensorFA MAF_SensorFA ECT_Sensor_FA TPS_ThrottleAuthorityDefaulted FuelInjectorCircuit_FA AIR System FA EvapExcessPurgePsbl_FA CamSensorAnyLocationFA		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Bank 2 Air-Fuel Ratio Imbalance	P219B	This monitor determines if a cylinder-to-cylinder air-fuel ratio imbalance is present on bank 2.	Filtered Ratio > Note: See P219A for a detailed description of this failure metric. 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.	0.40 If the diagnostic has reported a failure on the prior trip, the Filtered Ratio must fall below 0.38 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 0.40 .	See Bank 1 (P219A) Secondary Parameters and Enable Conditions. Quality Factor (QF) QF calibrations are located in a 17x17 lookup table versus engine speed and load (Supporting Table "**Quality Factor Bank2**"). 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. 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:	>= 0.99 >= 0.40 >= 0.40 0.00 0.00	See Bank 1 info	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure (BARO) Sensor Performance (naturally aspirated)	P2227	Compares baro sensor to the calculated baro estimate (part throttle calculation or unthrottled MAP)	Difference between baro sensor reading and estimated baro when distance since last estimated baro update OR Difference between baro sensor reading and estimated baro when distance since last estimated baro update	> 15.0 kPa <= 0.06 miles > 20.0 kPa > 0.06 miles	No Active DTCs:	AmbPresSnsrCktFA ECT_Sensor_Ckt_FA 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
			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:	> 409.6 seconds EngineModeNotRunTimer Error MAP_SensorFA TC_BoostPresSnsrCktFA AAP2_SnsrFA MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP	4 failures out of 5 samples 1 sample every 12.5 msec	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure (BARO) Sensor Circuit Low (non-boosted applications)	P2228	Detects a continuous short to low or open in either the signal circuit or the BARO sensor.	BARO Voltage	< 40.0 % of 5 Volt Range (2.0 Volts = 51.0 kPa)			320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure (BARO) Sensor Circuit High (non-boosted applications)	P2229	Detects an open sensor ground or continuous short to high in either the signal circuit or the BARO sensor.	BARO Voltage	> 90.0 % of 5 Volt Range (4.5 Volts = 115.1 kPa)			320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 barometric pressure input	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 samples	No Active DTCs:	AmbPresSnsrCktFA ECT_Sensor_Ckt_FA IAT_SensorFA MAF_SensorFA AfterThrottlePressureFA TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA	4 failures out of 5 samples Each sample takes 1.00 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Signal Stuck Lean Bank 1 Sensor 2	P2270	This DTC determines if the post catalyst O2 sensor is stuck in a normal lean voltage range and thereby can no longer be used for post oxygen sensor fuel control or for catalyst monitoring. The diagnostic is an intrusive test (during coast) which increases the delivered fuel to achieve the required rich threshold.	Post O2 sensor signal AND The Accumulated mass air flow monitored during the Stuck Lean Voltage Test	< 825 mvolts > 183 grams	No Active DTC's B1S2 DTC's Not active this key cycle System Voltage ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Pedal position Engine Airflow Closed loop integral Closed Loop Active Evap Ethanol	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013B, P013E, P013F, P2270 or P2271 10.0 < Volts < 32.0 = Not Valid = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab. = False ≤ 100.0 % 3 ≤ gps ≤ 20 0.74 ≤ C/L Int ≤ 1.08 = TRUE not in control of purge not in estimate mode	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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Post fuel cell (Decel) Crankshaft Torque 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 0.0 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: 0.95 ≤ Commanded Fuel EQR ≤ 1.10	= enabled < 1,000.0 Nm = not active = not active ≥ 80.0 sec 600 ≤ ºC ≤ 900 = DFCO possible ================= 1,100 ≤ RPM ≤ 2,500 1,050 ≤ RPM ≤ 2,650 40.4 ≤ MPH ≤ 82.0 36.0 ≤ MPH ≤ 87.0		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Signal Stuck Rich Bank 1 Sensor 2	P2271	This DTC determines if the post catalyst O2 sensor is stuck in a normal rich voltage range and thereby can no longer be used for post oxygen sensor fuel control or for catalyst monitoring. The diagnostic is an intrusive test which requests the DFCO mode to achieve the required lean threshold.	Post O2 sensor signal AND The Accumulated mass air flow monitored during the Stuck Rich Voltage Test	> 150 mvolts > 82 grams	No Active DTC's B1S2 DTC's Not Active this key cycle System Voltage ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Engine Speed Engine Airflow Vehicle Speed Closed loop integral Closed Loop Active Evap Ethanol	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013B, P013E, P013F or P2270 10.0 < Volts < 32.0 = Not Valid = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab. = False 1,100 ≤ RPM ≤ 2,500 3 ≤ gps ≤ 20 40.4 ≤ MPH ≤ 82.0 0.74 ≤ C/L Int ≤ 1.08 = TRUE not in control of purge not in estimate mode	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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Power Take Off EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on Time Predicted Catalyst temp Fuel State DTC's Passed ================= After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).	= not active = not active = not active ≥ 80.0 sec 600 ≤ ºC ≤ 900 DFCO possible = P2270 (and P2272 if applicable) = P013E (and P014A if applicable) = P013A (and P013C if applicable) =================		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Signal Stuck Lean Bank 2 Sensor 2	P2272	This DTC determines if the post catalyst O2 sensor is stuck in a normal lean voltage range and thereby can no longer be used for post oxygen sensor fuel control or for catalyst monitoring. The diagnostic is an intrusive test (during coast) which increases the delivered fuel to achieve the required rich threshold.	Post O2 sensor signal AND The Accumulated mass air flow monitored during the Stuck Lean Voltage Test	< 825 mvolts > 183 grams.	No Active DTC's B2S2 DTC's Not Active this key cycle System Voltage ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Pedal position Engine Airflow Closed loop integral Closed Loop Active Evap Ethanol	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013C, P013D, P014A, P014B, P2272 or P2273 10.0 < Volts < 32.0 = Not Valid = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 in Supporting Tables tab. = False ≤ 100.0 % 3 ≤ gps ≤ 20 0.74 ≤ C/L Int ≤ 1.08 = TRUE not in control of purge not in estimate mode	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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Post fuel cell (Decel) Crankshaft Torque 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 0.0 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: 0.95 ≤ Commanded Fuel EQR ≤ 1.10	= enabled < 1,000.0 Nm = not active = not active ≥ 80.0 sec 600 ≤ ºC ≤ 900 = DFCO possible ================== 1,100 ≤ RPM ≤ 2,500 1,050 ≤ RPM ≤ 2,650 40.4 ≤ MPH ≤ 82.0 36.0 ≤ MPH ≤ 87.0		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Signal Stuck Rich Bank 2 Sensor 2	P2273	This DTC determines if the post catalyst O2 sensor is stuck in a normal rich voltage range and thereby can no longer be used for post oxygen sensor fuel control or for catalyst monitoring. The diagnostic is an intrusive test which requests the DFCO mode to achieve the required lean threshold.	Post O2 sensor signal AND The Accumulated mass air flow monitored during the Stuck Rich Voltage Test	> 150 mvolts > 82 grams.	No Active DTC's B2S2 DTC's Not Active this key cycle System Voltage ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Engine Speed Engine Airflow Vehicle Speed Closed loop integral Closed Loop Active Evap Ethanol	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013C, P013D, P014A, P014B or P2272 10.0 < Volts < 32.0 = Not Valid = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 in Supporting Tables tab. = False 1,100 ≤ RPM ≤ 2,500 3 ≤ gps ≤ 20 40.4 ≤ MPH ≤ 82.0 0.74 ≤ C/L Int ≤ 1.08 = TRUE not in control of purge not in estimate mode	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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Power Take Off EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on Time Predicted Catalyst temp Fuel State DTC's Passed ================== After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).	= not active = not active = not active ≥ 80.0 sec 600 ≤ ºC ≤ 900 = DFCO possible = P2270 (and P2272 if applicable) = P013E (and P014A if applicable) = P013A (and P013C if applicable) ==================		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #1 CIRCUIT LOW - for 3 DTC implementation only	P2300	Diagnoses Cylinder #1 Ignition Control (EST) output driver circuit for a Short to Ground fault	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match. Voltage low during driver high state (indicates short-to-ground)	$\leq$ 100 Ω impedance between signal and controller ground	Engine running Ignition Voltage	> 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #1 CIRCUIT High - for 3 DTC implementation only	P2301	Diagnoses Cylinder #1 Ignition Control (EST) output driver circuit for a Short to Power fault	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match. Voltage high during driver low state (indicates short-to-power)	≤ 100 Ω impedance between signal and controller power	Engine running Ignition Voltage	 > 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #2 CIRCUIT Low - for 3 DTC implementation only	P2303	Diagnoses Cylinder #2 Ignition Control (EST) output driver circuit for a Short to Ground fault	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match. Voltage low during driver high state (indicates short-to-ground)	$\leq$ 100 Ω impedance between signal and controller ground	Engine running Ignition Voltage	> 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #2 CIRCUIT High - for 3 DTC implementation only	P2304	Diagnoses Cylinder #2 Ignition Control (EST) output driver circuit for a Short to Power fault	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match. Voltage high during driver low state (indicates short-to-power)	≤ 100 Ω impedance between signal and controller power	Engine running Ignition Voltage	> 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #3 CIRCUIT Low - for 3 DTC implementation only	P2306	Diagnoses Cylinder #3 Ignition Control (EST) output driver circuit for a Short to Ground fault	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match. Voltage low during driver high state (indicates short-to-ground)	$\leq$ 100 Ω impedance between signal and controller ground	Engine running Ignition Voltage	> 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

15 OBDG11 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #3 CIRCUIT High - for 3 DTC implementation only	P2307	Diagnoses Cylinder #3 Ignition Control (EST) output driver circuit for a Short to Power fault	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match. Voltage high during driver low state (indicates short-to-power)	≤ 100 Ω impedance between signal and controller power	Engine running Ignition Voltage	> 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #4 CIRCUIT Low - for 3 DTC implementation only	P2309	Diagnoses Cylinder #4 Ignition Control (EST) output driver circuit for a Short to Ground fault	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match. Voltage low during driver high state (indicates short-to-ground)	≤ 100 Ω impedance between signal and controller ground	Engine running Ignition Voltage	> 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #4 CIRCUIT High - for 3 DTC implementation only	P2310	Diagnoses Cylinder #4 Ignition Control (EST) output driver circuit for a Short to Power fault	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match. Voltage high during driver low state (indicates short-to-power)	$\leq$ 100 Ω impedance between signal and controller power	Engine running Ignition Voltage	> 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #5 CIRCUIT Low - for 3 DTC implementation only	P2312	Diagnoses Cylinder #5 Ignition Control (EST) output driver circuit for a Short to Ground fault	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match. Voltage Low during driver high state (indicates short-to-ground)	 $\leq$ 100 Ω impedance between signal and controller power	Engine running Ignition Voltage	 > 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

15 OBDG11 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #5 CIRCUIT High - for 3 DTC implementation only	P2313	Diagnoses Cylinder #5 Ignition Control (EST) output driver circuit for a Short to Power fault	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match. Voltage high during driver low state (indicates short-to-power)	$\leq$ 100 Ω impedance between signal and controller power	Engine running Ignition Voltage	 > 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #6 CIRCUIT Low - for 3 DTC implementation only	P2315	Diagnoses Cylinder #6 Ignition Control (EST) output driver circuit for a Short to Ground fault	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match. Voltage low during driver high state (indicates short-to-power)	 ≤ 100 Ω impedance between signal and controller power	Engine running Ignition Voltage	 > 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

15 OBDG11 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #6 CIRCUIT High - for 3 DTC implementation only	P2316	Diagnoses Cylinder #6 Ignition Control (EST) output driver circuit for a Short to Power fault	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match. Voltage high during driver low state (indicates short-to-power)	≤ 100 Ω impedance between signal and controller power	Engine running Ignition Voltage	> 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #7 CIRCUIT Low - for 3 DTC implementation only	P2318	Diagnoses Cylinder #7 Ignition Control (EST) output driver circuit for a Short to Ground fault	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match. Voltage low during driver high state (indicates short-to-power)	$\leq$ 100 Ω impedance between signal and controller power	Engine running Ignition Voltage	 > 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #7 CIRCUIT High - for 3 DTC implementation only	P2319	Diagnoses Cylinder #7 Ignition Control (EST) output driver circuit for a Short to Power fault	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match. Voltage high during driver low state (indicates short-to-power)	 ≤ 100 Ω impedance between signal and controller power	Engine running Ignition Voltage	 > 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #8 CIRCUIT Low - for 3 DTC implementation only	P2321	Diagnoses Cylinder #8 Ignition Control (EST) output driver circuit for a Short to Ground fault	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match. Voltage low during driver high state (indicates short-to-power)	≤ 100 Ω impedance between signal and controller power	Engine running Ignition Voltage	> 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

15 OBDG11 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #8 CIRCUIT High - for 3 DTC implementation only	P2322	Diagnoses Cylinder #8 Ignition Control (EST) output driver circuit for a Short to Power fault	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match. Voltage high during driver low state (indicates short-to-power)	≤ 100 Ω impedance between signal and controller power	Engine running Ignition Voltage	 > 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 - ($199 - PTEI3) OR Rolling count error - Serial Communication message ($199 - PPEI3) rolling count value OR Range Error - Serial Communication message - ($199 - PTEI3) TCM Requested Torque Increase OR Multi-transition error - Trans torque intervention type request change	Message <> two's complement of message Message <> previous message rolling count value + one > 450 Nm Requested torque intervention type toggles from not increasing request to increasing request	Diagnostic enabled/ disabled Power Mode Ignition Voltage Engine Running Run/Crank Active No Serial communication to TCM (U0101)	Enabled = Run > 6.41 volts = True > 0.50 Sec No loss of communication	>= 16 failures Performed on every received message >= 6 Rolling count errors out of 10 samples. Performed on every received message >= 6 range errors out of 10 samples. Performed on every received message >= 3 multi-transitions out of 5 samples. Performed every 200 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 > 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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Malfunction Indicator Lamp (MIL) Control Circuit (ODM) Low	P263A	Diagnoses the malfunction indicator lamp 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	Run/Crank Voltage Remote Vehicle Start is not active	Voltage ≥ 11 volts	50 failures out of 63 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 Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Malfunction Indicator Lamp (MIL) Control Circuit (ODM) High	P263B	Diagnoses the malfunction indicator lamp 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	Run/Crank Voltage Remote Vehicle Start is not active	Voltage ≥ 11 volts	4 failures out of 5 samples 50 ms / sample	Type B, No MIL NO MIL

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication on Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures out of these samples	≥ 5 counts	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycleDiagEnbl Ignition Accessory Line or Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds	 Not Active on Current Key Cycle Enabled Not Active Not Active >= 11.00 or >= 6.41 = run = 0 (1 indicates enabled) = Active > 11.00	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					CAN hardware is bus OFF for	> 0.1125 seconds		

Component/ System	Fault Code	Monitor 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 $0C7 or Message $0F9 or Message $199 or Message $1F5	 ≥ 10.0 seconds ≥ 10.0 seconds ≥ 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: Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycleDiagEnbl Ignition Accessory Line or Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in	 Not Active on Current Key Cycle Enabled Not Active Not Active >= 11.00 or >= 6.41 = run = 0 (1 indicates enabled) = Active > 11.00	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					accessory or run or crank and High Voltage Virtual Network Management is not active for U0101 TCM	> 0.4000 seconds Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Body Control Module	U0140	This DTC monitors for a loss of communication with the Body Control Module.	Message is not received from controller for	≥ 10.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycleDiagEnbl Ignition Accessory Line or Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds	 Not Active on Current Key Cycle Enabled Not Active Not Active >= 11.00 or >= 6.41 = run = 0 (1 indicates enabled) = Active > 11.00	Diagnostic runs in 12.5 ms loop	Type C, No MIL

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	> 0.4000 seconds		
					U0140	Not Active on Current Key Cycle		
					Body Control Module	is present on the bus		

Closed Loop Enable Clarification: Calibration values are in the Supporting Tables

Engine run time greater than

KtFSTA_t_ClosedLoopAutostart (HYBRID ONLY)

AutoStart Coolant	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11
Close Loop Enable Time	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11

and

KtFSTA_t_ClosedLoopTime

Start-Up Coolant	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11
Close Loop Enable Time	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11

and pre converter 02 sensor voltage less than

KfFULC_U_O2_SensorReadyThrsh Lo

Voltage < *XXXX* milliVolts

for

KcFULC_O2_SensorReadyEvents

Time (events * 12.5 milliseconds) > *XXXX* events

and

COSC (Converter Oxygen Storage Control) not enabled

and

Consumed AirFuel Ratio is stoichiometry i.e. not in component protection

and

POPD or Catalyst Diagnostic not intrusive

and

Turbo Scavenging Mode not enabled

and

All cylinders whose valves are active also have their injectors enabled

and

O2S_Bank_ 1_TFTKO, O2S_Bank_ 2_TFTKO, FuelInjectorCircuit_FA and CylnderDeacDriverTFTKO = False

Long Term FT Enable Criteria

Closed Loop Enable Clarification: Calibration values are in the Supporting Tables

Closed Loop Enable and
Coolant greater than
KfFCLL_T_AdaptiveLoCoolant

Coolant > *XXXX* Celcius

or less than
KfFCLL_T_AdaptiveHiCoolant

Coolant < *XXXX* Celcius

and
KtFCLL_p_AdaptiveLowMAP_Limit

Barometric Pressure	X1	X2	X3	X4	X5	X6	X7	X8	X9
Manifold Air Pressure	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9

and
TPS_ThrottleAuthorityDefaulted = False
and
Flex Fuel Estimate Algorithm is not active
and
Excessive fuel vapors boiling off from the engine oil algorithm (BOFR) is not enabled
and
Catalyst or EVAP large leak test not intrusive

Secondary Fuel Trim Enable Criteria

Closed Loop Enable and
KfFCLP_U_O2ReadyThrshLo

Voltage < *XXXX* milliVolts

for
KcFCLP_Cnt_O2RdyCyclesThrsh

Time (events * 12.5 milliseconds) > *XXXX* events

Long Term Secondary Fuel Trim Enable Criteria

KtFCLP_t_PostIntglDisableTime

Closed Loop Enable Clarification: Calibration values are in the Supporting Tables

Start-Up Coolant X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11
Post Integral Enable Time Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11

Plus
KtFCLP_t_PostIntglRampInTime

Start-Up Coolant X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11
Post Integral Ramp In Time Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11

and
KeFCLP_T_IntegrationCatalystMax
Modeled Catalyst Temperature < *XXXX*Celcius
and
KeFCLP_T_IntegrationCatalystMin
Modeled Catalyst Temperature > *XXXX*Celcius
and
PO2S_Bank_1_Snsr_2_FA and
PO2S_Bank_2_Snsr_2_FA = False
and
(KeFCLP_Pct_CatAccuSlphrPostDsbl

Modeled converter sulfur percent < XXXX Percent

and
Post Integral < KaFCLP_U_SlphrIntglOfst_Thrsh)

X axis: Post O2 Sensor
Y axis: Post O2 Mode
Z: Post Integral threshold

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

Description: This Calibration is the airflow (in gps) above which the green airflow is acculmulated to expire the condition.

Notes: Used for: P0133, P013A, P013B, P013C, P013D, P013E, P013F, P014A, P014B, P0153, P015A, P015B, P015C, P015D, P1133, P1153, P2270, P2271, P2272 and P2273. The specific diagnostic (from summary table) will not be enabled until the next ignition cycle after the airflow criteria below (by sensor location) has been met:

y/x	1
1	22

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

Description: This Calibration is the acculmulated airflow (in grams) limit above which the green condition is expired

Notes: 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

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: P0011 - Cam Position Error Limit for performance diagnostic

Notes: KtPHSD_phi_CamPosErrorLimIc1

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

Initial Supporting table - P0011_P0021_P05CC_P05CD_EngOilPressEnblIc

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

Notes: KtPHSC_t_EngOilPressEnblIc

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	60	60	60	60	60	60	60	60	0	0	0	0	0	0	0	0	0

Initial Supporting table - P0011_P0021_P05CC_P05CD_HiEngSpdHiDsblIc

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

Notes: KtPHSC_n_HiEngSpdHiDsblIc

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

Initial Supporting table - P0011_P0021_P05CC_P05CD_HiEngSpdLoEnblIc

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

Notes: KtPHSC_n_HiEngSpdLoEnblIc

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

Initial Supporting table - P0011_P0021_P05CC_P05CD_LoPresHiEnblIc

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

Notes: KtPHSC_p_LoPresHiEnblEc

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_LoPresLoDsblIc

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

Notes: KtPHSC_p_LoPresLoDsblIc

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

Initial Supporting table - P0011_P0021_P05CC_P05CD_LoRpmHiEnblIc

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

Notes: KtPHSC_n_LoRpmHiEnblIc

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	900	900	900	900	875	875	875	875	875	875	875	875	950	1,000	1,250	1,400	1,900

Initial Supporting table - P0011_P0021_P05CC_P05CD_LoRpmLoDsblIc

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

Notes: KtPHSC_n_LoRpmLoDsblIc

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

Initial Supporting table - P0011_P0021_P05CC_P05CD_P0014_P0024_P05CE_P05CF_ColdStartEngRunning

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

Notes: KtPHSR_t_ColdStartEngRunning

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

Initial Supporting table - P0011_P05CC_StablePositionTimeIc1

Description: P0011 - Delay after transient move

Notes: KtPHSD_t_StablePositionTimeIc1

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
400	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
800	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
1,200	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
1,600	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
2,000	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
2,400	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
2,800	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
3,200	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
3,600	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
4,000	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
4,400	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
4,800	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
5,200	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
5,600	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
6,000	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
6,400	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
6,800	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4

Initial Supporting table - P0011_PerfMaxIc1

Description: P0011 - Range of phaser travel where diagnostic cannot make a decision if both desired & measured positions are greater than this value

Notes: From Calculation Table CalcPerfMaxIc1: <KePHSD_phi_MaxTravelInt>-<KtPHSD_phi_CamPosErrorLimIc1>

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
2	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
3	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
4	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
5	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
6	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
7	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
8	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
9	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
10	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
11	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
12	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
13	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
14	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
15	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
16	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
17	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0

Initial Supporting table - P0068_Delta MAF Threshold f(TPS)

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

Notes: P0068, KtTPSD_dm_MAF_DesThrDelt

y/x	5.00	10.00	15.00	20.00	25.00	30.00	35.00	40.00	100.00
1.00	15.43	19.72	25.32	26.87	36.79	45.05	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.

Notes: P0068, KtTPSD_p_MAP_DesThrDelt

y/x	5.00	10.00	15.00	20.00	25.00	30.00	35.00	40.00	100.00
1.00	21.45	22.81	22.56	18.69	19.59	19.23	100.00	100.00	100.00

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.

Notes: P0068, KtTPSD_dm_MaxMAF_VsRPM

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	25.00	60.00	100.00	140.00	180.00	220.00	250.00	280.00	300.00

Initial Supporting table - P0068_Maximum MAF f(Volts)

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

Notes: P0068, KtTPSD_dm_MaxMAF_VsVoltage

y/x	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00
1.00	0.00	18.00	40.00	75.00	135.00	250.00	500.00	500.00	500.00

Initial Supporting table - P00B6_Fail if power up ECT exceeds RCT by these values

Description: KtTHMD_T_DCRD_FastFailTempDiff

Notes: X axis is IAT Temperature at Power up (° C), Z axis is the Fast Failure temp difference (° C) The 17 X-axis breakpoints for the table below are (L to R) -40, -28, -16, -4, 8, 20, 32, 44, 56, 68, 80, 92, 104, 116, 128, 140 and 152. Note: Remove for applications with single coolant sensor

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	141	152
1	80	80	80	60	60	40	40	30	30	30	30	30	30	30	30	30	30

Initial Supporting table - P0101_P0106_P0121_P012B_P0236_P1101 MAF Residual Weight Factor based on MAF Est

Description: P0101_P0106_P0121_P012B_P0236_P1101 MAF Residual Weight Factor based on MAF Est

Notes:

y/x	0	50	70	73	76	79	82	85	89	95	100	110	150	170	200	280	350
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Initial Supporting table - P0101_P0106_P0121_P012B_P0236_P1101 MAF Residual Weight Factor based on RPM

Description: P0101_P0106_P0121_P012B_P0236_P1101 MAF Residual Weight Factor based on RPM

Notes:

y/x	0	500	850	1,200	1,550	1,900	2,250	2,600	2,950	3,300	3,650	4,000	4,350	4,700	5,050	5,400	5,750
1	1.000	0.940	0.900	0.870	0.840	0.800	0.770	0.760	0.750	0.745	0.740	0.700	0.660	0.630	0.588	0.580	0.580

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

Notes:

y/x	0	500	850	1,200	1,550	1,900	2,250	2,600	2,950	3,300	3,650	4,000	4,350	4,700	5,050	5,400	5,750
1	0.780	0.790	0.790	0.790	0.807	0.825	0.837	0.850	0.855	0.855	0.850	0.850	0.850	0.850	0.850	0.850	0.850

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

Notes:

y/x	0	500	850	1,200	1,550	1,900	2,250	2,600	2,950	3,300	3,650	4,000	4,350	4,700	5,050	5,400	5,750
1	0.900	0.900	0.900	0.875	0.860	0.865	0.870	0.870	0.880	0.890	0.892	0.896	0.950	0.970	0.980	0.990	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

Notes:

y/x	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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

Notes:

y/x	0	500	850	1,200	1,550	1,900	2,250	2,600	2,950	3,300	3,650	4,000	4,350	4,700	5,050	5,400	5,750
1	1.000	0.500	0.500	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.850	0.850	0.850	0.850	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

Notes:

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

Notes:

y/x	0	1,500	2,200	2,500	2,800	3,100	3,200	3,300	3,500	3,700	4,000	4,200	4,500	5,000	5,500	6,500	8,000
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 SCIAP2 Residual Weight Factor based on RPM

Description: P0101_P0106_P0121_P012B_P1101 SCIAP2 Residual Weight Factor based on RPM

Notes:

y/x	0	1,500	2,200	2,500	2,800	3,100	3,200	3,300	3,500	3,700	4,000	4,200	4,500	5,000	5,500	6,500	8,000
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

Notes:

y/x	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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-Baro Correlation Max Air Flow

Description: P0101_P0106_P0121_P0236_P1101 TIAP-Baro Correlation Max Air Flow

Notes:

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - P0101_P0106_P0121_P0236_P1101 TIAP-Baro Correlation Max MAP

Description: P0101_P0106_P0121_P0236_P1101 TIAP-Baro Correlation Max MAP

Notes:

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - P0101_P0106_P0121_P0236_P1101 TIAP-Baro Correlation Offset

Description: P0101_P0106_P0121_P0236_P1101 TIAP-Baro Correlation Offset

Notes:

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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

Notes:

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - P0101_P0106_P0121_P0236_P1101 TIAP-MAP Correlation Min MAP

Description: P0101_P0106_P0121_P0236_P1101 TIAP-MAP Correlation Min MAP

Notes:

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - P0101_P0106_P0121_P0236_P1101 TIAP-MAP Correlation Offset

Description: P0101_P0106_P0121_P0236_P1101 TIAP-MAP Correlation Offset

Notes:

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - P0101_P0106_P0121_P0236_P1101 Turbocharger Intake Flow Rationality Diagnostic Failure Matrix

Description: Turbocharger Intake Flow Rationality Diagnostic Failure Matrix

Notes: This table describes combinations of individual model failures that will set P0101, P0106, P0121, P0236 and P1101 on turbocharged applications.

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	P1101
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
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

Initial Supporting table - P0101_P0106_P0121_P0236_P1101 Turbocharger Intake Flow Rationality Diagnostic Failure Matrix

35	F	F	T	F	F	F	F	F	P1101
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	P1101
68	F	T	F	F	F	F	F	T	P1101
69	F	T	F	F	F	F	T	F	P1101
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

Initial Supporting table - P0101_P0106_P0121_P0236_P1101 Turbocharger Intake Flow Rationality Diagnostic Failure Matrix

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
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

Initial Supporting table - P0101_P0106_P0121_P0236_P1101 Turbocharger Intake Flow Rationality Diagnostic Failure Matrix

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	P1101
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
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

Initial Supporting table - P0101_P0106_P0121_P0236_P1101 Turbocharger Intake Flow Rationality Diagnostic Failure Matrix

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
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

Initial Supporting table - P0101_P0106_P0121_P0236_P1101 Turbocharger Intake Flow Rationality Diagnostic Failure Matrix

187	T	F	T	T	T	F	F	F	P1101
188	T	F	T	T	T	F	F	T	P1101
189	T	F	T	T	T	F	T	F	P1101
190	T	F	T	T	T	F	T	T	P1101
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
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

Initial Supporting table - P0101_P0106_P0121_P0236_P1101 Turbocharger Intake Flow Rationality Diagnostic Failure Matrix

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 - P0116_Fail if power up ECT exceeds IAT by these values

Description: KtECTD_T_HSC_FastFailTempDiff

Notes: X axis is IAT Temperature at Power up (° C), Z axis is the Fast Failure temp difference (° 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 - P0128_Maximum Accumulated Time for IAT and Start-up ECT conditions (Alternate Test)

Description: KtTHMD_t_WrmUpTempTimeLimTest1

Notes: Z axis is the accumulated time failure threshold (seconds), X axis is ECT Temperature at Power up (° C) The 11 X-axis breakpoints for the table below are (L to R) -40, -28, -16, -4, 8, 20, 32, 44, 56, 68 and 80. Note: Remove for applications with single coolant sensor (Old time based version)

y/x	-40	-28	-16	-4	8	20	32	44	56	69	80
1	870	785	700	615	530	445	360	275	190	105	20

Initial Supporting table - P0128_Maximum Accumulated Time for IAT and Start-up ECT conditions (Primary Test)

Description: KtTHMD_t_WrmUpTempTimeLimTest0

Notes: Z axis is the accumulated time failure threshold (seconds), X axis is ECT Temperature at Power up (° C) The 11 X-axis breakpoints for the table below are (L to R) -40, -28, -16, -4, 8, 20, 32, 44, 56, 68 and 80. Note: Remove for applications with single coolant sensor (Old time based version)

y/x	-40	-28	-16	-4	8	20	32	44	56	69	80
1	950	865	780	695	610	525	440	355	270	185	100

Initial Supporting table - P0133_KnEOSD_t_ST_LRC_LimRS1

Description: KnEOSD_t_ST_LRC_LimRS1. X Table Axis (in sec) for P0133, L2R Reponse time breakpoints for table

Notes:

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	0.000	0.010	0.020	0.030	0.040	0.050	0.060	0.080	0.090	0.100	0.120	0.140	0.160	0.180	0.200	0.210	2.000

Initial Supporting table - P0133_KnEOSD_t_ST_RLC_LimRS1

Description: KnEOSD_t_ST_RLC_LimRS1. Y Table Axis (in sec) for P0133, R2L Reponse time breakpoints for table

Notes:

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	0.000	0.010	0.020	0.030	0.040	0.050	0.060	0.080	0.100	0.120	0.130	0.140	0.150	0.160	0.170	0.180	2.000

Initial Supporting table - P0133_O2S Slow Response Bank 1 Sensor 1 "Pass/Fail Threshold table"

Description: KaEOSD_x_ST_ResponseLimRS1[x][y]

Notes: 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 axis is Rich to Lean response time (sec), Please see the cal table below named "KnEOSD_t_ST_RLC_LimRS1" for the 17 Y axis table breakpoints. Z axis is the pass/fail result, Note: If the cell contains a "0" then the fault is indicated, if it contains a "1" a fault is not indicated.

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	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
2	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
3	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
4	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
5	1	1	1	1	1	1	1	1	1	1	1	1	0	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	1	0	0	0
8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
10	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
11	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
12	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0
13	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0
14	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0
15	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - P0153_KnEOSD_t_ST_LRC_LimRS2

Description: KnEOSD_t_ST_LRC_LimRS2. X Table Axis (in sec) for P0153, L2R Reponse time breakpoints for table

Notes:

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	0.000	0.010	0.020	0.030	0.040	0.050	0.060	0.080	0.090	0.100	0.120	0.140	0.160	0.180	0.200	0.210	2.000

Initial Supporting table - P0153_KnEOSD_t_ST_RLC_LimRS2

Description: KnEOSD_t_ST_RLC_LimRS2. Y Table Axis (in sec) for P0153, R2L Reponse time breakpoints for table

Notes:

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	0.000	0.010	0.020	0.030	0.040	0.050	0.060	0.080	0.100	0.120	0.130	0.140	0.150	0.160	0.170	0.180	2.000

Initial Supporting table - P0153_O2S Slow Response Bank 2 Sensor 1 "Pass/Fail Threshold table"

Description: KaEOSD_x_ST_ResponseLimRS2[x][y]

Notes: 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 axis is Rich to Lean response time (sec), Please see the cal table below named "KnEOSD_t_ST_RLC_LimRS2" for the 17 Y axis table breakpoints. Z axis is the pass/fail result, Note: If the cell contains a "0" then the fault is indicated, if it contains a "1" a fault is not indicated.

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	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
2	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
3	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
4	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
5	1	1	1	1	1	1	1	1	1	1	1	1	0	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	1	0	0	0
8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
10	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
11	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
12	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0
13	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0
14	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0
15	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage

Description: Identifies which Long Term Fuel Trim Cell I.D.s are used for diagnosis. Only cells identified as "CeFADD_e_NonSelectedCell" are not used for diagnosis.

Notes: DTCs: P0171, P0172, P0174, P0175; Calibration Name: KaFADD_e_SelectCellSet; Axis is Long Term Fuel Trim Cell I.D.

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_SelectedPurgeCell

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_SelectedNonPurgeCell

Initial Supporting table - P0300 EngineOverSpeedLimit

Description: Engine OverSpeed Limit versus gear

Notes: Used for P0300-P0308. Cal Name: KaEOSC_n_EngOvrspdLimitGear

P0300 EngineOverSpeedLimit - Part 1

y/x	CeTGRR_e_TransGr1	CeTGRR_e_TransGr2	CeTGRR_e_TransGr3	CeTGRR_e_TransGr4	CeTGRR_e_TransGr5	CeTGRR_e_TransGr6
1	5,000	5,000	5,000	5,000	5,000	5,000

P0300 EngineOverSpeedLimit - Part 2

y/x	CeTGRR_e_TransGrEVT 1	CeTGRR_e_TransGrEVT 2	CeTGRR_e_TransGrNeut	CeTGRR_e_TransGrRvrs	CeTGRR_e_TransGrPark	
1	5,000	5,000	4,000	5,000	4,000	

Initial Supporting table - P0300 Number of Normals

Description: 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.

Notes: Used for P0300-P0308. Cal Name: KaMSFD_Cnt_NumOfNormalsFil

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 - P0300 Ring Filter

Description: 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.

Notes: Used for P0300-P0308. Cal Name: KaMSFD_Cnt_RingFilter

y/x	0	1	2	3	4	5	6	7	8
1	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00

Initial Supporting table - P0300_Abnormal Cylinder Mode

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

Notes: Used for P0300-P0308. Cal Name: KaMSFD_Cnt_CylAbnormal

y/x	0	1	2	3	4	5	6	7	8
1	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00

Initial Supporting table - P0300_Abnormal Rev Mode

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

Notes: Used for P0300-P0308. Cal Name: KaMSFD_Cnt_RevAbnormal

y/x	0	1	2	3	4	5	6	7	8
1	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00

Initial Supporting table - P0300_Abnormal SCD Mode

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

Notes: Used for P0300-P0308. Cal Name: KaMSFD_Cnt_SCD_CylAbnormal

y/x	0	1	2	3	4	5	6	7	8
1	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00

Initial Supporting table - P0300_AFM_Decel

Description: Crankshaft decel threshold. Thresholds are a function of rpm and % engine Load.

Notes: Used for P0300-P0308. Cal Name: KtMISF_DoDCylinderMode

y/x	400	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	3,500
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
9	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
11	32,767	32,767	32,767	32,767	32,767	32,767	32,767	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
13	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
15	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
17	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
19	32,767	32,767	32,767	32,767	32,767	32,767	32,767	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
25	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
29	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
33	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
38	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
42	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
48	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
54	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
61	32,767	32,767	32,767	32,767	32,767	32,767	32,767	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 - P0300_Catalyst_Damage_Misfire_Percentage

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

Notes: Used for P0300-P0308. Cal Name: KtMSFD_Pct_CatalystMisfire

y/x	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000
0	10.6	10.6	10.6	10.0	4.8	4.8	4.8	4.8
10	10.6	10.6	10.6	10.0	4.8	4.8	4.8	4.8
20	10.6	10.6	10.6	10.0	4.8	4.8	4.8	4.8
30	10.6	10.6	9.8	8.1	4.8	4.8	4.8	4.8
40	10.6	10.6	8.1	8.1	4.8	4.8	4.8	4.8
50	8.1	8.1	6.8	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 - P0300_CylMode_Decel

Description: Crankshaft decel threshold. Thresholds are a function of rpm and % engine Load.

Notes: Used for P0300-P0308. Cal Name: KtMISF_CylinderMode

y/x	400	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	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
8	1,300	1,100	800	650	400	280	200	170	160	110	60	50	36	27	20	15	13	12	6	5	5	4	3	3	3	3
9	1,200	1,000	750	600	380	280	200	170	160	100	60	45	36	27	19	15	12	11	6	5	4	4	3	3	3	3
11	1,200	1,000	650	500	360	275	200	160	125	80	55	40	30	25	17	14	12	10	6	4	4	4	3	3	3	3
12	1,300	1,100	700	550	375	275	200	150	120	75	50	35	26	22	16	13	10	10	5	4	4	4	3	3	3	3
13	1,200	1,000	700	550	350	250	175	150	125	65	50	35	28	22	15	12	10	10	6	4	4	4	3	3	3	3
15	1,400	1,200	800	600	400	275	200	150	140	80	60	40	30	25	17	14	12	10	6	4	4	4	3	3	3	3
17	1,500	1,300	900	600	400	300	225	160	140	90	65	45	42	26	18	16	14	11	6	5	4	4	3	3	3	3
19	1,600	1,400	1,000	700	500	325	275	175	160	100	75	55	40	30	22	16	15	12	6	5	4	4	3	3	3	3
22	1,700	1,500	1,100	800	500	350	300	200	180	120	90	65	50	35	26	20	16	14	7	5	4	4	3	3	3	3
25	1,800	1,600	1,200	900	700	450	350	250	200	140	100	70	55	40	30	24	20	16	8	6	5	4	3	3	3	3
29	1,900	1,700	1,300	1,000	800	550	400	300	220	150	110	80	60	42	35	25	22	18	8	6	5	4	3	3	3	3
33	2,000	1,800	1,400	1,200	900	650	500	350	235	160	130	90	60	45	40	30	24	20	9	7	5	4	3	3	3	3
38	2,000	1,800	1,600	1,400	1,000	750	600	400	250	180	140	100	70	55	45	35	30	22	10	7	6	5	3	3	3	3
42	2,200	2,000	1,800	1,600	1,100	950	700	500	300	220	150	110	80	60	50	40	32	25	11	8	6	5	4	4	4	4
48	2,200	2,000	1,800	1,600	1,200	1,000	800	550	375	230	150	125	95	75	55	45	35	30	12	9	6	5	4	4	4	4
54	2,200	2,000	1,800	1,600	1,200	1,000	800	600	400	240	180	125	100	80	60	50	40	30	14	10	7	6	5	5	5	5
61	2,200	2,000	1,800	1,600	1,200	1,000	800	700	500	300	250	170	110	85	65	55	45	40	16	11	8	6	6	6	6	6

Initial Supporting table - P0300_CylMode_Jerk

Description: Crankshaft jerk threshold. Thresholds are a function of rpm and % engine Load.

Notes: Used for P0300-P0308. Cal Name: KtMISF_ddt_CylinderMode

y/x	400	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	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
8	1,300	1,100	800	650	400	280	200	170	160	110	50	50	35	27	20	15	13	12	0	0	0	0	0	0	0	0
9	1,200	1,000	750	600	380	280	200	170	160	100	60	45	35	27	19	15	12	11	0	0	0	0	0	0	0	0
11	1,200	1,000	650	500	360	275	200	150	110	80	50	40	28	25	17	14	12	10	0	0	0	0	0	0	0	0
12	1,300	1,100	700	550	350	275	200	140	110	80	50	35	24	22	16	13	10	10	0	0	0	0	0	0	0	0
13	1,200	1,000	700	550	350	250	175	150	115	80	50	35	28	22	15	12	10	10	0	0	0	0	0	0	0	0
15	1,400	1,200	800	600	400	275	200	150	140	85	50	40	30	25	17	14	12	10	0	0	0	0	0	0	0	0
17	1,500	1,300	900	600	400	300	225	160	140	90	50	45	35	26	18	16	14	11	0	0	0	0	0	0	0	0
19	1,600	1,400	1,000	700	500	325	275	175	160	100	70	55	38	30	22	16	15	12	0	0	0	0	0	0	0	0
22	1,700	1,500	1,100	800	500	350	300	200	180	120	75	65	40	35	26	20	16	14	0	0	0	0	0	0	0	0
25	1,800	1,600	1,200	900	700	450	350	250	200	140	90	70	50	40	30	24	20	16	0	0	0	0	0	0	0	0
29	1,900	1,700	1,300	1,000	900	550	400	300	220	150	90	80	50	42	35	25	22	18	0	0	0	0	0	0	0	0
33	2,000	1,800	1,500	1,200	1,000	650	500	350	235	160	110	90	60	45	40	30	24	20	0	0	0	0	0	0	0	0
38	2,000	1,800	1,600	1,400	1,100	750	600	400	250	180	140	100	70	55	45	35	30	22	0	0	0	0	0	0	0	0
42	2,200	2,000	1,800	1,600	1,200	950	700	500	300	220	150	110	80	60	50	40	32	25	0	0	0	0	0	0	0	0
48	2,200	2,000	1,800	1,600	1,200	1,000	800	550	375	230	175	125	95	75	55	45	35	30	0	0	0	0	0	0	0	0
54	2,200	2,000	1,800	1,600	1,200	1,000	800	600	400	240	180	125	100	80	60	50	40	30	0	0	0	0	0	0	0	0
61	2,200	2,000	1,800	1,600	1,200	1,000	800	700	500	300	250	170	110	85	65	55	45	40	0	0	0	0	0	0	0	0

Initial Supporting table - P0300_IdleCylModeDecel

Description: Crankshaft decel threshold. Thresholds are a function of rpm and % engine Load.

Notes: Used for P0300-P0308. Cal Name: KtMSFD_dt_IdleCylinderMode

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600
8	1,100	1,000	650	450	350	250	225	150	120	100	75	70	60
9	1,200	1,100	650	450	350	300	225	150	130	100	75	70	60
11	1,200	1,100	700	450	350	300	225	150	130	100	75	70	60
12	1,300	1,200	800	450	350	300	225	150	130	100	75	70	60
13	1,300	1,200	800	550	350	300	225	150	130	100	75	70	60
14	1,200	1,100	800	550	350	300	225	150	130	100	75	70	60
15	1,100	1,000	800	650	450	325	225	150	120	90	75	70	60
16	1,100	1,000	900	650	425	325	250	160	120	90	75	70	60
17	1,300	1,200	900	650	425	300	250	175	120	110	75	70	60
18	1,400	1,300	900	650	425	300	250	175	130	110	80	70	60
19	1,500	1,400	900	650	425	325	250	175	130	120	80	80	60
21	1,600	1,500	900	650	450	325	250	175	130	120	85	80	70
22	1,700	1,600	1,000	650	450	325	250	190	130	120	100	80	70
24	1,800	1,700	1,000	750	450	325	230	190	150	120	100	80	70
25	1,900	1,800	1,050	750	450	325	230	190	160	130	100	80	80
27	2,000	1,900	1,100	800	500	325	250	190	150	140	110	80	80
29	2,100	2,000	1,150	900	550	350	275	200	160	140	110	110	100

Initial Supporting table - P0300_IdleCylModeJerk

Description: Crankshaft jerk threshold. Thresholds are a function of rpm and % engine Load.

Notes: Used for P0300-P0308. Cal Name: KtMSFD_ddt_IdleCylinderMode

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600
8	1,100	1,100	600	450	350	300	200	150	130	100	75	70	60
9	1,200	1,100	600	450	350	300	200	150	130	100	75	70	60
11	1,200	1,100	650	450	350	300	200	150	130	100	75	70	60
12	1,300	1,100	700	450	350	300	200	150	130	100	75	70	60
13	1,300	1,100	700	550	350	300	200	150	130	100	75	70	60
14	1,200	1,000	700	550	350	300	200	150	130	100	75	70	60
15	1,100	900	700	600	450	280	200	150	120	100	75	70	60
16	1,100	1,000	800	600	425	280	200	150	120	90	75	70	60
17	1,300	1,200	800	600	425	280	200	175	110	100	75	70	60
18	1,400	1,300	800	600	425	250	200	170	110	100	80	70	60
19	1,500	1,400	800	600	375	250	200	150	110	100	80	80	60
21	1,600	1,500	800	600	375	250	200	140	110	100	80	80	70
22	1,700	1,600	900	600	375	250	200	150	110	100	80	80	70
24	1,800	1,700	1,000	700	400	275	200	150	120	100	90	80	70
25	1,900	1,800	1,050	700	400	275	210	150	120	100	95	80	80
27	2,000	1,900	1,100	800	500	300	250	160	120	100	100	80	80
29	2,100	2,000	1,150	900	550	350	275	180	120	100	100	90	100

Initial Supporting table - P0300_IdleSCD_Decel

Description: Crankshaft decel threshold while in SCD mode. SCD mode uses smaller windows near TDC. Thresholds are a function of rpm and % engine Load.

Notes: Used for P0300-P0308. Cal Name: KtMISF_dt_SCD_IdleMode
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)

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600
8	550	500	400	200	150	110	100	90	50	32,767	32,767	32,767	32,767
9	550	500	400	200	150	110	100	90	50	32,767	32,767	32,767	32,767
11	550	500	400	200	150	110	100	90	50	32,767	32,767	32,767	32,767
12	550	450	400	200	150	110	100	90	50	32,767	32,767	32,767	32,767
13	550	475	360	230	150	110	110	90	50	32,767	32,767	32,767	32,767
14	550	475	330	260	190	130	110	80	50	32,767	32,767	32,767	32,767
15	550	475	360	260	190	140	110	75	50	32,767	32,767	32,767	32,767
16	600	525	400	270	190	130	95	70	50	32,767	32,767	32,767	32,767
17	600	550	400	250	190	120	100	75	40	32,767	32,767	32,767	32,767
18	600	550	425	270	190	130	110	80	50	32,767	32,767	32,767	32,767
19	700	600	425	270	200	140	120	80	55	32,767	32,767	32,767	32,767
21	800	700	450	270	200	140	120	80	60	32,767	32,767	32,767	32,767
22	900	750	475	300	200	150	100	80	60	32,767	32,767	32,767	32,767
24	1,000	800	500	325	220	160	100	80	60	32,767	32,767	32,767	32,767
25	1,100	900	600	350	240	170	120	80	60	32,767	32,767	32,767	32,767
27	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
29	32,767	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 - P0300_IdleSCD_Jerk

Description: Crankshaft jerk threshold while in SCD mode. SCD mode uses smaller windows near TDC. Thresholds are a function of rpm and % engine Load.

Notes: Used for P0300-P0308. Cal Name: KtMISF_ddt_SCD_IdleMode

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600
8	550	500	400	200	150	110	100	90	50	32,767	32,767	32,767	32,767
9	550	500	400	200	150	110	100	90	50	32,767	32,767	32,767	32,767
11	550	500	400	200	150	110	100	90	50	32,767	32,767	32,767	32,767
12	550	450	400	200	150	110	100	90	50	32,767	32,767	32,767	32,767
13	550	500	375	230	150	110	100	90	50	32,767	32,767	32,767	32,767
14	550	500	375	240	170	110	100	80	50	32,767	32,767	32,767	32,767
15	550	500	375	240	170	110	90	75	50	32,767	32,767	32,767	32,767
16	600	550	375	250	170	110	75	70	50	32,767	32,767	32,767	32,767
17	600	550	375	250	180	120	80	75	40	32,767	32,767	32,767	32,767
18	600	550	375	270	180	130	100	80	50	32,767	32,767	32,767	32,767
19	700	600	375	270	180	140	110	80	50	32,767	32,767	32,767	32,767
21	800	700	400	270	180	115	105	80	55	32,767	32,767	32,767	32,767
22	900	750	400	300	180	120	90	80	55	32,767	32,767	32,767	32,767
24	1,000	800	500	325	200	130	100	70	50	32,767	32,767	32,767	32,767
25	1,100	900	600	350	220	140	120	80	50	32,767	32,767	32,767	32,767
27	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
29	32,767	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 - P0300_Max_PatternMultiplier

Description: Crankshaft should return to normal after the misfire. If crankshaft snap value after the misfire being evaulated is larger than the misfire's Jerk threshold times this multiplier, its not a real misfire. However, if random misfire occurs every engine cycle, more noise is allowed to be considered "normal" since the crankshaft does not have time to fully return to normal before the next misfire occurs.

Notes: Used for P0300-P0308. Cal Name: KtMSFD_K_SCD_MaxPttrnRecogMult

y/x	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
1	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

Initial Supporting table - P0300_Min_PatternMultiplier

Description: Crankshaft should return to normal after the misfire.   If crankshaft snap value after single isolated misfire being evaulated is larger than the misfire's Jerk threshold times this multiplier, its not a real misfire.

Notes: Used for P0300-P0308. Cal Name: KtMSFD_K_SCD_MinPttrnRecogMult

y/x	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
1	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90

Initial Supporting table - P0300_RevMode_Decel

Description: Crankshaft decel threshold. Thresholds are a function of rpm and % engine Load.

Notes: Used for P0300-P0308. Cal Name: KtMISF_RevolutionMode

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
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	110	75	45	35	26	25	25	25	25
9	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	100	60	40	30	25	24	24	24	24
11	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	95	60	40	35	26	24	24	24	24
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	100	60	40	35	28	24	24	24	24
13	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	110	70	50	40	28	24	24	24	24
15	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	115	80	55	45	32	26	26	26	26
17	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	120	90	65	50	35	32	32	32	32
19	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	140	100	75	55	45	35	35	35	35
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	160	120	80	65	50	40	40	40	40
25	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	180	140	100	75	60	45	45	45	45
29	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	200	150	110	85	70	55	55	55	55
33	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	220	180	120	100	80	60	60	60	60
38	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	280	220	140	120	80	70	70	70	70
42	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	320	240	160	130	100	80	80	80	80
48	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	350	290	180	145	110	90	90	90	90
54	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	370	320	200	150	120	100	100	100	100
61	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	400	350	230	155	140	140	140	140	140

Initial Supporting table - P0300_SCD_Decel

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

Notes: Used for P0300-P0308. Cal Name: KtMISF_dt_SCD_OffIdleMode

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
8	600	450	300	220	150	130	90	70	55	32,767	32,767	32,767	32,767
9	570	420	275	180	135	110	85	65	50	32,767	32,767	32,767	32,767
11	550	400	250	180	135	110	85	60	45	32,767	32,767	32,767	32,767
12	550	400	275	190	140	115	75	60	50	32,767	32,767	32,767	32,767
13	650	500	320	220	160	115	80	60	50	32,767	32,767	32,767	32,767
15	700	550	350	240	170	115	90	70	55	32,767	32,767	32,767	32,767
17	700	550	380	260	180	120	90	70	60	32,767	32,767	32,767	32,767
19	750	600	425	300	200	140	100	80	65	32,767	32,767	32,767	32,767
22	750	600	500	350	220	160	120	90	75	32,767	32,767	32,767	32,767
25	1,050	900	750	400	275	180	140	120	90	32,767	32,767	32,767	32,767
29	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
33	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
38	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
42	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
48	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
54	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
61	32,767	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 - P0300_SCD_Jerk

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

Notes: Used for P0300-P0308. Cal Name: KtMISF_ddt_SCD_OffIdleMode

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
8	600	450	300	220	150	130	90	70	55	32,767	32,767	32,767	32,767
9	570	420	275	180	135	110	85	65	50	32,767	32,767	32,767	32,767
11	550	400	250	180	135	110	85	60	45	32,767	32,767	32,767	32,767
12	550	400	275	190	140	115	75	60	50	32,767	32,767	32,767	32,767
13	650	500	320	220	160	115	80	60	50	32,767	32,767	32,767	32,767
15	700	550	350	240	170	115	90	70	55	32,767	32,767	32,767	32,767
17	700	550	380	260	180	120	90	70	60	32,767	32,767	32,767	32,767
19	750	600	425	300	200	140	100	80	65	32,767	32,767	32,767	32,767
22	750	600	500	350	220	160	120	90	75	32,767	32,767	32,767	32,767
25	1,050	900	750	400	275	180	140	120	90	32,767	32,767	32,767	32,767
29	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
33	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
38	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
42	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
48	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
54	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
61	32,767	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 - P0300_TOSSRoughRoadThres

Description: Only used if Rough Road source = TOSS: dispersion value on Transmission Output Speed Sensor above which rough road is indicated present

Notes: Used for P0300-P0308. Cal Name: KtRRDI_a_RoughRoadThresh

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
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
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
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
1,200	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
1,500	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
1,800	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
2,100	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
2,400	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
2,700	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
3,000	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
3,300	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
3,600	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
4,200	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

Initial Supporting table - P0300_WSSRoughRoadThres

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

Notes: Used for P0300-P0308. Cal Name: KtRRDI_a_WhlSpdRoughRoadLim

y/x	0	12	24	36	48	60	72	85	97	109	121	133	145	157	169	181	193
1	0.40	0.44	0.48	0.52	0.56	0.60	0.64	0.68	0.72	0.76	0.80	0.84	0.88	0.92	0.96	1.00	1.04

Initial Supporting table - P0300_ZeroTorqBaro

Description: adjusts zero torque for altitude

Notes: Used for P0300-P0308. Cal Name: KtMSFD_K_ZeroTorqBaro

y/x	65	70	75	80	85	90	95	100	105
1	0.82	0.85	0.88	0.90	0.93	0.95	0.97	1.00	1.03

Initial Supporting table - P0300_ZeroTorqDoD

Description: Zero torque engine load while in Active Fuel Management

Notes: Used for P0300-P0308. Cal Name: KtMSFD_ZeroTorqDoD

y/x	400	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	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
1	11.00	9.50	8.75	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.75	9.00	9.00	9.00	9.00	11.23	13.46	15.69	17.92	20.14	22.38	24.60	26.83

Initial Supporting table - P0300_ZeroTorqueEngLoad

Description: %air load that represents Zero Brake torque along the Neutral rev line. The Zero torque threshold is adjusted for Baro via P0300_ZeroTorqueBaro

Notes: Used for P0300-P0308. Cal Name: KtMISF_ZeroTorqSpd

y/x	400	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	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
1	11.00	9.50	8.75	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.75	9.00	9.00	9.00	9.00	11.23	13.46	15.69	17.92	20.14	22.38	24.60	26.83

Initial Supporting table - P0324_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)

Notes: Used for P0324, P0326 and P0331. Cal name: KaKNKD_b_PerfAbnIncludeCyl. x-axis = Cylinder number in firing order (i.e. Cyl 0 = first cylinder in firing order, Cyl 1 = second cylinder in firing order....)

A cal value = 1 specifies the cylinder is used for the Abnormal Noise diagnostic. A cal value = 0 specifies the cylinder is not used. Only the first four values in the table are relavent for a four-cylinder engine and only the first six values in the table are relavent for a six-cylinder engine.

Typically, all cylinders are used. Cylinders are only excluded if the signal from that cylinder is weak and there is no separation between normal and faulted conditions (can occur if the sensor location results in poor signal-to-noise ratio for a given cylinder).

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

Initial Supporting table - P0324_P0326_P0331_AbnormalNoise_Threshold

Description: Fail threshold for the Knock Performance Abnormal Noise Diagnostic

Notes: Used for P0324, P0326 and P0331. Cal Name: KtKNKD_k_PerfAbnLimitLo. X-axis = Engine Speed (RPM). Diagnostic fails when VaKNKD_k_PerfCylAbnFiltIntnsity < KtKNKD_k_PerfAbnLimitLo

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	0.290	0.290	0.290	0.290	0.290	0.380	0.440	0.520	0.590	0.540	0.630	0.660	0.660	0.660	0.660	0.660	0.660

Initial Supporting table - P0325_P0330_OpenCktThrshMax (20 kHz)

Description: Knock Open Circuit Diagnostic Maximum Threshold when using the 20 kHz method (see "OpenMethod" description)

Notes: Used for P0325 and P0330. Cal name: KtKNKD_k_OpenMax20K. x-axis = Engine Speed (RPM).

Diagnostic fails when the filtered diagnostic output is between the OpenCktThrshMin and OpenCktThrshMax:
i.e.: KtKNKD_k_OpenMin20K < VaKNKD_k_OpenFiltIntensity < KtKNKD_k_OpenMax20K.

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	43.1348	42.6289	42.0293	41.0059	40.6895	35.9766	33.5293	30.9180	31.5039	26.7090	22.8516	20.3320	18.0234	15.9980	14.3320	13.0996	12.3770

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).

Notes: Used for P0325 and P0330. Cal name: KtKNKD_k_OpenMaxNN. x-axis = Engine Speed (RPM)

Diagnostic fails when the filtered diagnostic output is between the OpenCktThrshMin and OpenCktThrshMax:
i.e.: KtKNKD_k_OpenMinNN < VaKNKD_k_OpenFiltIntensity < KtKNKD_k_OpenMaxNN.

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

Initial Supporting table - P0325_P0330_OpenCktThrshMin (20 kHz)

Description: Knock Open Circuit Diagnostic Minimum Threshold when using the 20 kHz method (see "OpenMethod" description)

Notes: Used for P0325 and P0330. Cal name: KtKNKD_k_OpenMin20K. x-axis = Engine Speed (RPM)

Diagnostic fails when the filtered diagnostic output is between the OpenCktThrshMin and OpenCktThrshMax:
i.e.: KtKNKD_k_OpenMin20K < VaKNKD_k_OpenFiltIntensity < KtKNKD_k_OpenMax20K.

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	12.7773	12.8477	12.5645	12.1777	12.1191	10.0938	8.9297	9.0586	9.4688	7.9785	6.4531	6.4492	6.4492	6.4492	6.4492	6.4492	6.4492

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).

Notes: Used for P0325 and P0330. Cal name: KtKNKD_k_OpenMinNN. x-axis = Engine Speed (RPM)

Diagnostic fails when the filtered diagnostic output is between the OpenCktThrshMin and OpenCktThrshMax:
i.e.: KtKNKD_k_OpenMinNN < VaKNKD_k_OpenFiltIntensity < KtKNKD_k_OpenMaxNN.

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

Description: Defines which Knock Open Circuit Diagnostic method to use.

Notes: Used for P0325 and P0330. Cal name: KtKNKD_e_OpenMethod. x-axis = Engine Speed Index, 500 to 8500 (RPM) by 500 rpm increments.

Selects 1 of 3 available methods: "20kHz Method", "Normal Noise Method," or "Disabled." The mode chosen dictates which set of threshold tables are used. Typically, either: A) the 20 kHz Method is used for all RPM or B) the 20 kHz Method is used for low/medium RPM and the Normal Noise Method is used for high RPM.

P0325_P0330_OpenMethod - 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 - 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 - 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 - Part 4

y/x	15	16			
1	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz			

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

Description: Data is Volatility Time (in seconds) and Axis is Estimated Ambient Coolant in Deg C

Notes: KtEONV_t_VolatilityTimeMax

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

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

Description: Data is Engine Off Time Before Vehicle Off Maximum Table (in seconds) and Axis is Estimated Ambient Coolant in Deg C

Notes: KtEONV_t_EngOffTimeBefVehOffMax

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) Table

Description: Data is EONV Pressure Threshold in Pascals, X axis (horizontal) is fuel level in % from 0 to 100 with step size 6.25, and Y axis (vertical) is temperature in deg C from -10 to 80 with step size 5.625

Notes: KtEONV_p_PressureThreshold

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5
2	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5
3	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5
4	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5
5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5
6	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5
7	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5
8	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5
9	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5
10	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5
11	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5
12	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5
13	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5
14	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5
15	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5
16	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5
17	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5	-124.5

Initial Supporting table - P0442: Estimate of Ambient Temperature Valid Conditioning Time as a Function of Ignition Off Time Table

Description: Data is EAT Valid Conditioning Time (in seconds) and Axis is Ignition Off Time (in seconds)

Notes: KtEONV_t_IdleCondTimePreset

P0442: Estimate of Ambient Temperature Valid Conditioning Time as a Function of Ignition Off Time Table - 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	200	300	300	300	300	300	300	300	300	300	300	300	300	295	290	285	280

P0442: Estimate of Ambient Temperature Valid Conditioning Time as a Function of Ignition Off Time Table - 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	275	270	265	260	255	250	245	240	235	230	225	220	215	210	205	200	

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

Description: Data is Purge Valve Leak Test Engine Vacuum Test Time (in seconds) and Axis is Fuel Level in %

Notes: KtEVPD_t_PVLT_EngineVacTimeCold

y/x	0	6	12	19	25	31	37	44	50	56	62	69	75	81	87	94	100
1	62	60	57	55	53	50	48	46	44	41	39	37	34	32	30	27	25

Initial Supporting table - P0521_Eng_Load_Stability_Weighting_Factor

Description: Engine Load Stability Weighting Factor

Notes: KtEOPD_r_EngLoadStblWeight with axis as Engine Load Stability defined by KnEOPD_m_EngLoadStabilityBpt

y/x	0	5	10	20	30	50	100	200	399
1	1.00	1.00	1.00	0.30	0.00	0.00	0.00	0.00	0.00

Initial Supporting table - P0521_Eng_Load_Stability_Weighting_Factor_Axis

Description: Engine Load Stability Weighting Factor Axis

Notes: KnEOPD_m_EngLoadStabilityBpt engine load axis used by KtEOPD_r_EngLoadStblWeight

y/x	1	2	3	4	5	6	7	8	9
1	0	5	10	20	30	50	100	200	399

Initial Supporting table - P0521_Eng_Oil_Pred_Weighting_Factor

Description: Oil Pressure Predicted Weighting Factor

Notes: KtEOPD_r_EOP_PredictWeight with axis as Predicted Oil Pressure defined by KnEOPD_p_EngOilPredictedBpt

y/x	160	170	250	275	360	375	400	450	600
1	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00

Initial Supporting table - P0521_Eng_Oil_Pred_Weighting_Factor_Axis

Description: Oil Pressure Predicted Weighting Factor Axis

Notes: KnEOPD_p_EngOilPredictedBpt predicted oil pressure axis used by KtEOPD_r_EOP_PredictWeight

y/x	1	2	3	4	5	6	7	8	9
1	160	170	250	275	360	375	400	450	600

Initial Supporting table - P0521_Oil_Temp_Weighting_Factor

Description: Oil Temperature Weighting Factor

Notes: KtEOPD_r_EOT_Weight with axis as Oil Temperature defined by KnEOPD_T_EngFilteredBpt

y/x	-10	-5	60	80	90	100	120	130	140
1	0.00	0.70	0.70	0.70	0.70	0.70	0.70	0.35	0.00

Initial Supporting table - P0521_Oil_Temp_Weighting_Factor_Axis

Description: Oil Temperature Weighting Factor Axis

Notes: KnEOPD_T_EngFilteredBpt oil temperature axis for use by KtEOPD_r_EOT_Weight

y/x	1	2	3	4	5	6	7	8	9
1	-10	-5	60	80	90	100	120	130	140

Initial Supporting table - P0521_RPM_Weighting_Factor

Description: Engine RPM Weighting Factor

Notes: KtEOPD_r_EngSpdWeight with axis as Engine RPM defined by KnEOPD_n_EngSpdFilteredBpt

y/x	0	500	900	1,000	2,000	3,000	3,500	4,000	5,000
1	0.00	0.00	0.00	0.45	0.45	0.45	0.45	0.20	0.00

Initial Supporting table - P0521_RPM_Weighting_Factor_X_Axis

Description: Engine RPM Weighting Factor Axis

Notes: KnEOPD_n_EngSpdFilteredBpt Engine RPM Axis for use by KtEOPD_r_EngSpdWeight

y/x	1	2	3	4	5	6	7	8	9
1	0	500	900	1,000	2,000	3,000	3,500	4,000	5,000

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.

Notes: P0606, KaPISD_t_LastSeedTimeout[x]

y/x	CePISR_e_6p25msSeq	CePISR_e_12p5msSeq	CePISR_e_25msSeq	CePISR_e_LORES_C
1	0.175	0.175	0.175	409.594

Initial Supporting table - P0606_Program Sequence Watch Enable f(Loop Time)

Description: The enabling flags for the program sequence watch as a function of operating loop time sequence.

Notes: P0606, KaPISD_b_ProgSeqWatchEnbl

y/x	CePISR_e_6p25msSeq	CePISR_e_12p5msSeq	CePISR_e_25msSeq	CePISR_e_LORES_C
1	1	1	1	1

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

Description: Fail threshold for PSW per operating loop.

Notes: P0606, KaPISD_Cnt_SequenceFail[x]

y/x	CePISR_e_6p25msSeq	CePISR_e_12p5msSeq	CePISR_e_25msSeq	CePISR_e_LORES_C
1	3	3	3	5

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

Description: Sample threshold for PSW per operating loop.

Notes: P0606, KaPISD_Cnt_SequenceSmpl[x]

y/x	CePISR_e_6p25msSeq	CePISR_e_12p5msSeq	CePISR_e_25msSeq	CePISR_e_LORES_C
1	4	4	4	4

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.

Notes: Used for P0325 and P0330. Cal name: KtKNKD_k_OpenTestCktMax. x-axis = Engine Speed (RPM).

Diagnostic fails when the filtered diagnostic output is between the OpenTestCktThrshMin and OpenTestCktThrshMax:
i.e. KtKNKD_k_OpenTestCktMin < VaKNKD_k_OpenTestCktIntFilter < KtKNKD_k_OpenTestCktMax

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	0.690	0.690	0.690	0.690	0.725	0.981	1.363	1.887	2.563	3.406	4.432	5.650	7.076	8.727	10.611	12.744	15.141

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.

Notes: Used for P0325 and P0330. Cal name: KtKNKD_k_OpenTestCktMin. x-axis = Engine Speed (RPM).

Diagnostic fails when the filtered diagnostic output is between the OpenTestCktThrshMin and OpenTestCktThrshMax:
i.e. KtKNKD_k_OpenTestCktMin < VaKNKD_k_OpenTestCktIntFilter < KtKNKD_k_OpenTestCktMax

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	0.199	0.186	0.176	0.188	0.223	0.279	0.385	0.522	0.701	0.928	1.207	1.545	1.943	2.408	2.945	3.559	4.252

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.

Notes: P1682, KtPMDD_U_PT_RelayPullInEnbl

y/x	23.00	85.00	95.00	105.00	125.00
1.00	7.00	8.70	9.00	9.20	10.00

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.

Notes: P16F3, KtMAPI_p_ES_TB_MAP_DeltaThresh

y/x	0.00	50.00	100.00	150.00	200.00	300.00
1.00	18.69	18.69	18.69	18.69	18.69	18.69

Initial Supporting table - P16F3_Delta Spark Threshold f(RPM,APC)

Description: Threshold for determining when the difference between commanded spark and applied spark exceeds the torque security requirement. It is a function of engine rpm and APC.

Notes: P16F3, KtSPRK_phi_DeltTorqueScrtyAdv

y/x	500.00	980.74	1,461.48	1,942.23	2,422.97	2,903.71	3,384.45	3,865.20	4,345.94	4,826.68	5,307.42	5,788.16	6,268.91	6,749.65	7,230.39	7,711.13	8,191.88
80.00	125.00	37.22	42.06	44.30	47.05	38.06	33.09	34.55	36.41	38.25	36.81	33.89	31.56	31.56	31.56	31.56	31.56
160.00	125.00	29.72	32.08	35.61	37.69	32.50	29.64	30.55	30.75	30.64	30.38	29.36	28.42	28.42	28.42	28.42	28.42
240.00	125.00	24.28	25.63	28.77	30.16	27.98	26.84	27.39	26.69	25.56	25.86	25.95	25.86	25.86	25.86	25.86	25.86
320.00	125.00	19.69	20.77	24.03	24.95	24.64	24.55	24.83	23.61	21.94	22.53	23.27	23.70	23.70	23.70	23.70	23.70
400.00	125.00	16.58	17.47	20.58	21.27	21.30	21.64	22.48	21.19	19.19	19.69	20.88	21.89	21.89	21.89	21.89	21.89
480.00	125.00	14.30	15.06	17.95	18.52	18.59	18.95	19.80	18.70	16.98	17.31	18.84	20.33	20.33	20.33	20.33	20.33
560.00	125.00	12.58	13.25	15.92	16.41	16.50	16.83	17.53	16.50	14.92	15.34	16.81	18.17	18.17	18.17	18.17	18.17
640.00	125.00	11.23	11.83	14.30	14.72	14.84	15.14	15.72	14.77	13.30	13.66	15.03	16.36	16.36	16.36	16.36	16.36
720.00	125.00	10.14	10.67	12.98	13.34	13.47	13.73	14.25	13.36	11.98	12.22	13.44	14.64	14.64	14.64	14.64	14.64
800.00	125.00	9.25	9.73	11.88	12.20	12.27	12.50	13.03	12.19	10.91	11.05	12.14	13.25	13.25	13.25	13.25	13.25
880.00	125.00	8.50	8.94	10.95	11.25	11.27	11.47	11.98	11.22	10.02	10.09	11.06	12.11	12.11	12.11	12.11	12.11
960.00	125.00	8.42	8.86	10.86	11.16	11.16	11.36	11.89	11.13	9.92	10.00	10.95	12.00	12.00	12.00	12.00	12.00
1,040.00	125.00	8.42	8.86	10.86	11.16	11.16	11.36	11.89	11.13	9.92	10.00	10.95	12.00	12.00	12.00	12.00	12.00
1,120.00	125.00	8.42	8.86	10.86	11.16	11.16	11.36	11.89	11.13	9.92	10.00	10.95	12.00	12.00	12.00	12.00	12.00
1,200.00	125.00	8.42	8.86	10.86	11.16	11.16	11.36	11.89	11.13	9.92	10.00	10.95	12.00	12.00	12.00	12.00	12.00
1,280.00	125.00	8.42	8.86	10.86	11.16	11.16	11.36	11.89	11.13	9.92	10.00	10.95	12.00	12.00	12.00	12.00	12.00
1,360.00	125.00	8.42	8.86	10.86	11.16	11.16	11.36	11.89	11.13	9.92	10.00	10.95	12.00	12.00	12.00	12.00	12.00

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.

Notes: P16F3, KtSPDC_M_ExternalLoad

y/x	-40.00	-15.00	5.00	32.00	55.00	90.00
200.00	650.00	650.00	650.00	650.00	650.00	650.00
305.00	650.00	650.00	650.00	650.00	650.00	650.00
410.00	650.00	650.00	650.00	650.00	650.00	650.00
515.00	650.00	650.00	650.00	650.00	290.00	200.00
560.00	650.00	650.00	650.00	650.00	245.00	169.32
705.00	348.47	305.43	285.05	280.99	199.88	100.99
875.00	343.45	309.26	288.32	259.00	132.30	80.73
1,050.00	258.44	233.76	218.54	197.74	70.27	49.43
1,300.00	115.81	97.59	86.21	71.41	34.89	27.82
1,600.00	65.57	48.09	37.02	23.41	21.72	21.27
2,000.00	59.37	41.21	29.58	15.93	21.17	22.20
2,500.00	65.40	45.82	33.19	18.80	25.78	26.95
3,200.00	72.68	51.86	38.36	23.32	32.77	34.35
4,000.00	98.94	77.23	63.10	47.61	55.31	56.65
5,000.00	125.20	102.77	88.15	72.28	77.07	76.52
6,100.00	150.57	127.63	112.65	96.51	99.66	98.30
8,000.00	162.74	139.25	123.88	107.45	107.43	104.65

Initial Supporting table - P219A Normalizer Bank1 Table

Description: Bank 1 Normalizer table used in the calculation of the Ratio for the current sample period.

Notes: DTCs: P219A; Calibration Name: KtFABD_U_Normalizer1; Horizontal axis is RPM; Vertical Axis is Air Per Cylinder (APC) in mg/cylinder

y/x	250	500	750	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	6,000
40	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
80	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
120	500.00	500.00	500.00	70.00	70.00	75.00	83.25	70.00	62.25	48.75	30.00	30.00	30.00	500.00	500.00	500.00	500.00
160	500.00	500.00	500.00	70.00	70.00	75.00	83.25	70.00	62.25	48.75	30.00	30.00	30.00	500.00	500.00	500.00	500.00
200	500.00	500.00	500.00	84.75	84.75	74.50	109.00	80.50	118.50	65.25	41.00	32.50	32.50	500.00	500.00	500.00	500.00
240	500.00	500.00	500.00	117.75	117.75	131.50	99.50	65.25	91.50	88.00	53.25	32.25	32.25	500.00	500.00	500.00	500.00
280	500.00	500.00	500.00	93.50	93.50	111.50	109.25	70.00	89.25	108.00	54.00	45.00	45.00	500.00	500.00	500.00	500.00
320	500.00	500.00	500.00	110.50	110.50	98.50	86.50	80.00	88.00	92.75	80.00	62.75	62.75	500.00	500.00	500.00	500.00
360	500.00	500.00	500.00	132.25	132.25	89.25	84.00	94.00	85.75	74.75	88.00	83.25	83.25	500.00	500.00	500.00	500.00
400	500.00	500.00	500.00	134.00	134.00	51.75	91.00	112.00	85.50	94.00	84.00	107.75	107.75	500.00	500.00	500.00	500.00
440	500.00	500.00	500.00	110.00	110.00	113.75	105.50	89.00	61.50	77.75	98.25	112.50	112.50	500.00	500.00	500.00	500.00
480	500.00	500.00	500.00	106.25	106.25	123.25	109.75	91.00	64.00	64.00	105.50	105.50	105.50	500.00	500.00	500.00	500.00
520	500.00	500.00	500.00	103.00	103.00	122.50	106.00	89.50	40.75	57.75	86.00	100.25	100.25	500.00	500.00	500.00	500.00
560	500.00	500.00	500.00	93.00	93.00	125.50	112.00	73.75	52.50	74.75	71.50	49.00	49.00	500.00	500.00	500.00	500.00
640	500.00	500.00	500.00	78.00	78.00	104.50	107.00	75.75	41.75	62.25	56.75	49.00	49.00	500.00	500.00	500.00	500.00
720	500.00	500.00	500.00	78.00	78.00	104.50	107.00	75.75	41.75	62.25	56.75	49.00	49.00	500.00	500.00	500.00	500.00
800	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00

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

Notes: DTCs: P219A; Calibration Name: KtFABD_K_QualFactor1; Horizontal axis is RPM; Vertical Axis is Air Per Cylinder (APC) in mg/cylinder

y/x	250	500	750	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	6,000
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	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
200	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
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	0.00	0.00	0.00	0.00	0.00
280	0.00	0.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
320	0.00	0.00	0.00	0.00	1.00	0.00	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	0.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
400	0.00	0.00	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
440	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
480	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	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	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
560	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
640	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
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

Notes: DTCs: P219A; Calibration Name: KtFABD_U_VarThresh1; Horizontal axis is RPM; Vertical Axis is Air Per Cylinder (APC) in mg/cylinder

y/x	250	500	750	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	6,000
40	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
80	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
120	500.00	500.00	500.00	19.50	19.50	25.50	20.75	8.75	19.25	22.00	7.50	9.75	9.75	500.00	500.00	500.00	500.00
160	500.00	500.00	500.00	19.50	19.50	25.50	20.75	8.75	19.25	22.00	7.50	9.75	9.75	500.00	500.00	500.00	500.00
200	500.00	500.00	500.00	30.00	30.00	63.50	24.25	22.50	24.75	29.75	8.25	6.00	6.00	500.00	500.00	500.00	500.00
240	500.00	500.00	500.00	33.75	33.75	50.75	38.75	46.50	57.75	44.50	9.75	8.00	8.00	500.00	500.00	500.00	500.00
280	500.00	500.00	500.00	78.50	78.50	55.50	37.50	60.00	76.00	50.50	19.00	10.00	10.00	500.00	500.00	500.00	500.00
320	500.00	500.00	500.00	64.50	64.50	67.75	71.00	114.50	78.25	75.75	20.00	12.50	12.50	500.00	500.00	500.00	500.00
360	500.00	500.00	500.00	55.00	55.00	89.00	81.00	76.00	82.25	110.25	24.50	10.75	10.75	500.00	500.00	500.00	500.00
400	500.00	500.00	500.00	55.00	55.00	131.00	79.50	80.75	85.50	127.50	42.00	9.75	9.75	500.00	500.00	500.00	500.00
440	500.00	500.00	500.00	80.00	80.00	96.00	90.00	96.00	117.00	122.25	25.75	9.75	9.75	500.00	500.00	500.00	500.00
480	500.00	500.00	500.00	96.75	96.75	87.75	86.25	91.25	111.00	111.00	18.50	18.50	18.50	500.00	500.00	500.00	500.00
520	500.00	500.00	500.00	122.25	122.25	92.75	95.25	88.00	123.25	103.75	54.25	26.50	26.50	500.00	500.00	500.00	500.00
560	500.00	500.00	500.00	135.00	135.00	101.00	97.25	96.00	106.50	84.25	82.25	55.50	55.50	500.00	500.00	500.00	500.00
640	500.00	500.00	500.00	155.00	155.00	115.50	90.50	82.50	111.75	91.00	82.75	43.00	43.00	500.00	500.00	500.00	500.00
720	500.00	500.00	500.00	155.00	155.00	115.50	90.50	82.50	111.75	91.00	82.75	43.00	43.00	500.00	500.00	500.00	500.00
800	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00

Initial Supporting table - P219B Normalizer Bank2 Table

Description: Bank 2 Normalizer table used in the calculation of the Ratio for the current sample period.

Notes: DTCs: P219B; Calibration Name: KtFABD_U_Normalizer2; Horizontal axis is RPM; Vertical Axis is Air Per Cylinder (APC) in mg/cylinder

y/x	250	500	750	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	6,000
40	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
80	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
120	500.00	500.00	500.00	29.00	29.00	35.25	54.75	33.00	20.50	20.00	19.00	34.25	34.25	500.00	500.00	500.00	500.00
160	500.00	500.00	500.00	29.00	29.00	35.25	54.75	33.00	20.50	20.00	19.00	34.25	34.25	500.00	500.00	500.00	500.00
200	500.00	500.00	500.00	122.00	122.00	136.25	69.75	38.00	34.00	45.00	28.00	43.50	43.50	500.00	500.00	500.00	500.00
240	500.00	500.00	500.00	160.50	160.50	215.75	76.00	53.50	64.50	106.00	57.50	59.75	59.75	500.00	500.00	500.00	500.00
280	500.00	500.00	500.00	170.00	170.00	220.75	94.75	66.75	75.00	84.25	79.75	110.00	110.00	500.00	500.00	500.00	500.00
320	500.00	500.00	500.00	209.75	209.75	155.75	114.75	106.00	126.50	102.75	84.00	94.75	94.75	500.00	500.00	500.00	500.00
360	500.00	500.00	500.00	191.25	191.25	138.50	176.00	139.50	158.25	141.50	118.00	139.00	139.00	500.00	500.00	500.00	500.00
400	500.00	500.00	500.00	169.00	169.00	162.50	192.50	173.00	216.00	150.75	195.50	148.50	148.50	500.00	500.00	500.00	500.00
440	500.00	500.00	500.00	204.00	204.00	150.00	144.00	144.00	168.50	125.75	145.75	116.25	116.25	500.00	500.00	500.00	500.00
480	500.00	500.00	500.00	124.75	124.75	110.00	144.75	217.00	220.75	120.00	118.75	116.00	116.00	500.00	500.00	500.00	500.00
520	500.00	500.00	500.00	120.50	120.50	154.00	139.00	215.00	239.00	115.75	120.25	105.00	105.00	500.00	500.00	500.00	500.00
560	500.00	500.00	500.00	183.25	183.25	152.25	164.50	125.75	145.75	100.00	97.25	80.00	80.00	500.00	500.00	500.00	500.00
640	500.00	500.00	500.00	169.75	169.75	189.50	163.25	155.00	149.00	130.50	69.50	67.25	67.25	500.00	500.00	500.00	500.00
720	500.00	500.00	500.00	169.75	169.75	189.50	163.25	155.00	149.00	130.50	69.50	67.25	67.25	500.00	500.00	500.00	500.00
800	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00

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

Notes: DTCs: P219B; Calibration Name: KtFABD_K_QualFactor2; Horizontal axis is RPM; Vertical Axis is Air Per Cylinder (APC) in mg/cylinder

y/x	250	500	750	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	6,000
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	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
200	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
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	0.00	0.00	0.00	0.00	0.00
280	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
320	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
360	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
400	0.00	0.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
440	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
480	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	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	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
560	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
640	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
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 - P219B Variance Threshold Bank2 Table

Description: Bank 2 lookup table of Variance metric used to calculate the Ratio for the current sample period

Notes: DTCs: P219B; Calibration Name: KtFABD_U_VarThresh2; Horizontal axis is RPM; Vertical Axis is Air Per Cylinder (APC) in mg/cylinder

y/x	250	500	750	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	6,000
40	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
80	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
120	500.00	500.00	500.00	7.50	7.50	14.75	15.75	6.00	7.00	7.25	5.25	14.50	14.50	500.00	500.00	500.00	500.00
160	500.00	500.00	500.00	7.50	7.50	14.75	15.75	6.00	7.00	7.25	5.25	14.50	14.50	500.00	500.00	500.00	500.00
200	500.00	500.00	500.00	11.25	11.25	34.00	23.00	15.50	9.50	16.00	9.75	21.50	21.50	500.00	500.00	500.00	500.00
240	500.00	500.00	500.00	12.25	12.25	34.50	19.50	16.50	10.25	14.00	14.00	31.00	31.00	500.00	500.00	500.00	500.00
280	500.00	500.00	500.00	18.50	18.50	34.75	22.00	16.25	11.25	15.50	16.00	30.50	30.50	500.00	500.00	500.00	500.00
320	500.00	500.00	500.00	20.75	20.75	87.50	31.75	52.50	14.50	24.25	25.00	43.00	43.00	500.00	500.00	500.00	500.00
360	500.00	500.00	500.00	27.50	27.50	110.00	57.00	98.25	20.75	58.00	41.50	50.50	50.50	500.00	500.00	500.00	500.00
400	500.00	500.00	500.00	106.00	106.00	139.50	99.75	93.00	29.50	73.00	48.50	63.75	63.75	500.00	500.00	500.00	500.00
440	500.00	500.00	500.00	97.50	97.50	242.50	268.75	144.75	79.50	97.25	73.75	75.50	75.50	500.00	500.00	500.00	500.00
480	500.00	500.00	500.00	187.50	187.50	208.00	191.25	74.50	70.75	160.00	116.50	72.75	72.75	500.00	500.00	500.00	500.00
520	500.00	500.00	500.00	195.50	195.50	154.25	192.25	72.50	58.50	112.50	116.50	83.50	83.50	500.00	500.00	500.00	500.00
560	500.00	500.00	500.00	142.50	142.50	160.75	143.75	114.00	90.00	125.50	108.75	141.00	141.00	500.00	500.00	500.00	500.00
640	500.00	500.00	500.00	152.25	152.25	106.00	135.25	83.25	90.00	111.00	113.75	109.00	109.00	500.00	500.00	500.00	500.00
720	500.00	500.00	500.00	152.25	152.25	106.00	135.25	83.25	90.00	111.00	113.75	109.00	109.00	500.00	500.00	500.00	500.00
800	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00

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.

Notes: millivolts

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

Initial Supporting table - Closed Loop Enable Clarification - KcFCLP_Cnt_O2RdyCyclesThrsh

Description: Number of post catalyst oxygen sensor samples which must be outside not ready window before post oxygen sensor is READY.

Notes: Time (events * 12.5 milliseconds)

y/x	1
1	10

Initial Supporting table - Closed Loop Enable Clarification - KcFULC_O2_SensorReadyEvents

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

Notes: Time (events * 12.5 milliseconds)

y/x	1
1	10

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.

Notes: Percent

y/x	1
1	75

Initial Supporting table - Closed Loop Enable Clarification - KeFCLP_T_IntegrationCatalystMax

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

Notes: Modeled catalyst Temperature in 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

Notes: Modeled catalyst Temperature in Celcius

y/x	1
1	500

Initial Supporting table - Closed Loop Enable Clarification - KfFCLL_T_AdaptiveHiCoolant

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

Notes: Degrees Celcius

y/x	1
1	140

Initial Supporting table - Closed Loop Enable Clarification - KfFCLL_T_AdaptiveLoCoolant

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

Notes: Degrees Celcius

y/x	1
1	39

Initial Supporting table - Closed Loop Enable Clarification - KfFCLP_U_O2ReadyThrshLo

Description: Lower threshold defining not ready window for post oxygen sensor voltage.

Notes: Voltage in millivolts

y/x	1
1	1,100

Initial Supporting table - Closed Loop Enable Clarification - KfFULC_U_O2_SensorReadyThrshLo

Description: Lower limit checked against when determining if an oxygen sensor is in range

Notes: Voltage in millivolts

y/x	1
1	1,795

Initial Supporting table - Closed Loop Enable Clarification - KtFCLL_p_AdaptiveLowMAP_Limit

Description: KtFCLL_p_AdaptiveLowMAP_Limit

Notes: MAP in KPa

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

Initial Supporting table - Closed Loop Enable Clarification - KtFCLP_t_PostIntglDisableTime

Description: Disable integral offset after engine start for this amount of time.

Notes: Time in seconds

y/x	-40	-29	-18	-6	5	16	28	39	50	61	73	84	95	106	118	129	140
1	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0

Initial Supporting table - Closed Loop Enable Clarification - KtFCLP_t_PostIntglRampInTime

Description: Time required to ramp integral offset to desired value.

Notes: Time in seconds

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

Initial Supporting table - Closed Loop Enable 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.

Notes: Time in seconds: Hybrid use Only

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	360.0	300.0	240.0	180.0	130.0	90.0	60.0	40.0	20.0	15.0	11.0	7.0	7.0	11.0	11.0	11.0	11.0

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.

Notes: Time in seconds

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	360.0	300.0	240.0	180.0	130.0	90.0	60.0	40.0	20.0	15.0	11.0	7.0	7.0	11.0	11.0	11.0	11.0

Initial Supporting table - P0420_BestFailingOSCTableB1

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

Notes: KtCATD_t_1_OSC_BestFailing - Used for P0420 norm ratio calculation

y/x	7.00	7.75	8.50	9.25	10.00	10.75	11.50	12.25	13.00	13.75	14.50	15.25	16.00	16.75	17.50	18.25	19.00
510.00	2.29	2.19	2.06	1.92	1.79	1.66	1.52	1.41	1.33	1.27	1.21	1.14	1.06	0.99	0.94	0.90	0.85
550.00	2.43	2.31	2.19	2.04	1.89	1.75	1.61	1.50	1.42	1.33	1.25	1.18	1.10	1.05	0.98	0.93	0.89
590.00	2.54	2.43	2.28	2.13	1.96	1.82	1.70	1.59	1.50	1.41	1.33	1.25	1.17	1.10	1.04	0.97	0.92
630.00	2.61	2.49	2.33	2.17	2.03	1.89	1.78	1.67	1.57	1.49	1.39	1.30	1.22	1.14	1.07	1.02	0.96
670.00	2.64	2.52	2.38	2.23	2.08	1.95	1.83	1.73	1.64	1.54	1.44	1.35	1.26	1.18	1.10	1.04	0.96
710.00	2.67	2.55	2.41	2.26	2.12	1.99	1.88	1.77	1.68	1.58	1.48	1.39	1.29	1.21	1.13	1.05	0.98
750.00	2.71	2.59	2.45	2.31	2.16	2.04	1.93	1.81	1.72	1.61	1.51	1.41	1.30	1.23	1.15	1.07	0.99
790.00	2.74	2.63	2.49	2.35	2.21	2.08	1.97	1.86	1.75	1.63	1.53	1.44	1.33	1.24	1.16	1.08	1.00
830.00	2.77	2.66	2.53	2.39	2.24	2.11	1.99	1.88	1.79	1.67	1.56	1.46	1.35	1.25	1.17	1.09	1.01

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.

Notes: KtCATD_t_1_OSC_WorstPassing - Used for P0420 norm ratio calculation

y/x	7.00	7.75	8.50	9.25	10.00	10.75	11.50	12.25	13.00	13.75	14.50	15.25	16.00	16.75	17.50	18.25	19.00
510.00	2.61	2.49	2.37	2.25	2.14	2.04	1.95	1.85	1.75	1.66	1.55	1.46	1.38	1.30	1.23	1.18	1.12
550.00	2.67	2.55	2.43	2.30	2.18	2.08	1.98	1.90	1.79	1.70	1.59	1.50	1.42	1.35	1.28	1.21	1.15
590.00	2.74	2.60	2.48	2.34	2.22	2.11	2.02	1.93	1.83	1.74	1.64	1.54	1.46	1.38	1.31	1.24	1.18
630.00	2.81	2.66	2.54	2.39	2.27	2.16	2.07	1.98	1.88	1.80	1.69	1.59	1.51	1.43	1.35	1.28	1.21
670.00	2.87	2.72	2.59	2.44	2.31	2.20	2.11	2.02	1.93	1.84	1.74	1.63	1.54	1.46	1.38	1.30	1.24
710.00	2.90	2.77	2.63	2.48	2.36	2.26	2.16	2.07	1.98	1.89	1.78	1.66	1.57	1.49	1.40	1.34	1.27
750.00	2.95	2.81	2.67	2.52	2.40	2.30	2.21	2.12	2.02	1.92	1.81	1.69	1.60	1.52	1.42	1.36	1.30
790.00	2.99	2.86	2.70	2.56	2.45	2.33	2.26	2.16	2.06	1.97	1.84	1.72	1.63	1.55	1.45	1.39	1.33
830.00	3.02	2.90	2.75	2.61	2.49	2.38	2.29	2.19	2.10	1.99	1.87	1.75	1.66	1.57	1.49	1.42	1.36

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.

Notes: KtCATD_t_2_OSC_BestFailing - Used for P0430 norm ratio calculation

y/x	7.00	7.75	8.50	9.25	10.00	10.75	11.50	12.25	13.00	13.75	14.50	15.25	16.00	16.75	17.50	18.25	19.00
510.00	2.29	2.19	2.06	1.92	1.79	1.66	1.52	1.41	1.33	1.27	1.21	1.14	1.06	0.99	0.94	0.90	0.85
550.00	2.43	2.31	2.19	2.04	1.89	1.75	1.61	1.50	1.42	1.33	1.25	1.18	1.10	1.05	0.98	0.93	0.89
590.00	2.54	2.43	2.28	2.13	1.96	1.82	1.70	1.59	1.50	1.41	1.33	1.25	1.17	1.10	1.04	0.97	0.92
630.00	2.61	2.49	2.33	2.17	2.03	1.89	1.78	1.67	1.57	1.49	1.39	1.30	1.22	1.14	1.07	1.02	0.96
670.00	2.64	2.52	2.38	2.23	2.08	1.95	1.83	1.73	1.64	1.54	1.44	1.35	1.26	1.18	1.10	1.04	0.96
710.00	2.67	2.55	2.41	2.26	2.12	1.99	1.88	1.77	1.68	1.58	1.48	1.39	1.29	1.21	1.13	1.05	0.98
750.00	2.71	2.59	2.45	2.31	2.16	2.04	1.93	1.81	1.72	1.61	1.51	1.41	1.30	1.23	1.15	1.07	0.99
790.00	2.74	2.63	2.49	2.35	2.21	2.08	1.97	1.86	1.75	1.63	1.53	1.44	1.33	1.24	1.16	1.08	1.00
830.00	2.77	2.66	2.53	2.39	2.24	2.11	1.99	1.88	1.79	1.67	1.56	1.46	1.35	1.25	1.17	1.09	1.01

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.

Notes: KtCATD_t_2_OSC_WorstPassing - Used for P0430 norm ratio calculation

y/x	7.00	7.75	8.50	9.25	10.00	10.75	11.50	12.25	13.00	13.75	14.50	15.25	16.00	16.75	17.50	18.25	19.00
510.00	2.61	2.49	2.37	2.25	2.14	2.04	1.95	1.85	1.75	1.66	1.55	1.46	1.38	1.30	1.23	1.18	1.12
550.00	2.67	2.55	2.43	2.30	2.18	2.08	1.98	1.90	1.79	1.70	1.59	1.50	1.42	1.35	1.28	1.21	1.15
590.00	2.74	2.60	2.48	2.34	2.22	2.11	2.02	1.93	1.83	1.74	1.64	1.54	1.46	1.38	1.31	1.24	1.18
630.00	2.81	2.66	2.54	2.39	2.27	2.16	2.07	1.98	1.88	1.80	1.69	1.59	1.51	1.43	1.35	1.28	1.21
670.00	2.87	2.72	2.59	2.44	2.31	2.20	2.11	2.02	1.93	1.84	1.74	1.63	1.54	1.46	1.38	1.30	1.24
710.00	2.90	2.77	2.63	2.48	2.36	2.26	2.16	2.07	1.98	1.89	1.78	1.66	1.57	1.49	1.40	1.34	1.27
750.00	2.95	2.81	2.67	2.52	2.40	2.30	2.21	2.12	2.02	1.92	1.81	1.69	1.60	1.52	1.42	1.36	1.30
790.00	2.99	2.86	2.70	2.56	2.45	2.33	2.26	2.16	2.06	1.97	1.84	1.72	1.63	1.55	1.45	1.39	1.33
830.00	3.02	2.90	2.75	2.61	2.49	2.38	2.29	2.19	2.10	1.99	1.87	1.75	1.66	1.57	1.49	1.42	1.36

Bundle Name: 5VoltReferenceA_FA
P0641
Bundle Name: 5VoltReferenceB_FA
P0651
Bundle Name: 5VoltReferenceMAP_OOR_Flt
P0697
Bundle Name: A/F Imbalance Bank1
P219A
Bundle Name: A/F Imbalance Bank2
P219B
Bundle Name: AAP_SnsrCktFA
Naturally aspirated: P2228, P2229. Turbocharged: P0237, P0238
Bundle Name: AAP_SnsrCktFP
Naturally aspirated: P2228, P2229. Turbocharged: P0237, P0238
Bundle Name: AAP_SnsrFA
Naturally Aspirated: P2227, P2228, P2229, P2230. Turbocharged: P0237, P0238.
Bundle Name: AAP_SnsrTFTKO
Naturally Aspirated: P2227, P2228, P2229, P2230. Turbocharged: P0237, P0238.
Bundle Name: AAP2_SnsrCktFA
P2228, P2229
Bundle Name: AAP2_SnsrCktFP
P2228, P2229
Bundle Name: AAP2_SnsrFA
P2227, P2228, P2229, P2230
Bundle Name: AAP2_SnsrTFTKO
P2227, P2228, P2229, P2230
Bundle Name: AAP3_SnsrCktFA
P222C, P222D
Bundle Name: AAP3_SnsrCktFP
P222C, P222D
Bundle Name: AccCktLo_FA
P2537
Bundle Name: AcceleratorPedalFailure
P2122, P2123, P2127, P2128, P2138, P0697, P06A3
Bundle Name: ACCMLostComm
U016B
Bundle Name: ACFailedOnSD
See ACCM Document

Bundle Name: ACHighSidePressSnsrCktFA
P0532, P0533
Bundle Name: ACThrmlRefrigSpdVld
See ACCM Document
Bundle Name: AfterThrottlePressTFTKO
Naturally Aspirated or Turbocharged: P0106, P0107, P0108. Supercharged: P012B, P012C, P012D.
Bundle Name: AfterThrottlePressureFA
Naturally Aspirated or Turbocharged: P0106, P0107, P0108. Supercharged: P012B, P012C, P012D.
Bundle Name: AfterThrottleVacuumTFTKO
Naturally Aspirated or Turbocharged: P0106, P0107, P0108. Supercharged: P012B, P012C, P012D.
Bundle Name: AIR System FA
P0411, P2440, P2444
Bundle Name: AIRPumpControlCircuit FA
P0418, P2257, P2258
Bundle Name: AIRSystemPressureSensor FA
P2430, P2431, P2432, P2433, P2435, P2436, P2437, P2438
Bundle Name: AIRValveControlCircuit FA
P0412, P041F, P044F
Bundle Name: AllTwoStepDrvr_TFTKO
P16CF, P16D2, P16D3, P2645, P2648, P2649
Bundle Name: AllVCE_Driver_TFTKO
P16CF, P16D2, P16D3, P2645, P2648, P2649
Bundle Name: AmbientAirDefault
Baro Sensor Present: P2227, P2228, P2229, P2230. No Baro Sensor Present: P0101, P0102, P0103, P0106, P0107, P0108, P0111, P0112, P0113, P0114, P0121, P0122, P0123, P012B, P012C, P012D, P0222, P0223, P1221
Bundle Name: AmbPresDfltdStatus
Baro Sensor Present: P2227, P2228, P2229, P2230. No Baro Sensor Present: P0101, P0102, P0103, P0106, P0107, P0108, P0111, P0112, P0113, P0114, P0121, P0122, P0123, P012B, P012C, P012D, P0222, P0223, P1221
Bundle Name: AmbPresSnsr2_CktFA
P222C, P222D
Bundle Name: AmbPresSnsrCktFA
P2228, P2229
Bundle Name: AmbPresSnsrCktFP
P2228, P2229
Bundle Name: AnyCamPhaser_FA
P0010, P0011, P0013, P0014, P0020, P0021, P0023, P0024, P2088, P2089, P2090, P2091, P2092, P2093, P2094, P2095, P05CC, P05CD, P05CE, P05CF, P25CA, P25CB, P25CC, P25CD, P25CE, P25CF

Bundle Name: AnyCamPhaser_TFTKO
P0010, P0011, P0013, P0014, P0020, P0021, P0023, P0024, P2088, P2089, P2090, P2091, P2092, P2093, P2094, P2095, P05CC, P05CD, P05CE, P05CF, P25CA, P25CB, P25CC, P25CD, P25CE, P25CF
Bundle Name: BrakeBoosterSensorCktFA
P0557, P0558
Bundle Name: BrakeBoosterSensorFA
P0556, P0557, P0558
Bundle Name: BrakeBoosterVacuumValid
P0556, P0557, P0558
Bundle Name: BSTR_b_BoostSnsrFA
P0236, P0237, P0238
Bundle Name: BSTR_b_ExcsvBstFA
P226B
Bundle Name: BSTR_b_ExcsvBstTFTKO
P226B
Bundle Name: BSTR_b_IC_Pmp_EffPerfTFTKO
P026A
Bundle Name: BSTR_b_IC_PmpCktFA
P023A, P023C
Bundle Name: BSTR_b_PCA_CktFA
P0033, P0034, P0035, P0045, P0047, P0048, P0243, P0245, P0246, P0247, P0249, P0250
Bundle Name: BSTR_b_PCA_CktLoFA
P0034, P0047, P0245, P0249
Bundle Name: BSTR_b_PCA_CktLoTFTKO
P0034, P0047, P0245, P0249
Bundle Name: BSTR_b_PCA_CktTFTKO
P0033, P0034, P0035, P0045, P0047, P0048, P0243, P0245, P0246, P0247, P0249, P0250
Bundle Name: BSTR_b_PCA_FA
P0234, P0299, P0033, P0034, P0035, P0045, P0047, P0048, P0243, P0245, P0246, P2261, P0247, P0249, P0250
Bundle Name: BSTR_b_PCA_PstnSnsrFA
P003A, P2564, P2565
Bundle Name: BSTR_b_PCA_PstnSnsrTFTKO
P003A, P2564, P2565
Bundle Name: BSTR_b_PCA_TFTKO
P0234, P0299, P0033, P0034, P0035, P0045, P0047, P0048, P0243, P0245, P0246, P2261, P0247, P0249, P0250
Bundle Name: BSTR_b_PresCntrlTooHiFA
P0234
Bundle Name: BSTR_b_PresCntrlTooHiTFTKO

P0234
Bundle Name: BSTR_b_PresCntrlTooLoFA
P0299
Bundle Name: BSTR_b_PresCntrlTooLoTFTKO
P0299
Bundle Name: BSTR_b_PstnCntrlFA
P166D, P166E
Bundle Name: BSTR_b_PstnCntrlTooHiFA
P166E
Bundle Name: BSTR_b_PstnCntrlTooHiTFTKO
P166E
Bundle Name: BSTR_b_PstnCntrlTooLoFA
P166D
Bundle Name: BSTR_b_PstnCntrlTooLoTFTKO
P166D
Bundle Name: BSTR_b_TurboBypassA_StkFA
P2261
Bundle Name: BSTR_b_TurboBypassCktFA
P0033, P0034, P0035, P00C0, P00C1, P00C2
Bundle Name: BSTR_b_TurboBypassCktTFTKO
P0033, P0034, P0035, P00C0, P00C1, P00C2
Bundle Name: BSTR_b_TurboBypB_CktFA
P00C0, P00C1, P00C2
Bundle Name: BSTR_b_TurboBypB_CktTFTKO
P00C0, P00C1, P00C2
Bundle Name: CamLctnExhFA
P0017, P0019, P0365, P0366, P0390, P0391
Bundle Name: CamLctnIntFA
P0016, P0018, P0340, P0341, P0345, P0346
Bundle Name: CamSensor_FA
P0016, P0017, P0018, P0019, P0340, P0341, P0345, P0346, P0365, P0366, P0390, P0391
Bundle Name: CamSensor_TFTKO
P0016, P0017, P0018, P0019, P0340, P0341, P0345, P0346, P0365, P0366, P0390, P0391
Bundle Name: CamSensorAnyLctnTFTKO
P0016, P0017, P0018, P0019, P0340, P0341, P0345, P0346, P0365, P0366, P0390, P0391
Bundle Name: CamSensorAnyLocationFA
P0016, P0017, P0018, P0019, P0340, P0341, P0345, P0346, P0365, P0366, P0390, P0391
Bundle Name: CamSensorFA

P0016, P0017, P0018, P0019, P0340, P0341, P0345, P0346, P0365, P0366, P0390, P0391
Bundle Name: CamSensorTFTKO
P0016, P0017, P0018, P0019, P0340, P0341, P0345, P0346, P0365, P0366, P0390, P0391
Bundle Name: Catalyst Warmup Enabled
N/A
Catalyst Warmup Enabled - Other Definitions: To enable the Cold Start Emission Reduction Strategy: Catalyst Temperature < 300.00 degC AND Engine Coolant > 140.00 degC AND Engine Coolant <= -40.00 degC AND Barometric Pressure>= 75.00 KPa AND DTC's Not Set: **ECT_Sensor_FA** **MAP_SensorFA** The Cold Start Emission Reduction Strategy will remain active until: Engine Run Time > **CatalystLightOffExtendedEngineRunTimeExit** This Extended Engine run time exit is a function of percent ethanol and Catmons NormRatioEWMA. Refer to "Supporting Tables" for details. OR Catalyst Temperature >= 600.00 degC AND Engine Run Time >= 1.00 seconds OR Barometric Pressure < 75.00 KPa
Bundle Name: CatalystSysEfficiencyLoB1_FA
P0420
Bundle Name: CatalystSysEfficiencyLoB2_FA
P0430
Bundle Name: Clutch Sensor FA
P0806, P0807, P0808
Bundle Name: ClutchPositionSensorCircuitHi FA
P0808

Bundle Name: ClutchPositionSensorCircuitLo FA
P0807
Bundle Name: ClutchPstnSnsr FA
P0806, P0807, P0808
Bundle Name: ClutchPstnSnsrCktHi FA
P0808
Bundle Name: ClutchPstnSnsrCktLo FA
P0807
Bundle Name: ClutchPstnSnsrNotLearned
P080A
Bundle Name: CommBusAOff_VICM_FA
U0073
Bundle Name: CommBusBOff_VICM_FA
U0074
Bundle Name: CoolingFanSpeedTooHigh_FA
P0495
Bundle Name: CrankCamCorrelationTFTKO
P0016, P0017, P0018, P0019
Bundle Name: CrankExhaustCamCorrelationFA
P0017, P0019
Bundle Name: CrankExhaustCamCorrFA
P0017, P0019
Bundle Name: CrankIntakeCamCorrelationFA
P0016, P0018
Bundle Name: CrankIntakeCamCorrFA
P0016, P0018
Bundle Name: CrankSensor_FA
P0335, P0336
Bundle Name: CrankSensor_TFTKO
P0335, P0336
Bundle Name: CrankSensorFA
P0335, P0336
Bundle Name: CrankSensorFaultActive
P0335, P0336
Bundle Name: CrankSensorTestFailedTKO
P0335, P0336
Bundle Name: CrankSensorTFTKO
P0335, P0336

Bundle Name: CylDeacAllDriverFault
P3401, P03403, P03404, P3409, P03411, P03412, P3417, P3419, P3420, P3425, P3427, P3428, P3433, P3435, P3436, P3441, P3443, P3444, P3449, P3451, P3452, P3457, P3459, P3460
Bundle Name: CylDeacDriverFault
P3401, P03403, P03404, P3409, P03411, P03412, P3417, P3419, P3420, P3425, P3427, P3428, P3433, P3435, P3436, P3441, P3443, P3444, P3449, P3451, P3452, P3457, P3459, P3460
Bundle Name: CylDeacSystemTFTKO
P3400
Bundle Name: ECT_Sensor_Ckt_FA
P0117, P0118
Bundle Name: ECT_Sensor_Ckt_FP
P0117, P0118
Bundle Name: ECT_Sensor_Ckt_High_FP
P0118
Bundle Name: ECT_Sensor_Ckt_Low_FP
P0117
Bundle Name: ECT_Sensor_Ckt_TFTKO
P0117, P0118
Bundle Name: ECT_Sensor_Ckt_TPTKO
P0117, P0118
Bundle Name: ECT_Sensor_DefaultDetected
P0116, P0117, P0118, P0119, P111E
Bundle Name: ECT_Sensor_FA
P0116, P0117, P0118, P0119, P0128, P111E
Bundle Name: ECT_Sensor_Perf_FA
P0116, P111E
Bundle Name: ECT_Sensor_TFTKO
P0116, P0117, P0118, P0119, P0128, P111E
ECT_Sensor_TFTKO - Other Definitions:
Bundle Name: EGRValve_FP
P0405, P0406, P042E
Bundle Name: EGRValveCircuit_FA
P0403, P0404, P0405, P0406, P0489, P0490, P042E
Bundle Name: EGRValveCircuit_TFTKO
P0403, P0404, P0405, P0406, P0489, P0490
Bundle Name: EGRValvePerformance_FA
P0404, P042E
Bundle Name: EGRValvePerformance_TFTKO

P0404, P042E
Bundle Name: ELCP_PumpCircuit_FA
P2400, P2401, P2402
Bundle Name: ELCP_SwitchCircuit_FA
P2418, P2419, P2420
Bundle Name: ELCPCircuit_FA
P24BA, P24BB
Bundle Name: EngineMetalOvertempActive
P1258
Bundle Name: EngineMisfireDetected_FA
P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308
Bundle Name: EngineMisfireDetected_TFTKO
P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308
Bundle Name: EngineModeNotRunTimer_FA
P2610
Bundle Name: EngineModeNotRunTimerError
P2610
Bundle Name: EnginePowerLimited
P0068, P00C8, P00C9, P00CA, P0090, P0091, P0092, P0122, P0123, P0191, P0192, P0193, P0222, P0223, P0601, P0604, P0606, P0697, P06A3, P06DB, P06DE, P0A1D, P1104, P127A, P127C, P127D, P15F2, P160D, P160E, P1682, P16A0, P16A1, P16A2, P16F3, P2100, P2101, P2102, P2103, P2122, P2123, P2127, P2128, P2135, P2138, P215B, P2176, P228C, P228D, U0073, U0074, U0293, U1817
Bundle Name: EngineTorqueEstInaccurate
EngineMisfireDetected_FA, FuelInjedtorCircuit_FA, FuelInjedtorCircuit_TFTKO, FuelTrimSystemB1_FA, FuelTrimSystemB2_FA, MAF_SensorTFTKO, MAP_SensorTFTKO, EGRValuePerforamnce_FA, P16F3
EngineTorqueEstInaccurate - Other Definitions: P16F3 with GetXOYR_b_SecurityFlt (CeXOYR_e_MAPR_AfterThrotPresFlt, CeXOYR_e_MAPR_EngineVacuumFlt, CeXOYR_e_MAPR_IntkMnfdPresFlt, CeXOYR_e_MAFR_Ahead1vs2FinalFlt)
Bundle Name: EngModeNotRunTmErr
P2610
Bundle Name: EngOilModeledTempValid
ECT_Sensor_FA, IAT_SensorCircuitFA
Bundle Name: EngOilPressureSensorCktFA
P0522, P0523
Bundle Name: EngOilPressureSensorFA
P0521, P0522, P0523
Bundle Name: EngOilTempFA
EngOilTempSensorCircuitFA, EngOilModeledTempValid, P16F3
EngOilTempFA - Other Definitions: P16F3 with GetXOYR_b_SecurityFlt(CeXOYR_e_EOTR_SecurityFlt)

Bundle Name: EngOilTempSensorCircuitFA
P0197, P0198
Bundle Name: Ethanol Composition Sensor FA
P0178, P0179, P2269
Bundle Name: EvapEmissionSystem_FA
P0455, P0446
Bundle Name: EvapExcessPurgePsbl_FA
ELCP sealed/vented fuel system, P0442, P0455, P0458 OR Conventional fuel system, P0442, P0455, P0458, P0496
Bundle Name: EvapFlowDuringNonPurge_FA
P0496
Bundle Name: EvapPurgeSolenoidCircuit_FA
P0443, P0458, P0459
Bundle Name: EvapReducedPurgePsbl_FA
ELCP sealed/vented fuel system, P0443, P0446, P0449, P0459, P0497, P0499, P1463, P2419, P2422 OR Conventional fuel system, P0443, P0446, P0455, P0459, P0498
Bundle Name: EvapSmallLeak_FA
P0442
Bundle Name: EvapVentSolenoidCircuit_FA
P0449, P0498, P0499
Bundle Name: ExhaustCamSensor_FA
P0017, P0019, P0365, P0366, P0390, P0391
Bundle Name: ExhaustCamSensor_TFTKO
P0017, P0019, P0365, P0366, P0390, P0391
Bundle Name: ExhaustCamSensorFA
P0017, P0019, P0365, P0366, P0390, P0391
Bundle Name: ExhaustCamSensorTFTKO
P0017, P0019, P0365, P0366, P0390, P0391
Bundle Name: ExhaustVVT_Enabled

ExhaustVVT_Enabled - Other Definitions:
ExhaustVVT_Enabled = TRUE if:

CrankExhaustCamCorrelationFA diagnostic has executed and passed AND
Cam Edge Locations have been learned AND
CrankSensor_TFTKO = False AND
ExhaustCamSensorTFTKO = False AND
CamLctnExhFA = False AND
(**IntakeVVT_Enabled** = True OR Intake Park Position (CePHSR_e_Advanced) = CePHSR_e_Retarded) AND
Engine Mode Run = True AND
Engine Power Requested = True AND
ExhEngineSpeed is Enabled AND
ExhOilPressure is Enabled AND

ExhEngineOilTemp is Enabled AND
(Engine Power Requested = True
OR
CSER_Enabled AND Engine Speed > 8,000.00 AND
Engine Run Time > **P0011_P0021_P05CC_P05CD_P0014_P0024_P05CE_P05CF_ColdStartEngRunning**)

****

ExhEngineSpeed is Enabled if:
P0014_P0024_P05CE_P05CF_LoRpmHiEnblEc < Engine RPM <**P0014_P0024_P05CE_P05CF_HiEngSpdLoEnblEc**

ExhEngineSpeed Disables if:
Engine RPM < **P0014_P0024_P05CE_P05CF_LoRpmLoDsblEc**
OR
Engine RPM > **P0014_P0024_P05CE_P05CF_HiEngSpdHiDsblEc**

****

ExhOilPressure is Enabled if:
(Oil Pressure Sensor In Use (1.00) = 1.00 (Note: 1.00 equals TRUE) AND
Oil Pressure Sensor Present (1.00) = 1.00 (Note: 1.00 equals Present) AND
Oil Pressure > **P0014_P0024_P05CE_P05CF_LoPresHiEnblEc**
for **P0014_P0024_P05CE_P05CF_EngOilPressEnblEc** sec)
OR
(Engine RPM > **P0014_P0024_P05CE_P05CF_LoRpmHiEnblEc**
for **P0014_P0024_P05CE_P05CF_EngOilPressEnblEc** sec)

ExhOilPressure Disables if:
Oil Pressure Sensor In Use (1.00) = 1.00 (Note: 1.00 equals TRUE) AND
Oil Pressure Sensor Present (1.00) = 1.00 (Note: 1.00 equals Present) AND
Oil Pressure < **P0014_P0024_P05CE_P05CF_LoPresLoDsblEc**)

****
ExhEngineOilTemp is Enabled if:
-10.00 < Engine Oil Temp < 135.00

ExhEngineOilTemp Disables if:
Engine Oil Temp < -12.00
OR
Engine Oil Temp > 140.00

Bundle Name: FanOutputDriver_FA

P0480, P0481, P0482, P0691, P0692, P0693, P0694, P0695, P0696, P1485 (EREV), P1486 (EREV), P1487 (EREV)

Bundle Name: FHPD_b_FRP_SnsrCkt_FP

P0192, P0193, P16E4, P16E5, P128F, P128A

Bundle Name: FHPD_b_HPC_PresErrNeg_FA

P228D

Bundle Name: FHPD_b_HPC_PresErrNeg_TFTKO

P228D
Bundle Name: FHPD_b_HPC_PresErrPos_FA
P228C
Bundle Name: FHPD_b_HPC_PresErrPos_TFTKO
P228C
Bundle Name: FHPD_b_HPC_Windup_ TFTKO
P0089
Bundle Name: FHPD_b_HPC_Windup_FA
P0089
Bundle Name: FHPD_b_PumpCurr_FA
P163A
Bundle Name: FHPD_b_PumpCurr_TFTKO
P163A
Bundle Name: FHPR_b_FRP_SnsrCkt_FA
P0192, P0193, P127C, P127D, P16E4, P16E5, P128F, P128A, P128B
Bundle Name: FHPR_b_FRP_SnsrCkt_TFTKO
P0192, P0193, , P127C, P127D, P16E4, P16E5, P128F, P128A, P128B
Bundle Name: FHPR_b_FRP_SnsrPerfDiag_FA
P0191, P127A
Bundle Name: FHPR_b_FRP_SnsrPerfDiag_TFTKO
P0191, P127A
Bundle Name: FHPR_b_PumpCkt_FA
P0090, P0091, P0092, P00C8, P00C9, P00CA
Bundle Name: FHPR_b_PumpCkt_TFTKO
P0090, P0091, P0092, P00C8, P00C9, P00CA
Bundle Name: FourWheelDriveLowStateInvalid
P2771
Bundle Name: FPSR_b_SENT_WaveForm_FPBndl
P128F, P16E4, P16E5
Bundle Name: FTP_SensorCircuit_FA
P0452, P0453
Bundle Name: FuelInjectorCircuit_FA
PFI: P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0261, P0264, P0267, P0270, P0273, P0276, P0279, P0282, P0262, P0265, P0268, P0271, P0274, P0277, P0280, P0283 SIDI: P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0261, P0264, P0267, P0270, P0273, P0276, P0279, P0282, P0262, P0265, P0268, P0271, P0274, P0277, P0280, P0283, P2147, P2150, P2153, P2156, P216B, P216E, P217B, P217E, P2148, P2151, P2154, P2157, P216C, P216F, P217C, P217F, P1248, P1249, P124A, P124B, P124C, P124D, P124E, P124F
Bundle Name: FuelInjectorCircuit_TFTKO
PFI: P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0261, P0264, P0267, P0270, P0273, P0276, P0279, P0282, P0262, P0265, P0268, P0271, P0274, P0277, P0280, P0283 SIDI: P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0261, P0264, P0267, P0270, P0273, P0276, P0279, P0282, P0262,

P0265, P0268, P0271, P0274, P0277, P0280, P0283, P2147, P2150, P2153, P2156, P216B, P216E, P217B, P217E, P2148, P2151, P2154, P2157, P216C, P216F, P217C, P217F, P1248, P1249, P124A, P124B, P124C, P124D, P124E, P124F
Bundle Name: FuelLevelDataFault
P0461, P0462, P0463, P2066, P2067, P2068
Bundle Name: FuelPumpRlyCktFA
P0627, P0628, P0629
Bundle Name: FuelTankPressureSnsrCkt_FA
P0452, P0453
Bundle Name: FuelTrimSystemB1_FA
P0171, P0172
Bundle Name: FuelTrimSystemB1_TFTKO
P0171, P0172
Bundle Name: FuelTrimSystemB2_FA
P0174, P0175
Bundle Name: FuelTrimSystemB2_TFTKO
P0174, P0175
Bundle Name: HumidityFA
P0097, P0098, P11C2, P11C3, P2227, P2228, P2229, P2230
Bundle Name: HumTempSnsrCktFA
P0097, P0098
Bundle Name: HumTempSnsrCktFP
P0097, P0098
Bundle Name: HumTempSnsrFA
P0096, P0097, P0098, P0099
Bundle Name: IAC_SystemRPM_FA
P0506, P0507
Bundle Name: IAT_ContCorrFA
P2199
Bundle Name: IAT_SensorCircuitFA
P0112, P0113
Bundle Name: IAT_SensorCircuitFP
P0112, P0113
Bundle Name: IAT_SensorCircuitTFTKO
P0112, P0113
Bundle Name: IAT_SensorFA
P0111, P0112, P0113, P0114
Bundle Name: IAT_SensorTFTKO
P0111, P0112, P0113, P0114

Bundle Name: IgnitionOffTimer_FA
P2610
Bundle Name: IgnitionOffTimeValid
P2610
Bundle Name: IgnitionOutputDriver_FA
P0351, P0352, P0353, P0354, P0355, P0356, P0357, P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, P2322
Bundle Name: IntakeCamSensor_FA
P0016, P0018, P0340, P0341, P0345, P0346
Bundle Name: IntakeCamSensor_TFTKO
P0016, P0018, P0340, P0341, P0345, P0346
Bundle Name: IntakeCamSensorFA
P0016, P0018, P0340, P0341, P0345, P0346
Bundle Name: IntakeCamSensorTFTKO
P0016, P0018, P0340, P0341, P0345, P0346
Bundle Name: IntakeVVT_Enabled

IntakeVVT_Enabled - Other Definitions:
IntakeVVT_Enabled = TRUE if:

CrankIntakeCamCorrelationFA diagnostic has executed and passed AND
Cam Edge Locations have been learned AND
CrankSensor_TFTKO = False AND
IntakeCamSensorTFTKO = False AND
CamLctnIntFA = False AND
Engine Mode Run = True AND
Engine Power Requested = True AND
IntEngineSpeed is Enabled AND
IntOilPressure is Enabled AND
IntEngineOilTemp is Enabled AND
(Engine Power Requested = True
OR
CSER_Enabled AND Engine Speed > 8,000.00 AND
Engine Run Time > **P0011_P0021_P05CC_P05CD_P0014_P0024_P05CE_P05CF_ColdStartEngRunning**)

****

IntEngineSpeed is Enabled if:
P0011_P0021_P05CC_P05CD_LoRpmHiEnblIc < Engine RPM < **P0011_P0021_P05CC_P05CD_HiEngSpdLoEnblIc**

IntEngineSpeed Disables if:
Engine RPM < **P0011_P0021_P05CC_P05CD_LoRpmLoDsblIc**
OR
Engine RPM > **P0011_P0021_P05CC_P05CD_HiEngSpdHiDsblIc**

****
IntOilPressure is Enabled if:
(Oil Pressure Sensor In Use (1.00) = 1.00 (Note: 1.00 equals "TRUE") AND
Oil Pressure Sensor Present (1.00) = 1.00 (Note: 1.00 equals "Present") AND
Oil Pressure > **P0011_P0021_P05CC_P05CD_LoPresHiEnblIc**
for **P0011_P0021_P05CC_P05CD_EngOilPressEnblIc** sec)
OR
(Engine RPM > **P0011_P0021_P05CC_P05CD_LoRpmHiEnblIc**
for **P0011_P0021_P05CC_P05CD_EngOilPressEnblIc** sec)

IntOilPressure Disables if:
Oil Pressure Sensor In Use (1.00) = 1.00 (Note: 1.00 equals "TRUE") AND
Oil Pressure Sensor Present (1.00) = 1.00 (Note: 1.00 equals "Present") AND
Oil Pressure < **P0011_P0021_P05CC_P05CD_LoPresLoDsblIc**)
****
IntEngineOilTemp is Enabled if:
0.00 < Engine Oil Temp < 160.00

IntEngineOilTemp Disables if:
Engine Oil Temp < -12.00
OR
Engine Oil Temp > 140.00

Bundle Name: IntkCamPhaser_FA
P0010, P0011, P0020, P0021, P05CC, P05CD, P2088, P2089, P2092, P2093, P25CA, P25CB, P25CC, P25CD, P25CE, P25CF
Bundle Name: IntkCamPhsrCircuit_TFTKO
P0010, P0020, P2088, P2089, P2092, P2093, P25CA, P25CB, P25CC, P25CD, P25CE, P25CF
Bundle Name: KS_Ckt_Perf_B1B2_FA
P0324, P0325, P0326, P0327, P0328, P0330, P0332, P0333, P06B6, P06B7
Bundle Name: LostCommBCM_FA
U0140
Bundle Name: LostCommBusB_VICM_FA
U182D
Bundle Name: LowFuelConditionDiagnostic
LowFuelConditionDiagnostic - Other Definitions: Flag set to TRUE if the fuel level < 10.0 % AND No Active DTCs: FuelLevelDataFault, P0462, P0463 for at least 30.0 seconds
Bundle Name: MAF_SensorCircuitFA
P0102, P0103, P010C, P010D
Bundle Name: MAF_SensorCircuitTFTKO
P0102, P0103, P010C, P010D
Bundle Name: MAF_SensorFA

P0101, P0102, P0103, P010B, P010C, P010D
Bundle Name: MAF_SensorFP
P0102, P0103, P010C, P010D
Bundle Name: MAF_SensorPerfFA
P0101
Bundle Name: MAF_SensorPerfTFTKO
P0101
Bundle Name: MAF_SensorTFTKO
P0101, P0102, P0103, P010B, P010C, P010D
Bundle Name: MAF_Snsr1_FA
P0101, P0102, P0103
Bundle Name: MAF_Snsr2_FA
P010B, P010C, P010D
Bundle Name: MAF_SnsrCktFA
P0102, P0103, P010C, P010D
Bundle Name: MAF_SnsrCktTFTKO
P0102, P0103, P010C, P010D
Bundle Name: MAP_EngineVacuumStatus
P0106, P0107, P0108 Fault Active OR P0107, P0108 Fault Pending
Bundle Name: MAP_SensorCircuitFA
P0107, P0108
Bundle Name: MAP_SensorCircuitFP
P0107, P0108
Bundle Name: MAP_SensorFA
P0106, P0107, P0108
Bundle Name: MAP_SensorPerfFA
P0106
Bundle Name: MAP_SensorPerfTFTKO
P0106
Bundle Name: MAP_SensorTFTKO
P0106, P0107, P0108
Bundle Name: MnfdTempSensorCktFA
Turbocharged or Supercharged, with Humidity sensor: P112C, P112D. Turbocharged or Supercharged, without Humidity sensor: P0097, P0098. Naturally Aspirated: P0112, P0113.
Bundle Name: MnfdTempSensorCktFP
Turbocharged or Supercharged, with Humidity sensor: P112C, P112D. Turbocharged or Supercharged, without Humidity sensor: P0097, P0098. Naturally Aspirated: P0112, P0113.
Bundle Name: MnfdTempSensorCktTFTKO
Turbocharged or Supercharged, with Humidity sensor: P112C, P112D. Turbocharged or Supercharged, without Humidity sensor: P0097, P0098. Naturally Aspirated: P0112, P0113.
Bundle Name: MnfdTempSensorFA

Turbocharged or Supercharged, with Humidity sensor: P112B, P112C, P112D, P112E. Turbocharged or Supercharged, without Humidity sensor: P0096, P0097, P0098, P0099. Naturally Aspirated: P0111, P0112, P0113, P0114.
Bundle Name: MnfdTempSensorTFTKO
Turbocharged or Supercharged, with Humidity sensor: P112B, P112C, P112D, P112E. Turbocharged or Supercharged, without Humidity sensor: P0096, P0097, P0098, P0099. Naturally Aspirated: P0111, P0112, P0113, P0114.
Bundle Name: ModuleOffTime_FA
P2610
Bundle Name: ModuleOffTimeErr
P2610
Bundle Name: O2S_Bank_ 1_TFTKO
P0131, P0132, P0134, P2A00
Bundle Name: O2S_Bank_ 2_TFTKO
P0151, P0152, P0154, P2A03
Bundle Name: O2S_Bank_1_Sensor_1_FA
P2A00, P0131, P0132, P0133, P0134, P0135, P0053, P1133, P015A, P015B, P0030
Bundle Name: O2S_Bank_1_Sensor_2_FA
P013A, P013B, P013E, P013F, P2270, P2271, P0137, P0138, P0140, P0141, P0054, P0036
Bundle Name: O2S_Bank_2_Sensor_1_FA
P2A03, P0151, P0152, P0153, P0154, P0155, P0059, P1153, P015C, P015D, P0050
Bundle Name: O2S_Bank_2_Sensor_2_FA
P013C, P013D, P014A, P014B, P2272, P2273, P0157, P0158, P0160, P0161, P0060, P0056
Bundle Name: OAT_AmbientFilteredFA
ECM OAT: P0071, P0072, P0073, P0074, EngModeNotRunTmErr, VehicleSpeedSensor_FA, IAT_SensorFA, ECT_Sensor_DefaultDetected, MAF_SensorFA. VIMC OAT: P0072, P0073, EngModeNotRunTmErr, VehicleSpeedSensor_FA, ECT_Sensor_DefaultDetected. IAT-Based OAT: not applicable. All other cases: not applicable.
Bundle Name: OAT_AmbientSensorFA
ECM OAT: P0071, P0072, P0073, P0074. VIMC OAT: P0071, P0072, P0073, EngModeNotRunTmErr, VehicleSpeedSensor_FA, ECT_Sensor_DefaultDetected. IAT-Based OAT: not applicable. All other cases: not applicable.
Bundle Name: OAT_EstAmbTemp_FA
ELCP sealed/vented fuel system, P0071, P0072, P0073, P0502, P0503, P0722, P0723 OR Conventional fuel system, P0071, P0072, P0073, P0074, P2610
Bundle Name: OAT_PtEstFiltFA
ECM OAT: P0071, P0072, P0073, P0074, EngModeNotRunTmErr, VehicleSpeedSensor_FA, IAT_SensorFA, ECT_Sensor_DefaultDetected, MAF_SensorFA. VIMC OAT: P0072, P0073, EngModeNotRunTmErr, VehicleSpeedSensor_FA, ECT_Sensor_DefaultDetected. IAT-Based OAT: VehicleSpeedSensor_FA, IAT_SensorFA, MAF_SensorFA. All other cases: EngModeNotRunTmErr, VehicleSpeedSensor_FA, IAT_SensorFA, ECT_Sensor_DefaultDetected.
Bundle Name: OAT_PtEstRawFA
ECM OAT: P0071, P0072, P0073, P0074. VIMC OAT: P0071, P0072, P0073, EngModeNotRunTmErr, VehicleSpeedSensor_FA, ECT_Sensor_DefaultDetected. IAT-Based OAT: IAT_SensorFA. All other cases: IAT_SensorFA, ECT_Sensor_DefaultDetected.
Bundle Name: OilPmpCktFA
P06DA, P06DB, P06DC
OilPmpCktFA - Other Definitions: Output Driver Codes

Bundle Name: OilPmpFA
P06DA, P06DB, P06DC, P06DD, P06DE
OilPmpFA - Other Definitions: FA only for Output Driver and rationality
Bundle Name: OilPmpStuckHigh
P06DA, P06DB, P06DD
OilPmpStuckHigh - Other Definitions: TFTKO and FA
Bundle Name: OilPmpStuckLow
P06DC, P06DE
OilPmpStuckLow - Other Definitions: TFTKO and FA
Bundle Name: OilPmpTFTKO
P06DA, P06DB, P06DC, P06DD, P06DE
OilPmpTFTKO - Other Definitions: TFTKO only for Output Driver and rationality
Bundle Name: OilSenDiagBndl_TFTKO
P055B, P055C, P055D
Bundle Name: PO2S_Bank_1_Snsr_2_FA
P0137, P0138, P0140, P0036, P0054, P0141, P2270, P2271
Bundle Name: PO2S_Bank_2_Snsr_2_FA
P0157, P0158, P0160, P0056, P0060, P0161, P2272, P2273
Bundle Name: PostCatFuelTrimHiB1
P2097
Bundle Name: PostCatFuelTrimHiB2
P2099
Bundle Name: PostCatFuelTrimLoB1
P2096
Bundle Name: PostCatFuelTrimLoB2
P2098
Bundle Name: PowertrainRelayFault
P1682
Bundle Name: PowertrainRelayStateOn_Error
P0685
Bundle Name: PowertrainRelayStateOn_FA
P0685
Bundle Name: PPS1_OutOfRange
P2122, P2123
Bundle Name: PPS1_OutOfRange_Composite

P2122, P2123, P06A3
Bundle Name: PPS2_OutOfRange
P2127, P2128
Bundle Name: PPS2_OutOfRange_Composite
P2127, P2128, P0697
Bundle Name: SCIAP_SensorCircuitFA
P012C, P012D
Bundle Name: SCIAP_SensorCircuitFP
P012C, P012D
Bundle Name: SCIAP_SensorFA
P012B, P012C, P012D
Bundle Name: SCIAP_SensorPerfFA
P012B
Bundle Name: SCIAP_SensorPerfTFTKO
P012B
Bundle Name: SCIAP_SensorTFTKO
P012B, P012C, P012D
Bundle Name: SuperchargerBypassValveFA
P2261
Bundle Name: SystemVoltageHigh_FA
P0563
Bundle Name: SystemVoltageLow_FA
P0562
Bundle Name: TC_BoostPresSnsrCktFA
P0237, P0238
Bundle Name: TC_BoostPresSnsrFA
P0236, P0237, P0238
Bundle Name: TCM_EngSpdReqCkt
P150C
Bundle Name: THMR_AHV_FA
P2681, P26A3, P26A6, P26A7, P26A9
THMR_AHV_FA - Other Definitions:
Bundle Name: THMR_AWP_AuxPumpFA
B269A, B269C, B269D
Bundle Name: THMR_ECT_Sensor_Ckt_FA
P0116, P0117, P0118, P0119, P111E
Bundle Name: THMR_Insuff_Flow_FA

P00B7
Bundle Name: THMR_RCT_Sensor_Ckt_FA
P00B3, P00B4
Bundle Name: THMR_SWP_Control_FA
P261A, P261D, P261C
Bundle Name: THMR_SWP_FlowStuckOn_FA
P261A, P261D, P261E
Bundle Name: THMR_SWP_NoFlow_FA
P261B, P261C
Bundle Name: THMR_Therm_Control_FA
P0597, P0598, P0599
Bundle Name: ThrotTempSensorFA
Turbocharged or Supercharged, with Humidity sensor: P112B, P112C, P112D, P112E. Turbocharged or Supercharged, without Humidity sensor: P0096, P0097, P0098, P0099. Naturally Aspirated: P0111, P0112, P0113, P0114.
Bundle Name: ThrotTempSensorTFTKO
Turbocharged or Supercharged, with Humidity sensor: P112B, P112C, P112D, P112E. Turbocharged or Supercharged, without Humidity sensor: P0096, P0097, P0098, P0099. Naturally Aspirated: P0111, P0112, P0113, P0114.
Bundle Name: ThrottlePositionSnsrPerfFA
P0121
Bundle Name: ThrottlePositionSnsrPerfTFTKO
P0121
Bundle Name: TIAP_SensorPerfFA
P0236
Bundle Name: TPS_FA
P0122, P0123, P0222, P0223, P16A0, P16A1, P16A2, P2135
Bundle Name: TPS_FaultPending
P0122, P0123, P0222, P0223, P16A0, P16A1, P16A2, P2135
Bundle Name: TPS_Performance_FA
P0068, P0121, P1104, P2100, P2101, P2102, P2103
Bundle Name: TPS_Performance_TFTKO
P0068, P0121, P1104, P2100, P2101, P2102, P2103
Bundle Name: TPS_TFTKO
P0122, P0123, P0222, P0223, P16A0, P16A1, P16A2, P2135
Bundle Name: TPS_ThrottleAuthorityDefaulted
P0068, P0122, P0123, P0222, P0223, P16F3, P16A0, P16A1, P16A2, P1104, P2100, P2101, P2102, P2103, P2135
Bundle Name: TPS1_OutOfRange_Composite
P0122, P0123, P06A3, P16A0, P16A1, P16A2
Bundle Name: TPS2_OutOfRange_Composite

P0222, P0223, P06A3, P16A0, P16A1, P16A2
Bundle Name: Trans Output Rotations Rolling Count Validity
P0722, P0723, P077C, P077D
Bundle Name: TransActualGearValidity
P182E, P1915
Bundle Name: Transfer Pump is Commanded On
Transfer Pump is Commanded On - Other Definitions: Fuel Volume in Primary Fuel Tank < 0.0 liters AND Fuel Volume in Secondary Fuel Tank ≥ 0.0 liters AND Transfer Pump on Time < P0461, P2066, P2636: Transfer Pump Enable (see supporting table for numeric value) AND Transfer Pump had been Off for at least 0.0 seconds AND Evap Diagnostic (Purge Valve Leak Test, Large Leak Test, and Waiting for Purge) is not running AND Engine Running
Bundle Name: Transmission Actual Gear Validity
P182E, P1915
Bundle Name: Transmission Engaged State Validity
P182E, P1915
Bundle Name: Transmission Estimated Gear Validity
P182E, P1915
Bundle Name: Transmission Gear Ratio Validity
P0716, P0717, P0722, P0723, P077C, P077D, P07BF, P07C0
Bundle Name: Transmission Gear Selector Position Validity
P182E, P1915
Bundle Name: Transmission Oil Temperature Validity
P0667, P0668, P0669, P0711, P0712, P0713
Bundle Name: Transmission Output Shaft Angular Velocity Validity
P0722, P0723, P077C, P077D
Bundle Name: Transmission Overall Actual Torque Ratio Validity
P0716, P0717, P0722, P0723, P077C, P077D, P07BF, P07C0, P182E, P1915
Bundle Name: Transmission Overall Estimated Torque Ratio Validity
P0716, P0717, P0722, P0723, P077C, P077D, P07BF, P07C0, P182E, P1915
Bundle Name: Transmission Shift Lever Position Validity
P182E, P1915
Bundle Name: Transmission Turbine Angular Velocity Validity
P0716, P0717, P07BF, P07C0
Bundle Name: TransmissionEngagedState_FA
P182E, P1915
Bundle Name: TransmissionGearDefaulted

P182E, P1915
Bundle Name: TransmissionOutputRotationalStatusValidity
P0722, P0723, P077C, P077D
Bundle Name: TransmissionRatioControlSystemFault
P0751, P0752, P0756, P0757, P0973, P0974, P0976, P0977
Bundle Name: TwoStepMechBndl_FA
P2646, P2647, P16D0, P16D1
Bundle Name: TwoStepMechBndl_TFTKO
P2646, P2647, P16D0, P16D1
Bundle Name: VCER_TorqueSecurity
P16F3
VCER_TorqueSecurity - Other Definitions: P16F3 with GetXOYR_b_SecurityFlt(CeXOYR_e_AFM_PreloadAreaFlt, CeXOYR_e_AFM_PreloadTimerFlt, CeXOYR_e_AFM_DualPreloadAreaFlt, CeXOYR_e_CDAR_SecurityFlt)
Bundle Name: VehicleSpeedSensor_FA
P0502, P0503, P0722, P0723
Bundle Name: VehicleSpeedSensorError
P0502, P0503, P0722, P0723
Bundle Name: VentCircuit_FA
ELCP sealed/vented fuel system, P0449, P0498, P0499
Bundle Name: VICM_WakeupDiag_FA
P06E4
Bundle Name: VICM_WakeupDiag_TFTKO
P06E4
Bundle Name: VITR_LVT_FltBndl
P058B, P058D, P118C, P118D