16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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	**Intake Cam Phsr Enable** System Voltage Engine Running Power Take Off (PTO) active Desired cam position Desired AND Measured cam position Desired cam position variation No Active DTCs	= TRUE > 11.00 Volts = TRUE = FALSE > 0 deg > (**P0011_CamPosErrorLimIc1**) deg AND < (**CalculatedPerfMaxIc1**) deg < 7.50 deg for (**P0011_P05CC_StablePositionTimeIc1**) seconds P0010 P2088 P2089	100.00 failures out of 300.00 samples 100 ms /sample	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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	 CrankSensor_FA P0340, P0341 < 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

16 OBDG07A ECM Summary Tables L20 (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 ohms 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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 ohms 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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 ohms 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

16 OBDG07A ECM Summary Tables L20 (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 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 ohms 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 ohms 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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 ohms 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

16 OBDG07A ECM Summary Tables L20 (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 ohms 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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 ohms 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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 ohms 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

16 OBDG07A ECM Summary Tables L20 (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 1	P0053	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Heater Resistance outside of the expected range of	3.1 < ohms < 8.4	No Active DTC's Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P262B IAT_SensorFA < 8.0 ºC > 28,800 seconds -30.0 < ºC < 255.0 < 32.0 volts < 0.04 seconds	Once per valid cold start	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (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	3.1 < ohms < 8.4	No Active DTC's Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P262B IAT_SensorFA < 8.0 ºC > 28,800 seconds -30.0 < ºC < 255.0 < 32.0 volts < 0.04 seconds	Once per valid cold start	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (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 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 ohms 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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 ohms 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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 ohms 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

16 OBDG07A ECM Summary Tables L20 (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	3.4 < ohms < 8.6	No Active DTC's Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P262B IAT_SensorFA < 8.0 ºC > 28,800 seconds -30.0 < ºC < 255.0 < 32.0 volts < 0.09 seconds	Once per valid cold start	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (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	3.4 < ohms < 8.6	No Active DTC's Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P262B IAT_SensorFA < 8.0 ºC > 28,800 seconds -30.0 < ºC < 255.0 < 32.0 volts < 0.09 seconds	Once per valid cold start	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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: **P0068_Delta MAP Threshold f(TPS)** Table, f(TPS). See supporting tables: **P0068_Delta MAF Threshold f(TPS)** Table, f(RPM). See supporting tables: **P0068_Maximum MAF f(RPM)** Table, f(Volts). See supporting tables: **P0068_Maximum MAF f(Volts)**	Engine Speed	> 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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor 2 Circuit Performance (applications with humidity sensor, but no manifold temperature sensor)	P0096	Detects an IAT2 sensor that has stuck in range by comparing to IAT and engine coolant temperature at startup	ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up ECT – Power Up IAT2) >= ABS(Power Up ECT – Power Up IAT)	> 25 deg C	Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA HumTempSnsrCktFA	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (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 2 Low (applications with humidity)	P0097	Detects a continuous short to ground or open in the IAT 2 signal circuit	Raw IAT 2 Input	< 13 Hertz (~-60 deg C)	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (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 2 High (applications with humidity)	P0098	Detects a continuous high frequency in the IAT 2 signal circuit	Raw IAT 2 Input	> 390 Hertz (~150 deg C)	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Pressure Measurement System - Multiple Sensor Correlation (naturally aspirated with TIAP/ Baro sensor)	P00C7	Detects an inconsistency between pressure sensors in the induction system in which a particular sensor cannot be identified as the failed sensor	ABS(Manifold Pressure - Baro Pressure)	> 10.0 kPa	Time between current ignition cycle and the last time the engine was running Engine is not rotating Manifold Pressure Manifold Pressure Baro Pressure Baro Pressure No Active DTCs: No Pending DTCs:	 > 5.0 seconds >= 50.0 kPa <= 115.0 kPa >= 50.0 kPa <= 115.0 kPa EngineModeNotRunTimer Error MAP_SensorFA AAP_SnsrFA MAP_SensorCircuitFP AAP_SnsrCktFP	4 failures out of 5 samples 1 sample every 12.5 msec	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Humidity Sensor Circuit Low	P00F4	Detects a continuous short to power in the Humidity Sensor circuit	Humidity Duty Cycle	<= 5.0 %	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Humidity Sensor Circuit High	P00F5	Detects a continuous open or short to low in the Humidity Sensor circuit	Humidity Duty Cycle	>= 95.0 %	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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

Component/ System	Fault Code	Monitor 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) > 25.0 grams/sec > 18.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables. No Active DTCs: -	>= 400 RPM <= 5,600 RPM >= -7 Deg C <= 129 Deg C >= -20 Deg C <= 125 Deg C >= 0.50 Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** Modeled Air Flow Error multiplied by **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM** and **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est** MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** MAP_SensorCircuitFA	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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	<= 1,500 Hertz (~ 2.33 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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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	>= 14,500 Hertz (~ 946.4 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) > 18.0 kPa > 18.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables. No Active DTCs: No Pending DTCs:	>= 400 RPM <= 5,600 RPM >= -7 Deg C <= 129 Deg C >= -20 Deg C <= 125 Deg C >= 0.50 Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** MAP Model 1 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM** MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA EGRValve_FP ECT_Sensor_Ckt_FP	Continuous Calculations 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.
						IAT_SensorCircuitFP		
			Manifold Pressure OR Manifold Pressure	< 50.0 kPa > 115.0 kPa	Time between current ignition cycle and the last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	 > 5.0 seconds EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP	4 failures out of 5 samples 1 sample every 12.5 msec	

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Manifold Absolute Pressure Sensor Circuit Low (Gen II)	P0107	Detects a continuous short to 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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Manifold Absolute Pressure Sensor Circuit High (Gen II)	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

16 OBDG07A ECM Summary Tables L20 (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 (applications with humidity sensor, but no manifold temperature sensor)	P0111	Detects an IAT sensor that has stuck in range by comparing to IAT2 and engine coolant temperature at startup	ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up ECT – Power Up IAT) > ABS(Power Up ECT – Power Up IAT2)	> 25 deg C	Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA HumTempSnsrCktFA	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (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 Low	P0112	Detects a continuous short to ground in the IAT signal circuit or the IAT sensor	Raw IAT Input	< 58 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

16 OBDG07A ECM Summary Tables L20 (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 High	P0113	Detects a continuous open circuit in the IAT signal circuit or the IAT sensor	Raw IAT Input	> 142,438 Ohms (~-60 deg C)	Engine Run Time	> 0.00 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 deg C 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 occur: 1) ECT at power up > IAT at power up by an IAT based table lookup value after a minimum 28,800 second soak (fast fail). 2) ECT at power up > IAT at power up by 19.3 C after a minimum 28,800 second soak and a block heater has not been detected. 3) ECT at power up > IAT at power up by 19.3 C after a minimum 28,800 seconds soak and the time spent cranking the engine without starting is greater than 10.0 seconds with the LowFuelConditionDiag	See **P0116_Fail if power up ECT exceeds IAT by these values** in the Supporting tables section = False	No Active DTC's Non-volatile memory initization Test complete this trip Test aborted this trip IAT LowFuelCondition Diag ========== Block Heater detection is enabled when either of the following occurs: 1) ECT at power up > IAT at power up by 2) Cranking time ========== Block Heater is detected and diagnostic is aborted when 1) or 2) occurs: 1a) Vehicle drive time 1b) Vehicle speed 1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is below 1b as follows:	VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA IgnitionOffTimeValid TimeSinceEngineRunning Valid = Not occurred = False = False ≥ -7 ºC = False ========== > 19.3 ºC < 10.0 seconds ========== > 400 seconds with > 14.9 MPH 0.00 times the seconds with vehicle speed below 1b	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.
					1d) IAT drops from power up IAT 2a) ECT drops from power up ECT 2b) Engine run time ========== Diagnostic is aborted when 3) or 4) occurs: 3) Engine run time with vehicle speed below 1b 4) Minimum IAT during test	≥ 3.3 ºC ≥ 1 ºC Within ≤ 30 seconds ========== > 1800 seconds ≤ -7 ºC		

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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)	> 333,000 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 -60.0 Deg C 150.0 Deg C	No Active DTC's	ECT_Sensor_Ckt_FP	3 failures out of 4 samples 1 sec/ sample Continuous	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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

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) > 25.0 grams/sec <= 18.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables. No Active DTCs: No Pending DTCs:	>= 400 RPM <= 5,600 RPM > -7 Deg C < 129 Deg C > -20 Deg C < 125 Deg C >= 0.50 Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** Modeled Air Flow Error multiplied by **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM** and **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est** MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA EGRValve_FP	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.
						ECT_Sensor_Ckt_FP IAT_SensorCircuitFP		

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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) (energy based "Deluxe" method	P0128	This DTC detects if the engine coolant temperature rises too slowly due to an ECT or Cooling system fault	Energy is accumulated after the first conbustion event using Range #1 or #2 below: Thermostat type is divided into normal (non-heated) and electrically heated. For this application the "type" cal (KeTHMG_b_TMS_ElecThstEquipped) = 0 If the type cal is equal to one, the application has an electrically heated t-stat, if equal to zero the the application has an non heated t-stat. See appropiate section below. ********** Type cal above = 1 (Electrically heated t-stat) == == == == Range #1 (Primary) ECT reaches Commanded temperature minus 11 °C when Ambient min is ≤ 52 °C and > 10 °C. Note: Warm up target for range #1 will be at least 75 °C == == == == Range #2 (Alternate) ECT reaches Commanded temperature minus 11 °C when Ambient min is ≤ 10 °C and > -7 °C. Note: Warm up target for range #2 will be at least	See the two tables named: **P0128_Maximum Accumulated Energy for Start-up ECT conditions - Primary** and **P0128_Maximum Accumulated Energy for Start-up ECT conditions - Alternate** in the Supporting tables section. This diagnostic models the net energy into and out of the cooling	No Active DTC's Engine not run time (soaking time before current trip) Engine run time Fuel Condition Distance traveled ********** If Engine RPM is continuously greater than for this time period The diagnostic test for this key cycle will abort ********** ********** If T-Stat Heater commanded duty cycle for this time period The diagnostic test for this	ECT_Sensor_Ckt_FA ECT_Sensor_Perf_FA VehicleSpeedSensor_FA OAT_PtEstFiltFA IAT_SensorCircuitFA MAF_SensorFA THMR_AWP_AuxPumpFA THMR_AHV_FA THMR_SWP_Control_FA THMR_SWP_NoFlow_FA THMR_SWP_FlowStuckOn_FA ETQR_IndTorqInaccurate EngineTorqueEstInaccurate ≥ 1,800 seconds 30 ≤ Eng Run Tme ≤ 1,470 seconds Ethanol ≤ 87 % ≥ 0.75 miles ********** 6,000 rpm 5.0 seconds ********** ********** > 20.0 % duty cycle > 5.0 seconds	1 failure to set DTC 1 sec/ sample Once per ignition key cycle	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			55 °C ********** Type cal above = 0 (non - heated t-stat) == == == == Range #1 (Primary) ECT reaches 75 °C when Ambient min is ≤ 52 °C and > 10 °C. == == == == Range #2 (Alternate) ECT reaches 55 °C when Ambient min is ≤ 10 °C and > -7 °C. **********	system during the warm-up process. The five energy terms are: heat from combustion, heat from after-run, heat loss to enviroment, heat loss to cabin and heat loss to DFCO.	key cycle will abort ********** ECT at start run	********** -60 ≤ ECT ≤ 70 °C		

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	TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA = Not active = Not active = Not active = Not active > 10.0 Volts = Not active = Not active = Not active = Not active = False 0.9922 < ratio < 1.0137 175 < mgram < 700 = Closed Loop = TRUE (Please see "**Closed Loop Enable Clarification**" in Supporting Tables). 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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAF_SensorFA MAP_SensorFA EvapExcessPurgePsbl_FA FuelInjectorCircuit_FA Ethanol Composition Sensor FA AIR System FA	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips
					System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum	> 10.0 Volts = All Cylinders active = Complete > 5.0 seconds > 30.0 seconds		
					Low Fuel Condition Diag	= False		
					Initial delay after Open Test Criteria met (cold start condition)	> 235.0 seconds when engine soak time > 28,800 seconds		
					Initial delay after Open Test Criteria met (not cold start condition)	> 235.0 seconds when engine soak time <= 28,800 seconds		
					Equivalence Ratio	0.9922 <=ratio<= 1.0137		
					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 and w/o WRAF	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 Ethanol Composition Sensor FA EngineMisfireDetected_FA P0131, P0132, P0134 > 10.0 Volts = 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**	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.
						for the following locations: B1S1, B2S1 (if applicable) in Supporting Tables tab.		
					O2 Heater on for Learned Htr resistance	>= 40 seconds = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's")		
					Engine Coolant	> 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	> 1.0 seconds		
					Time since Purge Off to On change	> 2.0 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 Active	= Closed Loop = TRUE (Please see "**Closed Loop Enable Clarification**" in Supporting Tables).		
					LTM (Block Learn) fuel cell	= Enabled, refer to **Multiple DTC Use - Response Cell Enable Table** for additional info.		
					Transient Fuel Mass	<= 100.0 mgrams		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Baro Fuel Control State Fuel State Commanded Proportional Gain ========== All of the above met for	= Not Defaulted not = Power Enrichment DFCO not active >= 0.0 % ========== > 2.0 seconds		

16 OBDG07A ECM Summary Tables L20 (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 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 = 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	TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA = Not active = Not active = Not active = Not active > 10.0 Volts = Not active = Not active = Not active = Not active = False 0.9922 <=ratio<= 1.0137 175 <=mgrams<= 700 = Closed Loop = TRUE (Please see "**Closed Loop Enable Clarification**" in Supporting Tables). Enabled (On) Ethanol <= 87 % DFCO not active	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.
					All of the above met for	> 5.0 seconds		

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	No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Low Fuel Condition Diag Initial delay after Open Test Criteria met (cold start condition) Initial delay after Open Test Criteria met (not cold start condition) Equivalence Ratio Fuel Control State All of the above met for	TPS_ThrottleAuthorityDefaulted MAF_SensorFA MAP_SensorFA EvapExcessPurgePsbl_FA FuelInjectorCircuit_FA Ethanol Composition Sensor FA AIR System FA > 10.0 Volts = All Cylinders active = Complete > 5.0 seconds > 30.0 seconds = False > 235.0 seconds when engine soak time > 28,800 seconds > 235.0 seconds when engine soak time <= 28,800 seconds 0.9922 <= ratio <= 1.0137 not = Power Enrichment > 2.0 seconds	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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. The EWMA caluclation uses a 0.25 coefficient. OR The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 8.0 units > 75.0 grams (upper voltage threshold is 500 mvolts and lower voltage threshold is 200 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 Low Fuel Condition Diag	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA P013B, P013E, P013F, P2270 or P2271 > 10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = 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	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.
					Post fuel cell Crankshaft Torque DTC's Passed ========== After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).	= Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info. < 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 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. The EWMA caluclation uses a 0.25 coefficient. OR The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 8.0 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	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA P013A, P013E, P013F, P2270 or P2271 > 10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = 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.	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.
					Condition	= Not Valid, System is not valid until accumulated airflow is greater than 720,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** (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, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info.		
					DTC's Passed	P2270 P013E P013A P2271 P013F		
					========== After above conditions are met: Fuel Enrich mode continued. ========== 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. The EWMA caluclation uses a 0.25 coefficient. OR The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 8.0 units > 75.0 grams (upper voltage threshold is 500 mvolts and lower voltage threshold is 200 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	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA P013D, P014A, P014B, P2272 or P2273 > 10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = 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.	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.
					Low Fuel Condition Diag Post fuel cell Crankshaft Torque DTC's Passed ========== After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).	= False = Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info. < 1,000.0 Nm P2272 P014A ==========		

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. The EWMA caluclation uses a 0.25 coefficient. OR The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 8.0 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	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA P013C, P014A, P014B, P2272 or P2273 > 10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = 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.	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.
					Condition	= Not Valid, System is not valid until accumulated airflow is greater than 720,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** (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, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info.		
					DTC's Passed	P2272 P014A P013C P2273 P014B		
					========== 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 > 80 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	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA P013A, P013B, P013F, P2270 or P2271 > 10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = 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.	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.
					Low Fuel Condition Diag Post fuel cell Crankshaft Torque DTC's Passed Number of fueled cylinders ========== After above conditions are met: DFCO mode entered (wo driver initiated pedal input).	= False = Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info. < 1,000.0 Nm P2270 <= 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	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA P013A, P013B, P013E, P2270 or P2271 > 10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = 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.	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.
					Condition	= Not Valid, System is not valid until accumulated airflow is greater than 720,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** (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, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info.		
					DTC's Passed	P2270 P013E P013A P2271		
					Number of fueled cylinders ========== 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	>= 1 cylinders ==========		

16 OBDG07A ECM Summary Tables L20 (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 = 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 > 80 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	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA P013C, P013D, P014B, P2272 or P2273 > 10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = 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.	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.
					Low Fuel Condition Diag Post fuel cell Crankshaft Torque DTC's Passed Number of fueled cylinders ========== After above conditions are met: DFCO mode entered (wo driver initiated pedal input).	= False = Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info. < 1,000.0 Nm P2272 <= 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	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA P013C, P013D, P014A, P2272 or P2273 > 10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = 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.	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.
					Condition	= Not Valid, System is not valid until accumulated airflow is greater than 720,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C and **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** (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, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info.		
					DTC's Passed	P2272 P014A P013C P2273		
					Number of fueled cylinders ========== 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	>= 1 cylinders ==========		

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	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	285 failures out of 350 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips
					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	= Not active = Not active = Not active = Not active > 10.0 Volts = Not active = Not active = Not active = Not active = False 0.9922 <= equiv. ratio <= 1.0137 175 <= APC <= 700 mgrams = Closed Loop = TRUE (Please see “**Closed Loop Enable Clarification**” in Supporting Tables). Enabled (On) <= 87 % Ethanol		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Fuel Condition Fuel State All of the above met for	DFCO not active > 5.0 seconds		

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAF_SensorFA MAP_SensorFA EvapExcessPurgePsbl_FA FuelInjectorCircuit_FA Ethanol Composition Sensor FA AIR System FA	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips
					System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum	> 10.0 Volts = All Cylinders active = Complete > 5.0 seconds > 30.0 seconds		
					Low Fuel Condition Diag	= False		
					Initial delay after Open Test Criteria met (cold start condition)	> 280.0 seconds when engine soak time > 28,800 seconds		
					Initial delay after Open Test Criteria met (not cold start condition)	> 280.0 seconds when engine soak time <= 28,800 seconds		
					Equivalence Ratio	0.9922 <= ratio <= 1.0137		
					Fuel Control State	not = Power Enrichment		
					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.
O2S Slow Response Bank 2 Sensor 1) (For use with ESPD and w/o WRAF	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 Ethanol Composition Sensor FA EngineMisfireDetected_FA = P0151, P0152 or P0154 > 10.0 Volts = 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**	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.
						for the following locations: B1S1, B2S1 in Supporting Tables tab.		
					O2 Heater on for Learned Htr resistance	>= 40 seconds = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's")		
					Engine Coolant	> 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	> 1.0 seconds		
					Time since Purge Off to On change	> 2.0 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 (Please see "**Closed Loop Enable Clarification**" in Supporting Tables).		
					LTM (Block Learn) fuel cell	= Enabled, refer to **Multiple DTC Use - Response Cell Enable Table** for additional info.		
					Transient Fuel Mass	<= 100.0 mgrams		
					Baro	= Not Defaulted		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Fuel Control State Fuel State Commanded Proportional Gain ========== All of the above met for	not = Power Enrichment DFCO not active >= 0.0 % ========== > 2.0 seconds		

16 OBDG07A ECM Summary Tables L20 (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 = 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	TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA = Not active = Not active = Not active = Not active > 10.0 Volts = Not active = Not active = Not active = Not active = False 0.9922 <= ratio <= 1.0137 175 <= mgrams <= 700 = Closed Loop = TRUE (Please see "**Closed Loop Enable Clarification**" in Supporting Tables). Enabled (On) Ethanol <= 87 % DFCO not active	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.
					All of the above met for	> 5.0 seconds		

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	No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Low Fuel Condition Diag Initial delay after Open Test Criteria met (cold start condition) Initial delay after Open Test Criteria met (not cold start condition) Equivalence Ratio Fuel Control State All of the above met for	TPS_ThrottleAuthorityDefaulted MAF_SensorFA MAP_SensorFA EvapExcessPurgePsbl_FA FuelInjectorCircuit_FA Ethanol Composition Sensor FA AIR System FA > 10.0 Volts = All Cylinders active = Complete > 5.0 seconds > 30.0 seconds = False > 280.0 seconds when engine soak time > 28,800 seconds > 280.0 seconds when engine soak time <= 28,800 seconds 0.9922 <= ratio <= 1.0137 not = Power Enrichment > 2 seconds	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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) (For use w/o WRAF	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. The EWMA caluclation uses a 0.30 coefficient. OR [The Accumulated time monitored during the R2L Delayed Response Test (Gross failure). AND Pre O2 sensor voltage is	> 0.7 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 ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA AmbientAirDefault P0131, P0132, P013A, P013B, P013E, P013F, P2270, P2271 > 10.0 Volts = Not active = Not active = Not active = Not active = False = Not Valid, See definition of	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.
						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) in Supporting Tables tab.		
					O2 Heater (pre sensor) on for Learned Htr resistance	>= 40 seconds = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's")		
					Engine Coolant IAT Engine run Accum	> 50 ºC > -40 ºC > 30 seconds		
					Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled)	1,100 <= RPM <= 2,500		
					Engine Airflow Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled)	950 <= RPM <= 2,650 3 <= gps <= 20 40.4 <= MPH <= 82.0		
					Closed loop integral Closed Loop Active	36.0 <= MPH <= 87.0 0.74 <= C/L Int <= 1.08 = TRUE (Please see “**Closed Loop Enable Clarification**” in Supporting Tables).		
					Evap			

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Ethanol Baro Post fuel cell EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on Time Predicted Catalyst temp Fuel State ========== All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested. ========== Pre O2S voltage B1S1 at end of Cat Rich stage Fuel State Number of fueled cylinders ========== After above conditions are met: DFCO Mode is entered (wo driver initiated pedal input).	not in control of purge not in estimate mode > 70 kpa = enabled = not active = not active >= 80.0 sec 600 <= ºC <= 900 = DFCO possible ========== ========== >= 690 mvolts = DFCO active <= 7 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) (For use w/o WRAF	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. The EWMA caluclation uses a 0.30 coefficient. 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	> 0.7 EWMA (sec) >= 1.8 Seconds < 350 mvolts < 690 mvolts	No Active DTC's P015A test is complete and System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Diag Green O2S Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA AmbientAirDefault P0131, P0132, P013A, P013B, P013E, P013F, P015A, P2270, P2271 = Passed > 10.0 Volts = Not active = Not active = Not active = Not active = False = Not Valid, See definition of	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.
						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) in Supporting Tables tab.		
					O2 Heater (pre sensor) on for Learned Htr resistance	>= 40 seconds = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's")		
					Engine Coolant IAT Engine run Accum	> 50 ºC > -40 ºC > 30 seconds		
					Engine Speed to initially enable test	1,100 <= RPM <= 2,500		
					Engine Speed range to keep test enabled (after initially enabled)	950 <= 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 Closed Loop Active	0.74 <= C/L Int <= 1.08 = TRUE (Please see "**Closed Loop Enable Clarification**" in		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						Supporting Tables).		
					Evap Ethanol Baro Post fuel cell EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on Time Predicted Catalyst temp Fuel State Number of fueled cylinders ========== When above conditions are met: Fuel Enrich mode is entered. ========== During this test: Engine Airflow must stay between: and the delta Engine Airflow over 12.5msec must be :	not in control of purge not in estimate mode > 70 kpa = enabled = not active = not active >= 80.0 sec 600 <= ºC <= 900 = DFCO inhibit >= 1 cylinders ========== ========== 4 <= gps <= 20 <= 6.0 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) (For use w/o WRAF	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. The EWMA caluclation uses a 0.30 coefficient. OR [The Accumulated time monitored during the R2L Delayed Response Test (Gross failure). AND Pre O2 sensor voltage is above]	> 0.7 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 ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA AmbientAirDefault P0151, P0152, P013C, P013D, P014A, P014B, P2272, P2273 > 10.0 Volts = Not active = Not active = Not active = Not active = False = Not Valid, See definition of	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.
						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 Tables tab.		
					O2 Heater (pre sensor) on for Learned Htr resistance	>= 40 seconds = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's")		
					Engine Coolant IAT Engine run Accum	> 50 ºC > -40 ºC > 30 seconds		
					Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled)	1,100 <= RPM <= 2,500		
					Engine Airflow	950 <= RPM <= 2,650		
					Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled)	3 <= gps <= 20 40.4 <= MPH <= 82.0		
					Closed loop integral Closed Loop Active	36.0 <= MPH <= 87.0 0.74 <= C/L Int <= 1.08 = TRUE (Please see “**Closed Loop Enable Clarification**” in Supporting Tables).		
					Evap			

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Ethanol Baro Post fuel cell EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on Time Predicted Catalyst temp Fuel State ========== All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested. ========== Pre O2S voltage B1S1 at end of Cat Rich stage Fuel State Number of fueled cylinders ========== After above conditions are met: DFCO Mode is entered (wo driver initiated pedal input).	not in control of purge not in estimate mode > 70 kpa = enabled = not active = not active >= 80.0 sec 600 <= ºC <= 900 = DFCO possible ========== ========== >= 690 mvolts = DFCO active <= 7 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) (For use w/o WRAF	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. The EWMA caluclation uses a 0.30 coefficient. 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	> 0.7 EWMA (sec) >= 1.8 Seconds < 350 mvolts < 690 mvolts	No Active DTC's P015C test is complete and System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Diag Green O2S Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA AmbientAirDefault P0151, P0152, P013C, P013D, P014A, P014B, P015C, P2272, P2273 = Passed > 10.0 Volts = Not active = Not active = Not active = Not active = False = Not Valid, See definition of	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.
						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 Tables tab.		
					O2 Heater (pre sensor) on for Learned Htr resistance	>= 40 seconds = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's")		
					Engine Coolant IAT Engine run Accum	> 50 ºC > -40 ºC > 30 seconds		
					Engine Speed to initially enable test	1,100 <= RPM <= 2,500		
					Engine Speed range to keep test enabled (after initially enabled)	950 <= 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 Closed Loop Active	0.74 <= C/L Int <= 1.08 = TRUE (Please see “**Closed Loop Enable Clarification**” in Supporting Tables).		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Evap Ethanol Baro Post fuel cell EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on Time Predicted Catalyst temp Fuel State Number of fueled cylinders ========== When above conditions are met: Fuel Enrich mode is entered. ========== During this test: Engine Airflow must stay between: and the delta Engine Airflow over 12.5msec must be :	not in control of purge not in estimate mode > 70 kpa = enabled = not active = not active >= 80.0 sec 600 <= ºC <= 900 = DFCO inhibit >= 1 cylinders ========== ========== 4 <= gps <= 20 <= 6.0 gps		

16 OBDG07A ECM Summary Tables L20 (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 = 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)	>= 1.280 >= 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.	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. > 27.5 seconds of data must accumulate on each trip, with at least 17.5 seconds of data in the current fuel trim cell before a pass or fail decision can be made. (Please see **P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage** in Supporting Tables for a list of cells utilized for diagnosis) Enabled Enabled (Please see "**Closed Loop Enable Clarification**" and "**Long Term FT Enable Criteria**" in Supporting Tables.) 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.
					Catalyst Diag. Post O2 Diag. Device Control EVAP Diag. No active DTC:	Intrusive Test Not Active Intrusive Test Not Active Not Active “tank pull down” Not Active IAC_SystemRPM_FA MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR System FA EvapExcessPurgePsbl_FA Ethanol Composition Sensor FA FuelInjectorCircuit_FA EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit_FA MAP_EngineVacuumStatus AmbPresDfltdStatuss TC_BoostPresSnsrFA O2S_Bank_1_Sensor_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 > 0.725 , 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 <= 0.725 , 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 20.0 seconds of purge-on time or enough time to	<= 0.720 <= 2.000 <= 0.725 <= 0.720 <= 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 > 0.725 for at least 200.0 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)	>= 1.280 >= 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.	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. > 27.5 seconds of data must accumulate on each trip, with at least 17.5 seconds of data in the current fuel trim cell before a pass or fail decision can be made. (Please see **P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage** in Supporting Tables for a list of cells utilized for diagnosis) Enabled Enabled (Please see "**Closed Loop Enable Clarification**" and "**Long Term FT Enable Criteria**" in Supporting Tables.) 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.
					Post O2 Diag. Device Control EVAP Diag. No active DTC:	Intrusive Test Not Active Not Active “tank pull down” Not Active IAC_SystemRPM_FA MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR System FA EvapExcessPurgePsbl_FA Ethanol Composition Sensor FA FuelInjectorCircuit_FA EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit_FA MAP_EngineVacuumStatus AmbPresDfltdStatuss TC_BoostPresSnsrFA O2S_Bank_2_Sensor_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 > 0.725 , 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 <= 0.725 , 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 20.0 seconds of purge-on time or enough time to	<= 0.720 <= 2.000 <= 0.725 <= 0.720 <= 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 > 0.725 for at least 200.0 seconds, indicating that the canister has been purged.					

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 Open Circuit - (PFI)	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	>= 11.00 Volts >= 5 Seconds >= 0 Seconds	50.00 failures out of 63.00 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0261 may also set (Injector 1 Short to Ground)

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 Open Circuit - (PFI)	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	>= 11.00 Volts >= 5 Seconds >= 0 Seconds	50.00 failures out of 63.00 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)	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	>= 11.00 Volts >= 5 Seconds >= 0 Seconds	50.00 failures out of 63.00 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)	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	>= 11.00 Volts >= 5 Seconds >= 0 Seconds	50.00 failures out of 63.00 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)	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	>= 11.00 Volts >= 5 Seconds >= 0 Seconds	50.00 failures out of 63.00 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0273 may also set (Injector 5 Short to Ground)

16 OBDG07A ECM Summary Tables L20 (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)	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	>= 11.00 Volts >= 5 Seconds >= 0 Seconds	50.00 failures out of 63.00 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0276 may also set (Injector 6 Short to Ground)

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 7 Open Circuit - (PFI)	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	>= 11.00 Volts >= 5 Seconds >= 0 Seconds	50.00 failures out of 63.00 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0279 may also set (Injector 7 Short to Ground)

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 8 Open Circuit - (PFI)	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	>= 11.00 Volts >= 5 Seconds >= 0 Seconds	50.00 failures out of 63.00 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0282 may also set (Injector 8 Short to Ground)

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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	>= 11.00 Volts >= 5 Seconds >= 0 Seconds	50.00 failures out of 63.00 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0201 may also set (Injector 1 Open Circuit)

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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	>= 11.00 Volts >= 5 Seconds >= 0 Seconds	50.00 failures out of 63.00 samples 100 ms /sample Continuous	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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	>= 11.00 Volts >= 5 Seconds >= 0 Seconds	50.00 failures out of 63.00 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0202 may also set (Injector 2 Open Circuit)

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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	>= 11.00 Volts >= 5 Seconds >= 0 Seconds	50.00 failures out of 63.00 samples 100 ms /sample Continuous	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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	>= 11.00 Volts >= 5 Seconds >= 0 Seconds	50.00 failures out of 63.00 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0203 may also set (Injector 3 Open Circuit)

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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	>= 11.00 Volts >= 5 Seconds >= 0 Seconds	50.00 failures out of 63.00 samples 100 ms /sample Continuous	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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	>= 11.00 Volts >= 5 Seconds >= 0 Seconds	50.00 failures out of 63.00 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0204 may also set (Injector 4 Open Circuit)

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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	>= 11.00 Volts >= 5 Seconds >= 0 Seconds	50.00 failures out of 63.00 samples 100 ms /sample Continuous	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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	>= 11.00 Volts >= 5 Seconds >= 0 Seconds	50.00 failures out of 63.00 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0205 may also set (Injector 5 Open Circuit)

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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	>= 11.00 Volts >= 5 Seconds >= 0 Seconds	50.00 failures out of 63.00 samples 100 ms /sample Continuous	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (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	>= 11.00 Volts >= 5 Seconds >= 0 Seconds	50.00 failures out of 63.00 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0206 may also set (Injector 6 Open Circuit)

16 OBDG07A ECM Summary Tables L20 (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 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	>= 11.00 Volts >= 5 Seconds >= 0 Seconds	50.00 failures out of 63.00 samples 100 ms /sample Continuous	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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	>= 11.00 Volts >= 5 Seconds >= 0 Seconds	50.00 failures out of 63.00 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0207 may also set (Injector 7 Open Circuit)

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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	>= 11.00 Volts >= 5 Seconds >= 0 Seconds	50.00 failures out of 63.00 samples 100 ms /sample Continuous	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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	>= 11.00 Volts >= 5 Seconds >= 0 Seconds	50.00 failures out of 63.00 samples 100 ms /sample Continuous	Type B, 2 Trips Note: In certain controllers P0208 may also set (Injector 8 Open Circuit)

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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	>= 11.00 Volts >= 5 Seconds >= 0 Seconds	50.00 failures out of 63.00 samples 100 ms /sample Continuous	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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.	Crankshaft Deceleration Value(s) vs. Engine Speed and Engine load The equation used to calculate deceleration value is tailored to specific vehicle operating conditions. The selection of the equation used is based on the 1st single cylinder continuous misfire threshold tables encountered that are not max of range. If all tables are max of range at a given speed/load, that speed load region is an ***Undetectable region*** see Algorithm Description Document for additional details. SINGLE CYLINDER CONTINUOUS MISFIRE((Medres_Decel Medres_Jerk OR (Medres_Decel Medres_Jerk OR (Lores_Decel Lores_Jerk OR (Lores_Decel Lores_Jerk OR RevBalanceTime)	- see details of thresholds on Supporting Tables Tab > **IdleSCD_Decel** AND > **IdleSCD_Jerk)** > **SCD_Decel** AND > **SCD_Jerk)** > **IdleCyl_Decel** AND > **IdleCyl_Jerk)** > **CylModeDecel** AND > **CylModeJerk)** >**RevMode_Decel**	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 < 95.00 % per 25 ms < 95.00 % per 25 ms Not Enabled	Emission Exceedence = any (5) failed 200 rev blocks out of (16) 200 rev block tests Failure reported for (1) Exceedence in 1st (16) 200 rev block tests, or (4) Exceedences thereafter. OR when Early Termination Reporting = Enabled and engine rev > 1,000 revs and < 3,200 revs at end of trip any Catalyst Exceedence = (1) 200 rev block as data supports for catalyst damage.	Type B, 2 Trips (Mil Flashes with Catalyst damage level of Misfire)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Other patterns of misfire use adjustments to the single cylinder continuous misfire threshold tables: RANDOM MISFIRE Use random misfire thresholds If no misfire for (Medres_Decel AND Medres_Jerk) OR (Medres_Decel AND Medres_Jerk) OR (Lores_Decel AND Lores_Jerk) OR (Lores_Decel AND Lores_Jerk) OR RevBalanceTime	 > 3 Engine Cycles > **IdleSCD_Decel** * **Random_SCD_Decel** > **IdleSCD_Jerk** * **Random_SCD_Jerk** > **SCD_Decel** * **Random_SCD_Decel** > **SCD_Jerk** * **Random_SCD_Jerk** > **IdleCyl_Decel** * **RandomCylModDecel** > **IdleCyl_Jerk** * **RandomCylModJerk** > **CylModeDecel** * **RandomCylModDecel** > **CylModeJerk** * **RandomCylModJerk** > **RevMode_Decel** * **RandomRevModDecl**			Catalyst Failure reported with (1 or 3) Exceedences in FTP, or (1) Exceedence outside FTP. Continuous	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			PAIRED CYLINDER MISFIRE If a cylinder & it's pair are above PAIR thresholds (Medres_Decel	> **IdleSCD_Decel** * **Pair_SCD_Decel**				
			AND Medres_Jerk)	> **IdleSCD_Jerk** * **Pair_SCD_Jerk**				
			OR (Medres_Decel	> **SCD_Decel** * **Pair_SCD_Decel**				
			AND Medres_Jerk)	> **SCD_Jerk** * **Pair_SCD_Jerk**				
			OR (Lores_Decel	> **IdleCyl_Decel** * **PairCylModeDecel**				
			AND Lores_Jerk)	> **IdleCyl_Jerk** * **PairCylModeJerk**				
			OR (Lores_Decel	> **CylModeDecel** * **PairCylModeDecel**				
			AND Lores_Jerk)	> **CylModeJerk** * **PairCylModeJerk**				
			OR (Revmode Active AND (within one engine cycle: 2nd largest Lores_Decel)	> **CylModeDecel** * **PairCylModeDecel**				
			AND Above TRUE for))	> 40 engine cycles out of 100 engine cycles				

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			BANK MISFIRE Cylinders above Bank Thresholds (Medres_Decel AND Medres_Jerk) OR (Medres_Decel AND Medres_Jerk) OR (Lores_Decel AND Lores_Jerk) OR (Lores_Decel AND Lores_Jerk) CONSECUTIVE CYLINDER MISFIRE 1st cylinder uses single cyl continuous misfire thresholds; 2nd Cylinder uses: (Medres_Decel	>= 3 cylinders > **IdleSCD_Decel** * **Bank_SCD_Decel** > **IdleSCD_Jerk** * **Bank_SCD_Jerk** > **SCD_Decel** * **Bank_SCD_Decel** > **SCD_Jerk** * **Bank_SCD_Jerk** > **IdleCyl_Decel** * **BankCylModeDecel** >**IdleCyl_Jerk** * **BankCylModeJerk** > **CylModeDecel** * **BankCylModeDecel** > **CylModeJerk** * **BankCylModeJerk** > **IdleSCD_Decel** * **ConsecSCD_Decel**				

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			AND Medres_Jerk)	> **IdleSCD_Jerk** * **ConsecSCD_Jerk**				
			OR (Medres_Decel	> **SCD_Decel** * **ConsecSCD_Decel**				
			AND Medres_Jerk)	> **SCD_Jerk** * **ConsecSCD_Jerk**				
			OR (Lores_Decel	> **IdleCyl_Decel** * **ConsecCylModDecel**				
			AND Lores_Jerk)	> **IdleSCD_Jerk** * **ConsecCylModeJerk**				
			OR (Lores_Decel	> **CylModeDecel** * **ConsecCylModDecel**				
			AND Lores_Jerk)	> **CylModeJerk** * **ConsecCylModeJerk**				
			CYLINDER DEACTIVATION MODE (Active Fuel Managment)					
			AFM: SINGLE CYLINDER CONTINUOUS MISFIRE (CylAfterDeacCyl_Decel	> **CylModeDecel** * **ClyAfterAFM_Decel**				
			AND CylAfterDeacCyl_Jerk)	> **CylModeJerk** * **CylAfterAFM_Jerk**				
			OR					

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			(CylBeforeDeacCylDecel AND CylBeforeDeacCyl_Jerk)	> **CylModeDecel** * **CylBeforeAFM_Decel** > **CylModeJerk** * **ClyBeforeAFM_Jerk**				
			AFM: RANDOM MISFIRE Use random misfire thresholds If no misfire for	> 3 Engine Cycles				
			(CylAfterDeacCyl_Decel AND CylAfterDeacCyl_Jerk)	> **CylModeDecel** * **ClyAfterAFM_Decel** * **RandomAFM_Decl** > **CylModeJerk** * **CylAfterAFM_Jerk** * **RandomAFM_Jerk**				
			(CylBeforeDeacCylDecel AND CylBeforeDeacCyl_Jerk)	> **CylModeDecel** * **CylBeforeAFM_Decel** * **RandomAFM_Decl** > **CylModeJerk** * **ClyBeforeAFM_Jerk** * **RandomAFM_Jerk** - see details on Supporting Tables Tab				
			Misfire Percent Emission Failure Threshold	≥ 2.31 % P0300				

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Misfire Percent Catalyst Damage When engine speed and load are less than the FTP cals (3) catalyst damage exceedences are allowed.	> **Catalyst_Damage_Misfire_Percentage** in Supporting Tables whenever secondary conditions are met. ≤ 0 FTP rpm AND ≤ 0 FTP % load	(at low speed/loads, one cylinder may not cause cat damage) Engine Speed Engine Load Misfire counts	> 1,200 rpm AND > 20 % load AND < 180 counts on one cylinder		
				disable conditions:				
					Engine Speed	430 < 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 CrankSensor_TFTKO CrankSensor_FA	4 cycle delay	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						CamLctnIntFA CamLctnExhFA CamSensorAnyLctnTFTKO AnyCamPhaser_FA AnyCamPhaser_TFTKO AmbPresDfltdStatus		
					P0315 & engine speed	> 1,000 rpm	4 cycle delay	
					Fuel Level Low	LowFuelConditionDiagnostic	500 cycle delay	
					Cam and Crank Sensors	in sync with each other	4 cycle delay	
					Misfire requests TCC unlock	Not honored because Transmission in hot mode or POPD intrusive diagnostic running	4 cycle delay	
					Fuel System Status	≠ Fuel Cut	4 cycle delay	
					Active FuelManagement	Transition in progress	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	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Manual Trans	Clutch shift	4 cycle delay	
					Accel Pedal Position AND Automatic transmission shift	> 95.00 %	7 cycle delay	
					After Fuel resumes on Automatic shift containing Fuel Cut		2 Cylinder delay	
					DRIVELINE RING FILTER After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early. Filter Driveline ring: Stop filter early:	> "**Ring Filter**" # of engine cycles after misfire in Supporting Tables > "**Number of Normals**" # of engine cycles after misfire in Supporting Tables tab		
					ABNORMAL ENGINE SPEED OSCILLATION: (checks each "misfire" candidate in 100 engine Cycle test to see if it looks like some disturbance like rough road (abnormal).) Used Off Idle, and while not shifting, TPS Engine Speed Veh Speed Auto Transmission	 > 3 % > 950 rpm > 3 mph not shifting		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					indivdual candidate deemed abnormal if number of consecutive decelerating cylinders after "misfire": (Number of decels can vary with misfire detection equation) Consecutive decels while in SCD Mode Cyl Mode Rev Mode At the end of 100 engine cycle test, the ratio of abnormal/candidate is checked to confirm if real misfire is present within the 100 engine cycles. abnormal candidates/ total candidates MISFIRE CRANKSHAFT PATTERN RECOGNITION checks each "misfire" candidate in 100 engine Cycle test to see if overall crankshaft pattern looks like real misfire (recognized), or some disturbance like rough road (unrecognized).	> **Abnormal SCD Mode** > **Abnormal Cyl Mode** > **Abnormal Rev Mode** in Supporting Tables > 0.50 ratio	discard 100 engine cycle test	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					At the end of 100 engine cycle test, the ratio of unrecog/recognized is checked to confirm if real misfire is present within the 100 engine cycles. Typically used for checking a single misfire per engine cycle but can support some other patterns on some packages			
					Pattern Recog Enabled:	Enabled		
					Pattern Recog Enabled during Cylinder Deac	Not Enabled		
					Pattern Recog Enabled consecutive cyl pattrn	Enabled		
					Engine Speed Veh Speed	1,000 < rpm < 3,000 > 5.0 mph		
					The 1st check for "recognized" is the 1st fired cylinder after the misfire candidate should both accelerate and jerk an amount based acceleration and jerk of Single Cylinder Misfire thresholds in effect at that speed and load.			
					(CylAfter_Accel AND CylAfter_Jerk)	> Misfire_ decel * **1st_FireAftrMisfr_Acel** > Misfire_Jerk * **1st_FireAftrMisfr_Jerk**		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Addtionally, the crankhaft is checked again a small calibratible number of cylinders later to see if the distrubance is still large like rough road, or has calmed down like real misfire. The size of disturbance is compared to a multiplier times the ddt_jerk value used to detect misfire at that speed and load. If there is repetitive misfire on consecutive engine cycles, the expected snap is adjusted due to the higher expected disturbance.			
					Num of Cylinders after misfire to start check of crankshaft snap	3 Cylinders		
					"misfire" recognized if: Crankshaft snap after: isolated "misfire"	< Misfire_Jerk *** SnapDecayAfterMisfire**		
					repetative "misfire"	< Misfire_Jerk * **SnapDecayAfterMisfire * RepetSnapDecayAdjst** in Supporting Tables	discard 100 engine cycle test	
					At the end of 100 engine cycle test, the ratio of unrecog/recognized is checked to confirm if real misfire is present.			
					Ratio of Unrecog/Recog	> 0.60		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					:		discard 100 engine cycle test	
					NON-CRANKSHAFT BASED ROUGH ROAD:	Disabled		
					Rough Road Source	TOSS	discard 100 engine cycle test	
					IF Rough Road Source = WheelSpeedInECM			
					ABS/TCS	active		
					Wheel speed noise	> **WSSRoughRoadThres**		
					VSES	active	discard 100 engine cycle test	
					IF Rough Road Source = "FromABS"			
					ABS/TCS	active	4 cycle delay	
					RoughRoad	detected		
					VSES	active		
					IF Rough Road Source = "TOSS"			
					TOSS dispersion	>**TOSSRoughRoadThres** in supporting tables		
					AND No Active DTCs	Transmission Output Shaft Angular Velocity Validity		
						TransmissionEngagedState_FA (Auto Trans only)		
						ClutchPstnSnsr FA (Manual Trans only)		

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 Excessive Knock (either real or false knock).	Enable Criteria for Excessive Knock		Diagnostic Enabled	Yes	First Order Lag Filters with Weight Coefficient = 0.0480 Updated each engine event	Type B, 2 Trips
					Engine Run Time	≥ 2.0 seconds		
					Engine Speed	≥ 450 RPM AND ≤ 8,500 RPM		
					Engine Air Flow	≥ 450 mg/cylinder AND ≤ 2,000 mg/cylinder		
					Engine Coolant Temperature	≥ -40 deg's C		
					Inlet Air Temperature	≥ -40 deg's C		
			Excessive Knock Diag: Filtered Knock Intensity (where 'Knock Intensity' = 0 with no knock; and > 0 & proportional to knock magnitude with knock)	**> P0324_PerCyl_ExcessiveKnock_Threshold** (no units)	Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle)	≥ 84 Revs		

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: **P0325_P0330_OpenMethod_2** (see Supporting Tables) **> P0325_P0330_OpenCktThrshMin (20 kHz) AND < P0325_P0330_OpenCktThrshMax (20 kHz)** **> P0325_P0330_OpenCktThrshMin (Normal Noise) AND < P0325_P0330_OpenCktThrshMax (Normal Noise)**	Diagnostic Enabled Engine Run Time Engine Speed Cumulative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above) Engine Air Flow 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 Abnormal (engine) Noise	Enable Criteria for Per Sensor Abnormal Noise Diag:		Diagnostic Enabled Engine Run Time Engine Speed Engine Air Flow Engine Coolant Temperature Inlet Air Temperature Individual Cylinders enabled for Abnormal Noise	Yes ≥ 2.0 seconds ≥ 1,500 RPM AND ≤ 8,500 RPM ≥ 10 mg/cylinder AND ≤ 2,000 mg/cylinder ≥ -40 deg's C ≥ -40 deg's C **P0326_P0331_Abnormal Noise_CylsEnabled** (Supporting Table)	First Order Lag Filters with Weight Coefficient = 0.0100 Updated each engine event	Type B, 2 Trips
			Filtered FFT Intensity: (where 'FFT Intensity' = Non-knocking, background engine noise)	< **P0326_P0331_AbnormalNoise_Threshold** (Supporting Table)	Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle)	≥ 100 Revs		

16 OBDG07A ECM Summary Tables L20 (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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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: **P0325_P0330_OpenMethod_2** (See Supporting Tables) **> P0325_P0330_OpenCktThrshMin (20 kHz) AND < P0325_P0330_OpenCktThrshMax (20 kHz)** **> P0325_P0330_OpenCktThrshMin (Normal Noise) AND < P0325_P0330_OpenCktThrshMax (Normal Noise)**	Diagnostic Enabled Engine Run Time Engine Speed Cumlative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above) Engine Air Flow 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 Abnormal (engine) Noise	Enable Criteria for Per Sensor Abnormal Noise Diag:		Diagnostic Enabled Engine Run Time Engine Speed Engine Air Flow Engine Coolant Temperature Inlet Air Temperature Individual Cylinders enabled for Abnormal Noise	Yes ≥ 2.0 seconds ≥ 1,500 RPM AND ≤ 8,500 RPM ≥ 10 mg/cylinder AND ≤ 2,000 mg/cylinder ≥ -40 deg's C ≥ -40 deg's C **P0326_P0331_Abnormal Noise_CylsEnabled** (Supporting Table)	First Order Lag Filters with Weight Coefficient = 0.0100 Updated each engine event	Type B, 2 Trips
			Filtered FFT Intensity: (where 'FFT Intensity' = Non-knocking, background engine noise)	< **P0326_P0331_AbnormalNoise_Threshold** (Supporting Table)	Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle)	≥ 100 Revs		

16 OBDG07A ECM Summary Tables L20 (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 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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 (MAF_SensorFA AND Engine Air Flow	 = 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		Continuous every 12.5 msec	
			No crankshaft pulses received		Engine is Running OR Starter is engaged No DTC Active:	 P0340 P0341	2 failures out of 10 samples One sample per engine revolution	

Component/ System	Fault Code	Monitor 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 P0335	Continuous every 250 msec	Type B, 2 Trips
			No crankshaft synchronization gap found	>= 0.4 seconds	Engine is Running Starter is not engaged		Continuous every 12.5 msec	
			Time since starter engaged without detecting crankshaft synchronization gap	>= 3.3 seconds	Starter engaged AND (cam pulses being received OR (MAF_SensorFA AND Engine Air Flow	 = 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:	 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 (MAF_SensorFA AND Engine Air Flow	= 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		Continuous every 100 msec	
			No camshaft pulses received during first 24 MEDRES events (There are 24 MEDRES events per engine cycle		Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	CrankSensor_FA	Continuous every MEDRES event	
			The number of camshaft pulses received during 100 engine cycles	= 0	Crankshaft is synchronized No DTC Active:	CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor 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:	CrankSensor_FA	Continuous every MEDRES event	Type B, 2 Trips
			The number of camshaft pulses received during 100 engine cycles OR	< 398 > 402	Crankshaft is synchronized No DTC Active:	CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #1 CIRCUIT	P0351	Diagnoses Cylinder #1 Ignition Control (EST) output driver circuit for an Open Circuit fault.	The ECM detects there is high impedance on the EST circuit.	$\geq$ 30 kΩ impedance between signal and controller ground	Engine cranking or running Ignition Voltage	 > 5.00 Volts	50 Failures out of 63 Samples 250 msec rate	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #3 CIRCUIT	P0353	Diagnoses Cylinder #3 Ignition Control (EST) output driver circuit for an Open Circuit fault.	High impedance during driver high state (indicates open circuit)	$\geq$ 30 kΩ impedance between signal and controller ground	Engine running Ignition Voltage	 > 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #4 CIRCUIT	P0354	Diagnoses Cylinder #4 Ignition Control (EST) output driver circuit for an Open Circuit fault.	High impedance during driver high state (indicates open circuit)	$\geq$ 30 kΩ impedance between signal and controller ground	Engine running Ignition Voltage	 > 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #6 CIRCUIT	P0356	Diagnoses Cylinder #6 Ignition Control (EST) output driver circuit for an Open Circuit fault.	High impedance during driver high state (indicates open circuit)	$\geq$ 30 kΩ impedance between signal and controller ground	Engine running Ignition Voltage	 > 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #7 CIRCUIT	P0357	Diagnoses Cylinder #7 Ignition Control (EST) output driver circuit for an Open Circuit fault.	High impedance during driver high state (indicates open circuit)	$\geq$ 30 kΩ impedance between signal and controller ground	Engine running Ignition Voltage	 > 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

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Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #8 CIRCUIT	P0358	Diagnoses Cylinder #8 Ignition Control (EST) output driver circuit for an Open Circuit fault.	High impedance during driver high state (indicates open circuit)	$\geq$ 30 kΩ impedance between signal and controller ground	Engine running Ignition Voltage	 > 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Catalyst System Low Efficiency Bank 1	P0420	NOTE: The information below applies to applications that use the Decel Catalyst Monitor Algorithm Oxygen Storage. The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and O2 during lean A/F excursions to store the excess oxygen (I.e. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H2 to release this stored oxygen (I.e. Cerium Reduction). This is referred to as the Oxygen Storage Capacity, or OSC. CatMon's strategy is to "measure" the OSC of the catalyst through forced Rich (intrusive rich) and Lean (decel fuel cutoff) A/F excursions Normalized Ratio OSC Value Calculation Information and Definitions = 1. Raw OSC Calculation = (post cat O2 Resp time - pre cat O2 Resp time) 2. BestFailing OSC value from a calibration	Normalized Ratio OSC Value (EWMA filtered)	< 0.35	All enable criteria associated with P0420 can be found under P2270 - (O2 Sensor Signal Stuck Lean Bank 1 Sensor 2) Rapid Step Response (RSR) feature will initiate multiple tests: If the difference between current EWMA value and the current OSC Normalized Ratio value is and the current OSC Normalized Ratio value is Maximum number of RSR tests to detect failure when RSR is enabled. Front O2 Sensor or Front WRAF 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 > 825.00 mV or > 1.25 EQR O2S_Bank_1_Sensor_1_FA O2S_Bank_1_Sensor_2_FA O2S_Bank_2_Sensor_1_FA	1 test attempted per valid decel period Minimum of 1 test per trip Maximum of 3 tests per trip Frequency: Fueling Related : 12.5 ms OSC Measurements: 100 ms Temp Prediction: 12.5ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor 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_WorstPassing OSCTableB1** and **P0420_BestFailingOS CTableB1** in Supporting Tables tab for details The Catalyst Monitoring Test is completed during a decel fuel cutoff event. This fuel cutoff event occurs following a rich instrusive fueling event initiated by the O2 Sensor Signal Stuck Lean Bank 1 Sensor 2 test (P2270). Several conditions must be met in order to execute this test. These conditions and their related values are				O2S_Bank_2_Sensor_2_ FA WRAF_Bank_1_FA WRAF_Bank_2_FA		

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Catalyst System Low Efficiency Bank 2	P0430	Note: The information below applies to applications that use the Decel Catalyst Monitor Algorithm Oxygen Storage. The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and O2 during lean A/F excursions to store the excess oxygen (I.e. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H2 to release this stored oxygen (I.e. Cerium Reduction). This is referred to as the Oxygen Storage Capacity, or OSC. CatMon's strategy is to "measure" the OSC of the catalyst through forced Rich (intrusive rich) and Lean (decel fuel cutoff) A/F excursions Normalized Ratio OSC Value Calculation Information and Definitions = 1. Raw OSC Calculation = (post cat O2 Resp time - pre cat O2 Resp time) 2. BestFailing OSC value from a calibration	Normalized Ratio OSC Value (EWMA filtered)	< 0.35	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. Front O2 Sensor or Front WRAF 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 > 825.00 mV or > 1.25 EQR O2S_Bank_1_Sensor_1_FA O2S_Bank_1_Sensor_2_FA O2S_Bank_2_Sensor_1_FA O2S_Bank_2_Sensor_2_FA WRAF_Bank_1_FA	1 test attempted per valid decel period Minimum of 1 test per trip Maximum of 3 tests per trip Frequency: Fueling Related : 12.5 ms OSC Measurements: 100 ms Temp Prediction: 12.5ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor 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 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				WRAF_Bank_2_FA		

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission (EVAP) System Small Leak Detected (No ELCP - Conventional EVAP Diagnostic with EAT using IAT Sensor)	P0442	This DTC will detect a small leak (≥ 0.020") in the EVAP system between the fuel fill cap and the purge solenoid. On some applications a small leak is defined as ≥ 0.025", 0.030", or 0.150". The engine off natural vacuum method (EONV) is used. EONV is an evaporative system leak detection diagnostic that runs when the vehicle is shut off when enable conditions are met. Prior to sealing the system and performing the diagnostic, the fuel volatility is analyzed. In an open system (Canister Vent Solenoid [CVS] open) high volatility fuel creates enough flow to generate a measurable pressure differential relative to atmospheric.After the volatility check, the vent solenoid will close. After the vent is closed, typically a build up of pressure from the hot soak begins (phase-1). The pressure typically will peak and then begin to decrease as the fuel cools. When	The total delta from peak pressure to peak vacuum during the test is normalized against a calibration pressure threshold table that is based upon fuel level and ambient temperature. (Please see **P0442 EONV Pressure Threshold (Pascals) 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.	> 0.59 (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 % ≥ 600 seconds ≥ 5.0 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 condition s 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) Pa from peak pressure, the vent is then opened for 60 seconds to normalize the system pressure. The vent is again closed to begin the vacuum portion of the test (phase-2). As the fuel temperature continues to fall, a vacuum will begin forming. The vacuum will continue until it reaches a vacuum peak. When the pressure rises 62 Pa from vacuum peak, the test then completes. If the key is turned on while the diagnostic test is in progress, the test will abort.			Startup delta deg C (ECT-IAT) OR 2. Short Soak and Previous EAT Valid Previous time since engine off OR 3. Less than a short soak and Previous EAT Not Valid Previous time since engine off AND Vehicle Speed AND Mass Air Flow Must expire Estimate of Ambient Temperature Valid Conditioning Time. **P0442 Estimate of Ambient Temperature Valid Conditioning Time as a Function of Ign Off Time 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 ≥ 39 mph ≥ 10 g/sec > 7,200 seconds ≥ 39 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 as a Function of Ign Off Time Table** in Supporting Tables. ********** 1. High Fuel Volatility During the volatility phase, pressure in the fuel tank is integrated vs. volatility time. If the integrated pressure is then test aborts and unsuccessful attempts is incremented. This value equates to an average integrated fuel tank pressure > 1,245 Pa. Please see **P0442 Volatility Time as a Function of Estimate of Ambient Temperature** in Supporting Tables. OR 2. Vacuum Refueling Detected See P0454 Fault Code for information on vacuum refueling algorithm. OR	********** < -5		

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

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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 ≥ 11.0 volts	20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0458 may also set (Canister Purge Solenoid Short to Ground)

Component/ System	Fault Code	Monitor 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 ≥ 10 liters	Fuel Level System Voltage Startup IAT Startup ECT BARO No active DTCs: No Active DTC's TFTKO	10 % ≤ Percent ≤ 90 % 11 volts ≤ Voltage ≤ 32 volts 4 °C ≤ Temperature ≤ 34 °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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 (97.0 % 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.	> 18 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) 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 ≥ 2.50 % MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454 ≤ 8 °C 4 °C≤Temperature≤ 34 °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

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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 ≥ 11.0 volts	20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0443 may also set (Canister Purge Solenoid Open Circuit)

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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 ≥ 11.0 volts	20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 33.1 liters of fuel consumed by the engine.	< 3 liters	Engine Running No active DTCs:	VehicleSpeedSensor_FA	250 ms / sample	Type B, 2 Trips

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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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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≤ 34 °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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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)

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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	> 91.00 rpm	Baro	> 70 kPa	Diagnostic runs in every 12.5 ms loop	Type B, 2 Trips
			filter coefficient	0.00300	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	> 12.00 pct < 75.00 pct		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No active DTCs	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 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.
					All of the above met for Idle time	TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA FuelLevelDataFault LowFuelConditionDiagnostic Clutch Sensor FA AmbPresDfltdStatus P2771 > 10 sec The diagnostic does not run during autostop as engine is shutdown during that time (occurs in a hybrid or 12v start stop vehicle)		

Component/ System	Fault Code	Monitor 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	< -182.00 rpm	Baro	> 70 kPa	Diagnostic runs in every 12.5 ms loop	Type B, 2 Trips
			filter coefficient	0.00300	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		
					For manual transmissions: Clutch Pedal Position or Clutch Pedal Position	> 12.00 pct < 75.00 pct		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No active DTCs	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 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.
					All of the above met for Idle time	FuelLevelDataFaultLow FuelConditionDiagnostic Clutch SensorFA AmbPresDfltdStatus P2771 > 10 sec The diagnostic does not run during autostop as engine is shutdown during that time (occurs in a hybrid or 12v start stop vehicle)		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Oil Pressure (EOP) Sensor Performance - Single Stage Oil Pump	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 passing 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 failing 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	Two Stage Oil Pump is Present = FALSE 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. (**P0521_RPM_Weighting_Factor - Single Stage Oil Pump** * **P0521_Oil_Temp_Weighting_Factor - Single Stage Oil Pump** * **P0521_Eng_Load_Stability_Weighting_Factor - Single Stage Oil Pump** * **P0521_Eng_Oil_Pred_Weighting_Factor - Single Stage Oil Pump**	FALSE 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.
					) with a first order filter coefficient of 0.01 (See Details on P0521 Supporting Tables Tab) **P0521_RPM_Weighting_Factor - Single Stage Oil Pump** **P0521_Oil_Temp_Weighting_Factor - Single Stage Oil Pump** **P0521_Eng_Load_Stability_Weighting_Factor - Single Stage Oil Pump** **P0521_Eng_Oil_Pred_Weighting_Factor - Single Stage Oil Pump** No active DTC's	Fault bundles: EngOilPressureSensorCktFA CrankSensor_FA ECT_Sensor_FA MAF_SensorFA IAT_SensorFA		

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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	800 failures out of 1,000 samples Performed every 6.25 msec	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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	800 failures out of 1,000 samples Performed every 6.25 msec	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 SVS

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 Present Diagnostic Status	Yes Enabled	80 failures out of 100 samples Performed every 25 msec	Type C, No SVS

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
System Voltage Low	P0562	Diagnoses the 12V battery system low	System voltage low	Battery voltage <= 9.00	System voltage low diag enable = TRUE Run Crank voltage Engine speed >=	1.00 Voltage ≥ 5.00 volts 400.00	400.00 failures out of 500.00 samples 12.5 ms / sample	Type C, No SVS

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
System Voltage High	P0563	Diagnoses the 12V battery system high	System voltage high	Battery voltage >= 18.00	System voltage high diag enable = TRUE Run Crank voltage	1.00 Voltage ≥ 5.00 volts	400.00 failures out of 500.00 samples 12.5 ms / sample	Type C, No SVS

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 SVS

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 89.000 seconds	MIL: Type C, No SVS

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 89.000 seconds	MIL: Type C, No SVS

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 SVS

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Pedal Position Sensor Circuit Range/ Performance	P057B	This diagnostic monitors the Brake Pedal Position Sensor for a stuck in range failure	.		Brake Pedal Position Sensor Circuit Range / Performance Diagnostic Enable	1.00 ignition voltage > 10.00		MIL: Type A, 1 Trips
			Calculated EWMA value must be greater than calibratable theshold after calibratable number of tests have completed to report a "test passed" for P057B	EWMA value looked up in supporting table **P057B KtBRKI_K_FastTestPointWeight** P057B as a function of calculated brake pedal position delta EWMA value is > 0.80	calculated brake pedal position delta sample counter > 50.00 for fast test OR calculated brake pedal position delta sample counter > 1,000.00 for slow test	calculated brake pedal position delta > 8.00 OR (for slow test) shift lever has been in park once this key cycle vehicle speed >= 5.00 accelerator pedal position < 5.00	total number of EWMA tests > 20.00	
			Calculated EWMA Value must be less than calibratable threshold after calibratable number of tests have completed to report a "test failed" for P057B. This test runs once per key cycle	EWMA value looked up in supporting table **P057B KtBRKI_K_FastTestPointWeight** P057B as a function of calculated brake pedal position delta EWMA value is less thatn 0.40	no DTC's active (P057C, P057D)	shift lever has been in park once this key cycle vehicle speed >= 5.00 accelerator pedal position < 5.00	total number of EWMA tests > 2.00	

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Pedal Position Sensor Circuit High	P057D	detects open circuit for brake pedal position sensor	If x of y samples are observed above failure threshold, default brake pedal position to zero percent and set DTC	95.00	Brake Pedal Position Sensore High Voltage Diagnostic Enable	1.00	20.00 / 32.00 counts	MIL: Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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				

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 >	0.47413 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_MainCPU_SOH_FltEnbld is: 0 . (If 0, this test is disabled) time from initialization >= 0.4875 seconds	50 ms	
			Software background task first pass time to complete exceeds			Run/Crank voltage > 6.41	360.000 seconds	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			2 fails in a row in the MAIN processor's ALU check			KePISD_b_ALU_TestEnbld == 1 Value of KePISD_b_ALU_TestEnbld is: 1 . (If 0, this test is disabled)	25 ms	
			2 fails in a row in the MAIN processor's configuration register masks versus known good data			KePISD_b_ConfigRegTestEnbld == 1 Value of KePISD_b_ConfigRegTestEnbld is: 1 . (If 0, this test is disabled)	12.5 to 25 ms	
			Checks number of stack over/under flow since last powerup reset >=	3		KeMEMD_b_StackLimitTestEnbl == 1 Value of KeMEMD_b_StackLimitTestEnbl is: 1 . . (If 0, this test is disabled)	variable, depends on length of time to corrupt stack	
			Voltage deviation >	0.4950		KePISD_b_A2D_CnvrtrTestEnbld == 1 Value of KePISD_b_A2D_CnvrtrTestEnbld is: 1 . (If 0, this test is disabled)	5 / 10 counts or 0.150 seconds continuous; 50 ms/count in the ECM main processor	
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		KeMEMD_b_FlashECC_CktTestEnbl == 1 Value of KeMEMD_b_FlashECC_CktTestEnbl is: 1 . (If 0, this test is disabled)	variable, depends on length of time to access flash with corrupted memory	
			Checks for ECC (error	3 (results in MIL),		KeMEMD_b_RAM_ECC_	variable,	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			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 >=	5 (results in MIL and remedial action)		CktTestEnbl == 1 Value of KeMEMD_b_RAM_ECC_ CktTestEnbl is: 1 . (If 0, this test is disabled)	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_XferTest Enbld == 1 Value of KePISD_b_DMA_XferTest Enbld is: 0 . (If 0, this test is disabled)	variable, depends on length of time to write flash to RAM	
			Safety critical software is not executed in proper order.	>= 1 incorrect sequence.		Table, f(Core, Loop Time). See supporting tables: **P0606_Program Sequence Watch Enable f(Core, Loop Time)** (If 0, this Loop Time test is disabled)	Fail Table, f(Loop Time). See supporting tables: **P0606_PSW Sequence Fail f (Loop Time)** / Sample Table, f (Loop Time)See supporting tables: **P0606_PSW Sequence Sample f(Loop Time)** counts 50 ms/count in the ECM main processor	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			MAIN processor determines a seed has not changed within a specified time period within the 50ms task.	Previous seed value equals current seed value.		KePISD_b_SeedUpdKeyStorFltEnbl == 1 Value of KePISD_b_SeedUpdKeyStorFltEnbl is: 1 . (If 0, this test is disabled)	Table, f(Loop Time). See supporting tables: **P0606_Last Seed Timeout f (Loop Time)**	

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Starter Relay Control Circuit Open	P0615	Diagnoses the starter relay control open circuit	Starter relay control open circuit	Controller internal diagnostic	Starter control diag enable = TRUE Engine speed Run Crank voltage	1.00 ≥ 0.00 RPM ≥ 11.00 volts	40.00 failures out of 50.00 samples 50 ms / sample	Type C, No SVS

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Starter Relay Control Circuit Low Voltage	P0616	Diagnoses the starter relay control circuit low voltage	Starter relay control circuit low voltage	Controller internal diagnostic	Starter control diag enable = TRUE Engine speed Run Crank voltage	1.00 ≥ 0.00 RPM ≥ 6.41 volts	8.00 failures out of 10.00 samples 50 ms / sample	Type C, No SVS

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Starter Relay Control Circuit High Voltage	P0617	Diagnoses the starter relay control circuit high voltage	Starter relay control circuit high voltage	Controller internal diagnostic	Starter control diag enable = TRUE Engine speed Run Crank voltage	1.00 ≥ 0.00 RPM ≥ 6.41 volts	40.00 failures out of 50.00 samples 50 ms / sample	Type C, No SVS

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 ≥ 11.00 volts ≥ 0 RPM	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 >	4.875 5.125 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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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	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 ≥ 11.00 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)

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 >	4.875 5.125 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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Powertrain Relay Control (ODM) Open	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 ≥ 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0686 may also set (Powertrain Relay Control Short to Ground).

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 ≥ 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0685 may also set (Powertrain Relay Control Open Circuit).

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 ≥ 11.00 volts	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Power Relay Feedback Circuit Low Voltage	P0689	Diagnoses control module relay feedback circuit low voltage	Control module relay feedback circuit low voltage	Powertrain relay voltage <= 5.00	Powertrain relay short low diagnostic enable Run Crank voltage Powertrain relay state	= 1.00 > 9.00 = ON	5.00 failures out o 6.00 f samples 1000 ms / sample	Type C, No SVS

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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	>= 4.00 volts will increment the fail counter	Powertrain relay commanded “OFF” No active DTCs:	>= 2.00 seconds PowertrainRelayStateOn_FA	50 failures out of 63 samples 100ms / Sample	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 >	4.875 5.125 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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 >	4.875 5.125 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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 < 8,500 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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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** **See Supporting Tables**	Diagnostic Enabled Engine Run Time Engine Speed Cumlative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above) Engine Air Flow	Yes ≥ 2.0 seconds > 400 RPM and < 8,500 RPM ≥ 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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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.
Traction Control Torque Request Circuit	P0856	Determines if torque request from the EBTCM is valid	Serial Communication 2's complement message - ($1C7/$1C9 for engine torque, $1CA/$1C6 for axle torque) OR Serial Communication message ($1C7/$1C9 for engine torque, $1CA/ $1C6 for axle torque) rolling count index value OR Too many minimum limit torque request transitions occur from TRUE to FALSE to TRUE within a time period Torque request greater than torque request diagnostic maximum threshold	Message <> 2's complement of message Message rolling count value <> previous message rolling count value plus one Requested torque intervention type toggles from not increasing request to increasing request > 250 Nm for engine torque based traction torque system, OR > 4,000 Nm for axle torque based traction torque system	Serial communication to EBTCM (U0108) Power Mode Engine Running Status of traction in GMLAN message ($4E9)	No loss of communication = Run = True = Traction Present	>= 6 failures out of 10 Performed on every received message 6 rolling count failures out of 10 samples Performed on every received message >= 5 multi-transitions out of 5 samples. Performed every 200 ms >= 4 out of 10 samples Performed on every received message	Type C, No SVS Safety Special Type C

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) > 25.0 grams/sec > 18.0 kPa) > 18.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables.	>= 400 RPM <= 5,600 RPM > -7 Deg C < 129 Deg C > -20 Deg C < 125 Deg C >= 0.50 Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** Modeled Air Flow Error multiplied by **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM** and **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est** MAP Model 1 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM** MAP Model 2 Error multiplied by	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM		
					No Active DTCs: No Pending DTCs:	MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP		

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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.
Cold Start Emissions Reduction System Fault	P1400	Model based test computes power from exhaust flow and thermal energy resulting from elevated idle speed and retarded spark advance. Detects if the cold start emission reduction system has failed resulting in the delivered power being out of range.	Average desired accumulated exhaust power - Average actual accumulated exhaust power (too much energy delivered to catalyst) Average desired accumulated exhaust power - Average actual accumulated exhaust power (too little energy delivered to catalyst) (EWMA filtered) Average Power = output of **P1400_EngineSpeedResidual_Table** * output of **P1400_SparkResidual_Table** NOTE: Desired accumulated power would use the desired catalyst light off spark and desired engine speed and the actual accumuated power would use the final commanded spark and actual engine speed. Refer to the Supporting Tables for details	< -32.00 KJ/s (high RPM failure mode) > 4.70 KJ/s (low RPM failure mode)	To enable the diagnostic, the Cold Start Emission Reduction Strategy must be Active per the following: Catalyst Temperature AND Engine Coolant AND Engine Coolant AND Barometric Pressure The Cold Start Emission Reduction strategy must not be exiting. The strategy will exit per the following: Catalyst Temperature AND Engine Run Time OR Engine Run Time OR Barometric Pressure	< 650.00 degC > 17.00 degC <= 40.00 degC >= 70.00 KPa >= 725.00 degC >= 2.50 seconds > **P050D_P1400_CatalystLightOffExtendedEngineRunTimeExit** This Extended Engine run time exit is a function of percent ethanol and Catmons NormRatioEWMA. Refer to "Supporting Tables" for details. < 70.00 KPa	Runs once per trip when the cold start emission reduction strategy is active Frequency: 100ms Loop Test completes after 10 seconds of accumulated qualified data.	EWMA Based - Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					allow time for the actual engine speed and actual final commanded spark to achieve their desired values. Therefore, when the:			
					Gear Shift Delay Timer	> 2.00 seconds		
					the diagnostic will continue the calculation			
					For Manual Transmission vehicles:			
					Clutch Pedal Position	> 12.00 %		
					Clutch Pedal Position	< 75.00 %		
					The diagnostic will delay calculation of the residual value and potentially weight the residual calculation differently based on engine run time. This is to ensure the diagnostic is operating in idle speed control as well as during the peak catalyst light off period.			
					The time weighting factor must be :	> 0 These are scalar values that are a function of engine run time. Refer to		

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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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	12 protect errors within the sample period 20		
					# 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 B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Switch State Undetermined	P155A	Detects when cruise switch state cannot be determined, such as low voltage conditions	cruise switch state remains undetermined for greater than a calibratable time				fail continuously for greater than 0.5 seconds	MIL: Type C, No SVS

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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: **P1682_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 0.175 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
TPS SENT Comm Circuit Low	P16A0	Detects a Low Circuit Fault in the TPS SENT Communication Circuit	Voltage for wave pulse is below state threshold as defined by SAE J2716 SENT Protocol	0.5 V		Run/Crank voltage > 6.41	79 / 159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
TPS SENT Comm Circuit High	P16A1	Detects a High Circuit Fault in the TPS SENT Communication Circuit	Voltage for wave pulse is above state threshold as defined by SAE J2716 SENT Protocol	4.1 V		Run/Crank voltage > 6.41	79 / 159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
TPS SENT Comm Circuit Performance	P16A2	Detects a Message Fault in the TPS SENT Communication Circuit	Message Pulse < Message Pulse > or Message Age Limit >= or Signal CRC fails	0.125977 ms 0.209991 ms 3.125 ms		Run/Crank voltage > 6.41	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.
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.	Equivance Ratio torque compensation exceeds threshold	-150.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	Type A, 1 Trips
			Absolute difference between Equivance Ratio torque compensation and its dual store out of bounds given by threshold	150.00 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	150.00 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	142.03 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	15.00 degrees		Engine speed >0rpm	Up/down timer 127 ms continuous, 0.5 down time multipier	
			Torque Learn offset is out of bounds given by threshold range	High Threshold 0.00 Nm Low Threshold 0.00	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				Nm				
			One step ahead calculation of air-per-cylinder and two step ahead is greater than threshold	80.00 mg		Engine speed > 580 rpm	Up/down timer 462 ms continuous, 0.5 down time multipier	
			Difference between Unmanaged Spark and PACS Spark is greater than threshold	15.00 degrees	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded Predicted Engine Torque and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Zero pedal axle torque is out of bounds given by threshold range	High Threshold 1,700.00 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 1,700.00 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	150.00 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.
			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 < 4,900.00 or 5,000.00 rpm (hysteresis pair)	Up/down timer 162 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.
			Commanded engine torque due to fast actuators and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded engine torque due to slow actuators and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			TOS to wheel speed conversion factor is out of bounds given by threshold range	High Threshold: 1.10 T/C Range Hi 0.10 T/C Range Lo Low Threshold: 1.10 T/C Range Hi 0.10 T/C Range Lo	Ignition State	Accessory, run or crank	255 / 6 counts; 25.0msec/count	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Cylinders active greater than commanded	4 cylinders		Engine run flag = TRUE > 2.00 s Number of cylinder events since engine run > 24 No fuel injector faults active	Up/down timer 162 ms continuous, 0.5 down time multipier	
			Transfer case neutral request from four wheel drive logic does not match with operating conditions	N/A	Ignition State	Accessory, run or crank Transfer case range valid and not over-ridden FWD Apps only	32 / 0 counts; 25.0msec/count	
			Driver progression mode and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							multipier	
			Predicted torque for uncorrected zero pedal determination is greater than calculated limit.	Table, f(Engine, Oil Temp). **P16F3_Speed Control External Load f(Oil Temp, RPM)** + 150.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Engine Predicted Request Without Motor is greater than its redundant calculation plus threshold	149.00 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	149.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 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	
			Positive Torque Offset is greater than its redundant calculation plus threshold OR Positive Torque Offset is less than its redundant calculation minus threshold	150.00 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	150.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, down time	

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Regeneration Brake Assist is not within a specified range	Brake Regen Assist < 0 Nm or Brake Regen Assist > 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Cylinder Spark Delta Correction exceeds the absolute difference as compared to Unadjusted Cylinder Spark Delta	15.00 degrees	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			1. Cylinder Torque Offset exceeds step size threshold OR	1. 150.00 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.
			2. Sum of Cylinder Torque Offset exceeds sum threshold	2. 150.00 Nm				
			Engine Capacity Minimum Immediate Without Motor is greater than its dual store plus threshold	150.00 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	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Engine Capacity Minimum Engine Immediate Without Motor is greater than threshold	0 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Commanded Immediate Engine Request is greater than its redundant calculation plus threshold	150.00 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 162 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 Speed Lores Intake Firing timing (event based) calculation does not equal its redundant calculation	N/A		Engine speed greater than 0rpm	Up/down timer 162 ms continuous, 0.5 down time multipier	
			Idle speed control calculated predicted minimum torque request exceeds calculated torque limit	Table, f(Oil Temp, RPM). See supporting tables: **P16F3_Speed Control External Load f(Oil Temp, RPM)** + 150.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Idle speed control calculated predicted minimum torque without reserves exceeds calculated torque limit	Table, f(Oil Temp, RPM). See supporting tables: **P16F3_Speed Control External Load f(Oil Temp, RPM)** +	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				150.00 Nm				
			Difference between Driver Requested Immediate Torque primary path and its secondary exceeds threshold	1,700.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Driver Immediate Request is less than its redundant calculation minus threshold	1,700.00 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	1,700.00 Nm	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.
			OR Commanded Immediate Request is less than its redundant calculation minus threshold				multipier	
			Commanded Immediate Response Type is set to Inactive	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Difference between Cruise Axle Torque Arbitrated Request and Cruise Axle Torque Request exceeds threshold	212.50 Nm		Cruise has been engaged for more than 4.00 seconds	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Desired engine torque request greater than redundant calculation plus threshold	149.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Engine min capacity above threshold	150.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 65 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: **P16F3_Delta Spark Threshold f (RPM,APC)**		Engine speed greater than 0rpm	Up/down timer 127 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 91 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	
			1. Absolute difference of redundant calculated engine speed above threshold	200 RPM		Engine speed greater than 0 RPM	Up/down timer 162 ms continuous, 0.5 down time multipier	
			After throttle blade pressure and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Speed Control's Preditcted Torque Request and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Engine oil temperature and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 220 ms continuous, 0.5 down time multipier	
			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	150.00 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.
			Desired filtered throttle torque exceeds the threshold plus the higher of desired throttle torque or modeled throttle torque	150.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Torque feedback proportional term is out of allowable range or its dual store copy does not match	High Threshold 75.00 Nm Low Threshold -75.00 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	High Threshold	Ignition State	Accessory, run or crank	Up/down timer 475	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			change is out of allowable range or its dual store copy do not match	140.63 Nm Low Threshold -150.00 Nm Rate of change threshold 9.38 Nm/loop			ms continuous, 0.5 down time multipier	
			Difference of Final Torque feedback proportional plus integral term and its redundant calculation is out of bounds given by threshold range	High Threshold 150.00 Nm Low Threshold - 150.00 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 torque desired throttle area and its redundant calculation is out of bounds given by threshold range	High Threshold 0.50 % Low Threshold - 0.50 %	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of torque model coefficients and its redundant calculation is out of bounds given by threshold range	High Threshold 0.0002967 Low Threshold - 0.0002967	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 150.00 Nm Low Threshold - 150.00 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.
			Accessory drive friction torque is out of bounds given by threshold range	High Threshold 150.00 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			AC friction torque is greater than commanded by AC control software or less than threshold limit	High Threshold 40.00 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of Oil temperature delta friction torque and its redundant	High Threshold 150.00	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.
			calculation is out of bounds given by threshold range	Nm Low Threshold - 150.00 Nm			0.5 down time multipier	
			Generator friction torque is out of bounds given by threshold range	High Threshold 150.00 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Absolute difference between the Supercharger friction torque and its redundant calculation greater than threshold	150.00 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.
			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 150.00 Nm Low Threshold -150.00 Nm Rate of change threshold 9.38 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 150.00 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.
			Delta Torque Baro compensation is out of bounds given by threshold range	High Threshold 12.83 Nm Low Threshold -4.13 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 exeed threshold OR 3. Rate of change of reserve torque exceeds threshold, increasing direction only OR 4. Reserve engine torque	1. 149.00 Nm 2. N/A 3. 149.00 Nm 4. 149.00 Nm	3. & 4.: Ignition State	1. & 2.: Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 150.00 Nm 3. & 4.: 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.
			above allowable capacity threshold					
			Engine Vacuum and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of the calculated Intake Manifold Pressure during engine event versus during time event is greater than threshold	Table, f(Desired Engine Torque). See supporting tables: **P16F3_Delta MAP Threshold f(Desired Engine Torque)**		Engine speed >0rpm	Up/down timer 162 ms continuous, 0.5 down time multipier	
			Min. Axle Torque Capacity is greater than threshold	0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Driver Predicted Request is greater than its redundant calculation plus threshold	1,700.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			OR Driver Predicted Request is less than its redundant calculation minus threshold				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	
			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)** + 150.00 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 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 redundant calculation is above threshold	0.26		Engine run flag = TRUE > 10.00 s	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Difference of minimum spark advance limit and	15.00 degrees	Ignition State	Accessory, run or crank	Up/down timer 162	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			its redundant calculation is out of bounds given by threshold range				ms continuous, 0.5 down time multipier	
			Difference of commanded spark advance and adjusted delivered is out of bounds given by threshold range	15.00 degrees		Engine speed >0rpm	Up/down timer 127 ms continuous, 0.5 down time multipier	
			Absolute difference between Estimated Engine Torque and its dual store are above a threshold	150.00 Nm		Engine speed >0rpm	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Absolute difference between Estimated Engine Torque without reductions due to torque control and its dual store are above a threshold	150.00 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.
			Difference of desired spark advance for managed torque and its redundant calculation is out of bounds given by threshold range	15.00 degrees		Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 150.00 Nm	Up/down timer 462 ms continuous, 0.5 down time multipier	
			One step ahead calculation of air-per-cylinder greater than two step ahead calculation by threshold for time	Threshold: Dynamically calculated based on current engine conditions Fault Pending Threshold: 100 ms		Engine speed > 580 rpm	Up/down timer 462 ms continuous, 0.5 down time multipier	
			Rate limited cruise axle torque request and its dual store do not match within a threshold	212.50 Nm	Ignition State	Accessory, run or crank	Up/down timer 163 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.
			1. Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions and its redundant calculation is out of bounds given by threshold range OR 2. Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions and its dual store do not equal OR 3. Absolute difference of Calculated accelerator pedal position and its dual store do not equal	1. 5.00 % 2. N/A 3. N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded axle torque is greater than its redundant calculation by	1,700.00 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.
			threshold				0.5 down time multipier	
			Commanded axle torque is less than its redundant calculation by threshold	2,550.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Preload timer and its redundant calculation do not equal	N/A	Ignition State	Accessory, run or crank AFM apps only	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			AC friction torque is greater than commanded by AC control software	40.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing (time based)	N/A		Engine speed >0rpm	Up/down timer 175	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			calculation does not equal its redundant calculation				ms continuous, 0.5 down time multipier	
			Absolute difference of the calculated spark offset for equivalence ratio and its redundant cacluation is greater than a threshold	15.00 degrees		Engine speed >0rpm	Up/down timer 162 ms continuous, 0.5 down time multipier	
			Transmission Torque Request cacluations do not equal their dual stores	N/A		Run or Crank = TRUE > 0.50 s	16 / 32 counts; 25.0msec/count	
			Absolute difference of the predicted motor torque ACS and its redundant cacluation is greater than a threshold	0.01 Nm			Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Absolute difference of maximum throttle area and its redundant cacluation is greater than	15 mm2			Up/down timer 91 ms continuous, 0.5	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			a threshold				down time multipier	
			Absolute difference of Desired TIAP and its redundant cacluation is greater than a threshold	5.00 kPa			Up/down timer 475 ms continuous, 0.5 down time multipier	
			Pedal learns and their redundant calculation do not equal		Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Throttle learns and their redundant calculation do not equal		Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Desired Throttle Position and its redundant calculation do not equal		Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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	> 11.00 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 Output driver is commanded on Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 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 >= 35.0 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: 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	> 0.0 seconds 300 300 0 300 300		

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 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 >= 35.0 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 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 “0” and a post catalyst	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 >= 35.0 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 0 300 300	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.
		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 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 >= 35.0 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 > 8.41)	15 counts; 12.5 ms/count in the primary processor	Type A, 1 Trips
			Throttle Position >	36.00 percent		Powertrain Relay voltage > 6.41 TPS minimum learn is active	11 counts; 12.5 ms/count in the primary processor	
			Throttle Position >	35.00 percent		Powertrain Relay voltage > 6.41 Reduced Power is True	11 counts; 12.5 ms/count in the primary processor	

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 >	6.797 % offset at min. throttle position with a linear threshold to 9.720 % 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	

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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	

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 >	0.5740 10 counts		Run/Crank voltage > 6.41 TPS minimum learn is active No previous TPS min learn values stored in long term memory	2.0 secs	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor 1 / 2 Correlation	P2199	Detects a difference between the IAT and IAT2 sensors	ABS (IAT - IAT2)	> 55.0 deg C	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.0 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 (see Supporting Table **P219A Variance Threshold Bank1 Table**) and subtracting it from the measured Variance. The result is then divided by a normalizer calibration	0.48 If the diagnostic has reported a failure on the prior trip, the Filtered Ratio must fall below 0.40 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 0.48 .	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 = 0.090 Air Per Cylinder (APC) APC delta during short term sample period Filtered APC delta	no lower than 10.0 Volts for more than 0.2 seconds > 10.0 percent AND no fuel level sensor fault > -20 deg. C > 10.0 seconds No 875 to 3,750 RPM < 200 RPM 5 to 1,000 g/s < 6 g/s < 0.70 g/s 181 to 680 mg/cylinder < 80 mg/cylinder	Minimum of 1 test per trip, up to 6 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, 16.50 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.
			from another 17 x 17 table (see Supporting Table **P219A Normalizer Bank1 Table**). This quotient is then multiplied by a quality factor calibration from a 17 x 17 table (see Supporting Table **P219A Quality Factor Bank1 Table**). This result is referred to as the Ratio. Note that the quality factor ranges between 0 and 1 and represents robustness to false diagnosis in the current operating region. Regions with low quality factors are not used. Finally, a EWMA filter is applied to the Ratio metric to generate the Filtered Ratio malfunction criteria metric. Generally, a normal system will result in a negative Filtered Ratio while a failing system will result in a positive Filtered 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		between samples Note: first order lag filter coefficient applied to APC = 0.250 Spark Advance Throttle Area (percent of max) Intake Cam Phaser Angle Exhaust Cam Phaser Angle Quality Factor (QF) QF calibrations are located in a 17x17 lookup table versus engine speed and load (see Supporting Table **P219A Quality Factor Bank1 Table**). QF values less than “1” indicate that we don’t have 4sigma/2sigma robustness in that region. The quality of the data is determined via statistical analysis of Variance data. Fuel Control Status Closed Loop and Long Term FT Enabled for: Device Control AIR pump	< 10.00 percent 5 to 55 degrees 0 to 200 percent 0 to 25 degrees 0 to 25 degrees >= 0.99 >= 2.0 seconds (Please see "**Closed Loop Enable Clarification**" and "**Long Term FT Enable Criteria**" in Supporting Tables) Not active Not on	made within 5 minutes of operation. For RSR or FIR, 12 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.
			need to command a unique cam phaser value before performing the above calculations since cam phasing has been shown to have an impact on overall signal quality. This application Does Not Use this feature.		CASE learn EGR EVAP Engine OverSpeed Protection Idle speed control PTO Injector base pulse width O2 learned htr resistance Rapid Step Response (RSR): RSR will trigger if the Ratio result from the last test is AND it exceeds the last Filtered ratio by Once triggered, the filtered ratio is reset to: Fast Initial Response (FIR): FIR will trigger when an NVM reset or code clear occurs. Once triggered, the filtered ratio is reset to: No Fault Active for:	Not active Not intrusive Not intrusive Not Active Normal Not Active Above min pulse limit = Valid (the O2 heater resistance has learned since NVM reset) >= 0.34 >= 0.32 0.00 0.00 EngineMisfireDetected_FA MAP_SensorFA MAF_SensorFA ECT_Sensor_FA TPS_ThrottleAuthorityDefaulted FuelInjectorCircuit_FA		

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

Component/ System	Fault Code	Monitor 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, while referencing the following Bank2 Supporting Tables: **P219B Variance Threshold Bank2 Table** **P219B Normalizer Bank2 Table** **P219B Quality Factor Bank2 Table** 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.	0.38 If the diagnostic has reported a failure on the prior trip, the Filtered Ratio must fall below 0.30 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 0.38 .	Same as P219A except for the following: Bank1 Fault Active criteria are replaced by the equivalent Bank2 Fault Active criteria. Quality Factor (QF) QF calibrations are located in a 17x17 lookup table versus engine speed and load (Supporting Table **P219B Quality Factor Bank2 Table**). QF values less than “1” indicate that we don’t have 4sigma/2sigma robustness in that region. The quality of the data is determined via statistical analysis of Variance data. 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 >= 0.21 >= 0.31 0.00 0.00	See P219A 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:	> 5.0 seconds EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP	4 failures out of 5 samples 1 sample every 12.5 msec	

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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, Gen II)	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, Gen II)	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

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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			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.
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 Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA P013A, P013B, P013E, P013F, P2270 or P2271 > 10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = 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.	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.
					Low Fuel Condition Diag Pedal position Engine Airflow Closed loop integral Closed Loop Active Evap Ethanol Post fuel cell 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	= False <= 100.0 % 3 <= gps <= 20 0.74 <= C/L Int <= 1.08 = TRUE (Please see "**Closed Loop Enable Clarification**" in Supporting Tables). not in control of purge not in estimate mode = Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info. < 1,000.0 Nm = not active = not active >= 80.0 sec 600 <= ºC <= 900 = DFCO possible ========== 1,100 <= RPM <= 2,500		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					initially enabled) Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled) ========== All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested. ========== During Stuck Lean test the following must stay TRUE or the test will abort: Commanded Fuel Crankshaft Torque	950 <= RPM <= 2,650 40.4 <= MPH <= 82.0 36.0 <= MPH <= 87.0 0.95 <= EQR <= 1.10 < 1,000.0 Nm		

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 > 10.0 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	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA P013A, P013B, P013E, P013F or P2270 > 10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = 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.	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.
					Low Fuel Condition Diag Fuel State DTC's Passed ========== After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).	= False DFCO possible = P2270 = P013E = P013A ==========		

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 Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA P013C, P013D, P014A, P014B, P2272 or P2273 > 10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = 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.	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.
					Low Fuel Condition Diag Pedal position Engine Airflow Closed loop integral Closed Loop Active Evap Ethanol Post fuel cell 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	= False <= 100.0 % 3 <= gps <= 20 0.74 <= C/L Int <= 1.08 = TRUE (Please see "**Closed Loop Enable Clarification**" in Supporting Tables). not in control of purge not in estimate mode = Enabled, refer to **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** for additional info. < 1,000.0 Nm = not active = not active >= 80.0 sec 600 <= ºC <= 900 = DFCO possible ========== 1,100 <= RPM <= 2,500		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					initially enabled) Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled) ========== All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested. ========== During Stuck Lean test the following must stay TRUE or the test will abort: Commanded Fuel Crankshaft Torque	950 <= RPM <= 2,650 40.4 <= MPH <= 82.0 36.0 <= MPH <= 87.0 0.95 <= EQR <= 1.10 < 1,000.0 Nm		

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 > 10.0 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	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA Ethanol Composition Sensor FA P013C, P013D, P014A, P014B or P2272 > 10.0 Volts = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = 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.	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.
					Low Fuel Condition Diag Fuel State DTC's Passed ========== After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).	= False = DFCO possible = P2272 = P014A = P013C ==========		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #1 CIRCUIT LOW	P2300	Diagnoses Cylinder #1 Ignition Control (EST) output driver circuit for a Short to Ground fault	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	 > 11.0	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	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	 > 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #2 CIRCUIT Low	P2303	Diagnoses Cylinder #2 Ignition Control (EST) output driver circuit for a Short to Ground fault	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	 > 11.0 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	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	 > 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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

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

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #7 CIRCUIT High	P2319	Diagnoses Cylinder #7 Ignition Control (EST) output driver circuit for a Short to Power fault	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	 > 11.0 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #8 CIRCUIT Low	P2321	Diagnoses Cylinder #8 Ignition Control (EST) output driver circuit for a Short to Ground fault	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	 > 11.0 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 High	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	 > 11.0 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 2's complement not equal ($189/$199)	Message <> two's complement of message	Diagnostic Status	Enabled	>= 16 failures out of 20 samples.	Type B, 2 Trips
					Power Mode	= Run	Performed on every received message	
			OR Rolling count error - Serial Communication message ($189/$199) rolling count index value	Message <> previous message rolling count value + one	Ignition Voltage	> 6.41 volts	>= 6 Rolling count errors out of 10 samples.	
					Engine Running	= True	Performed on every received message	
			OR		Run/Crank Active	> 0.50 Sec	>= 6 range errors out of 10 samples.	
			Range Error - Serial Communication message - ($189/$199) TCM Requested Torque Increase	> 450 Nm	No Serial communication loss to TCM (U0101)	No loss of communication	Performed on every received message	
			OR				>= 3 multi-transitions out of 5 samples. Performed every 200 msec	
			Multi-transition error - Trans torque intervention type request change	Requested torque intervention type toggles from not increasing request to increasing request				

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 > 0.25 %.			Count Up Test: 4 failures out of 20 samples 1 sec / sample Continuous while run/crank is not active and until controller shutdown is initiated. Range Test: Once per trip when controller shutdown is initiated or run/crank becomes active.	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 ≥ 11.00 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)

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

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 ≥ 11.00 volts	4 failures out of 5 samples 50 ms / sample	Type B, No MIL NO MIL

16 OBDG07A ECM Summary Tables L20 (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures exceeds before the sample time of is reached	5 counts (equivalent to 0.06 seconds) 0.56 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds CAN hardware is bus OFF for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts > 0.1125 seconds	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.
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 $0AB Message $0BD Message $0C7 Message $0F9 Message $189 Message $199 Message $19D Message $1AF Message $1BE Message $1BF Message $1F5 Message $4C9	 ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 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: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 Anti-Lock Brake System (ABS) Control Module	U0121	This DTC monitors for a loss of communication with the Anti-Lock Brake System (ABS) Control Module (Non-OBD Module ID 243).	Message is not received from controller for Message $0C1 Message $0C5 Message $0D1 Message $1C6 Message $1C7 Message $1E9 Message $2F1 Message $2F9	 ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 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: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts	Diagnostic runs in 12.5 ms loop	Type C, No SVS "Special Type C"

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Network Management is not active for U0121 Anti-Lock Brake System Control Module	> 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 Message $0F1 Message $12A Message $1E1 Message $1F1 Message $1F3 Message $3C9 Message $3CB Message $3F1 Message $451 Message $4D7 Message $4E1 Message $4E9	 ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 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: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts > 0.4000 seconds	Diagnostic runs in 12.5 ms loop	Type C, No SVS "Special Type C"

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					U0140 Body Control Module	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.
Fuel Level Sensor 1 Performance (For use on vehicles with electric transfer pump dual fuel tanks)	P0461	This DTC will detect a fuel sender stuck in range in the primary fuel tank.	****************************** Fuel Level in Primary and Secondary Tanks Remain in an Unreadable Range too Long ****************************** This subtest is not used If fuel volume in primary tank is and fuel volume in secondary tank is and remains in this condition for of fuel consumed by the engine. OR ****************************** During Fuel Transfer ****************************** During fuel transfer, when the enable conditions are met, at least 5.0 liters of fuel will be transferred from the secondary tank and 5.0 liters of fuel will be transferred into the primary tank within 300 seconds. There is a short delay of 20 seconds to allow fuel slosh to settle before the fail timer begins. If the secondary	≥ 1,024.0 liters < 0.0 liters 18.0 liters	Engine Running No active DTCs: Transfer pump is commanded on for the maximum time limit referenced in **P0461 P2066 P2636 Transfer Pump Enable Time Table** (see Supporting Table) No device control for the transfer pump Fuel Volume in Secondary Tank	 VehicleSpeedSensor_FA < 136 liters	250 ms / sample	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			tank volume does decrease by the cal amount but the primary volume does not increase by the cal amount after the fail timer has expired, then P0461 sets. OR ********** Distance Traveled without a Primary Fuel Level Change ********** Delta fuel volume change for of fuel consumed by the engine.	 < 3 liters 27.3 liters	Vehicle Speed	< 0.0 mph		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 2 Performance (For use on vehicles with electric transfer pump dual fuel tanks)	P2066	This DTC will detect a fuel sender stuck in range in the secondary fuel tank.	****************************** Fuel Level in Primary and Secondary Tanks Remains in an Unreadable Range too Long ****************************** This subset is not used If fuel volume in primary tank is and fuel volume in secondary tank is and remains in this condition for of fuel consumed by the engine. OR ****************************** During fuel transfer ****************************** When the enable conditions are met, 5.0 liters of fuel will be transferred from the secondary tank and 5.0 liters of fuel will be transferred into the primary tank within 300 seconds. There is a short delay of 20 seconds to allow fuel slosh to settle before the fail timer	 ≥ 1,024.0 liters < 0.0 liters 18.0 liters	Engine Running No active DTCs: Transfer pump is commanded on for the maximum time limit referenced in **P0461 P2066 P2636 Transfer Pump Enable Time Table** (see Supporting Table) No device control for the transfer pump Fuel volume in secondary tank	 VehicleSpeedSensor_FA < 136 liters	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.
			begins. If the secondary tank volume does not decrease by the cal amount but the primary volume does increase by the cal amount after the fail timer has expired, then P2066 sets. OR ****************************** After a Refuel Event ****************************** If the primary fuel volume changes by 1,024 liters from engine “off” to engine “on” the secondary volume should change by 5 liters. Otherwise, P2066 will set. OR ****************************** Distance Traveled without a Secondary Fuel Level Change ******************************		Vehicle Speed	< 0.0 mph		
			If the vehicle is driven with the fuel consumed by the engine of without the secondary fuel level changing by 5 liters, then the sender must be stuck. OR ****************************** Stuck Above Secondary Full During Fuel Transfer ****************************** The secondary fuel level	30 liters > 136 liters	 Volume in secondary tank Volume in secondary tank	 ≥ 7 liters < 136 liters		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			AND If the vehicle is driven with the fuel consumed by the engine of without the secondary fuel level changing by 5 liters, then the sender must be stuck.	30 liters	Secondary Fuel Transfer Pump On Time	≥ 600 seconds		

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 2 Circuit Low Voltage (For use on vehicles with dual fuel tanks)	P2067	This DTC will detect a fuel sender stuck out of range low in the secondary fuel tank.	Fuel level Sender % of 5V range	< 10 %			100 failures out of 125 samples 100 ms / sample	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 2 Circuit High Voltage (For use on vehicles with dual fuel tanks)	P2068	This DTC will detect a fuel sender stuck out of range low in the secondary fuel tank.	Fuel level Sender % of 5V range	> 60 %			100 failures out of 125 samples 100 ms / sample	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

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 6 samples 1 sec/ sample Continuous	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

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)	> 200,000 Ohms	Engine run time OR IAT min	> 60.0 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 Sensor Not Plausible) (TSRD	P111E	This DTC detects a difference between ECT and two other temp sensors after a soak condition.	**Sensor usage definitions:** **Sensor1 =** CeECTD_e_ECT_Snsr (Sensor1 is the temp sensor most impacted by the block heater (if equipped)) **Sensor2 =** CeECTD_e_RCT_Snsr **Sensor3 =** CeECTD_e_IAT_Snsr ========== A failure will be reported if any of the following occur: 1) Sensor1 power up absolute temp difference to Sensor2 and Sensor3 is (Sensor1 fast fail) . 2) Sensor1 power up temp is greater than Sensor2 and Sensor3 in this range: (and a block heater has not been detected) 3) Sensor1 power up temp is lower than Sensor2 and Sensor3 by this amount: 4) Sensor1 power up temp is ≥ Sensor2 and	 ≥ 50.0 ºC ≥ 19.3 and < 50.0 ºC ≤ 19.3 Deg ºC	No Active DTC's Engine Off Soak Time Propulsion Off Soak Time Non-volatile memory initization Test complete this trip Test aborted this trip Test disabled this trip Ambient LowFuelCondition Diag ========== Block Heater detection is **enabled** when either of the following occurs: 1) Sensor1 power up temp is greater than Sensor2 and Sensor3 in this range: 2) Cranking time ========== Block Heater is **detected**	VehicleSpeedSensor_FA IAT_SensorCircuitFA THMR_RCT_Sensor_Ckt_FA ECT_Sensor_Ckt_FA EngineModeNotRunTimerError EngineModeNotRunTimer_FA OAT_PtEstFiltFA OAT_PtEstRawFA PSAR_PropSysInactveCrs_FA DRER_DiagSystemDsbl > 28,800 seconds > 0 seconds = Not occurred = False = False = False ≥ -7 ºC = False ========== ≥ 19.3 ºC and < 50.0 ºC < 10.0 Seconds ==========	1 failure to set DTC 1 sec/ sample Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Sensor3 by 19.3 ºC and the time spent cranking the engine without starting is ≥ 10.0 seconds with the LowFuelConditionDiag	= False	and diagnostic is aborted when 1) or 2) occurs. 1a) IAT monitoring is enabled after the following Vehicle drive constraints 1b) Drive time 1c) Vehicle speed 1d) Additional Vehicle drive time is provided to 1b when Vehicle speed is below 1c as follows: 1e) IAT drops from power up IAT 2a) ECT monitoring is enabled after engine start in the following engine run time window 2b) Sensor1 temp derivative during the test is: 2c) Consectutive samples of 2b) being true are: ========== Diagnostic is **aborted** when 3) or 4) occurs: 3) Engine run time with vehicle speed below 1b 4) Engine off time (i.e. auto stop) during Block heater detection	 > 400 Seconds with > 14.9 MPH and 0.00 times the seconds with vehicle speed below 1b ≥ 3.3 ºC 5.0 <= seconds <= 60.0 < -0.12 ºC/sec ≥ 4 samples ========== ≥ 1,800 Seconds ≥ 180.0 Seconds		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Radiator Coolant Temperature Sensor Not Plausible) (TSRD	P112F	This DTC detects a difference between RCT and two other temp sensors after a soak condition.	**Sensor usage definitions:** **Sensor1 =** CeECTD_e_ECT_Snsr (Sensor1 is the temp sensor most impacted by the block heater (if equipped)) **Sensor2 =** CeECTD_e_RCT_Snsr **Sensor3 =** CeECTD_e_IAT_Snsr ================== A failure will be reported if (based on the above calibrations): 1) Sensor2 (if RCT is Sensor2)power up absolute temp difference to Sensor1 and Sensor3 is: OR (based on usage) 2) Sensor3 (if RCT is Sensor3) power up absolute temp difference to Sensor1 and Sensor2 is:	≥ 19.3 ºC ≥ 19.3 ºC	No Active DTC's Engine Off Soak Time Propulsion Off Soak Time Non-volatile memory initization Test complete this trip Test aborted this trip Test disabled this trip Ambient LowFuelCondition Diag	VehicleSpeedSensor_FA IAT_SensorCircuitFA THMR_RCT_Sensor_Ckt_FA ECT_Sensor_Ckt_FA EngineModeNotRunTimerError EngineModeNotRunTimer_FA OAT_PtEstFiltFA OAT_PtEstRawFA PSAR_PropSysInactveCrs_FA DRER_DiagSystemDsbl > 28,800 seconds > 0 seconds = Not occurred = False = False = False ≥ -7 ºC = False	1 failure to set DTC 1 sec/ sample Once per valid cold start	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Replicated Transmission Output Speed (RTOS) Sensor	P150A	No activity in the RTOS Signal circuit	RTOS Sensor Raw Speed	≤ 60 RPM	Transmission output speed angular velocity Engine Speed Vehicle Speed Ignition voltage P150B P0502, P0503, P0722, P0723, P215C, U0101	≥ 500 RPM 200 ≤ RPM ≤ 7,500 for ≥ 5.0 seconds ≤ 511.99 MPH for ≥ 5.0 sec 9.0 ≤ Volts ≤ 32.0 Not failed this key cycle Not Fault Active	≥ 4.5 sec	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Replicated Transmission Output Speed (RTOS) Sensor	P150B	RTOS Signal Circuit Intermittent	RTOS Sensor Loop-to-Loop speed change	≥ 350 RPM	Raw Output Speed Positive Output Speed change Transmission output speed angular velocity Engine Speed Vehicle Speed Ignition voltage	≥ 300 RPM for ≥ 2.0 sec ≤ 150 RPM for ≥ 2.0 sec ≥ 500 RPM 200 ≤ RPM ≤ 7,500 for ≥ 5.0 seconds ≤ 511.99 MPH for ≥ 5.0 sec 9.0 ≤ Volts ≤ 32.0	≥ 3.0 sec	Type B, 2 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 <u>one</u> of two methods based on the following calibration. This application has been calibrated as a Type 0 . <u>Type 0 - Airflow Method:</u> 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. <u>Type 1 - Energy Method:</u> 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 THMR_AHV_FA ≥ 1,800 seconds 30 ≤ Time ≤ 1,370 seconds Ethanol ≤ 87 % -10.0 ≤ ECT ≤ 70.0 °C -7 °C ≤ IAT ≤ 55 °C. ≤ 20 % 25.0 ≤ Airflow ≤ 450.0 gps 250.0 kJ	75 failures out of 100 samples 1 sec/ sample Once per ignition key cycle	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbo/Super Charger Bypass Valve Control Circuit	P0033	Detect Turbocharger Bypass Valve - Open Circuit	ECM detects that commanded and actual states of output driver do not match because the output is open circuit	Open circuit: ≥ 200 K Ω impedence between signal and controller ground	Diagnostic Enabled EnabledPowertrain relay Voltage Ignition run crank voltage Engine is not cranking Diagnostic System not Disabled	False >= 11.0 Volts > 5.00 Volts	50 failures out of 63 samples 100ms / sample	Type B, 2 Trips Note: In certain controllers P0034 may also set (Turbo/ Super Charger Bypass Valve Control Circuit Low)

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbo/Super Charger Bypass Valve Control Circuit Low	P0034	Detect Turbocharger Bypass Valve - Shorted to Ground	ECM detects that commanded and actual states of output driver do not match because the output is shorted to ground	Short to ground: ≤ 0.5 Ω impedence between signal and controller ground	Diagnostic Enabled EnabledPowertrain relay Voltage Ignition run crank voltage Engine is not cranking Diagnostic System not Disabled	False >= 11.0 Volts > 5.00 Volts	50 failures out of 63 samples 100ms / sample	Type B, 2 Trips Note: In certain controllers P0033 may also set (Turbo/ Super Charger Bypass Valve Control Circuit)

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbo/Super Charger Bypass Valve Control Circuit High	P0035	Detect Turbocharger Bypass Valve - Shorted to Power	ECM detects that commanded and actual states of output driver do not match because the output is shorted to power	Short to power: ≤ 0.5 Ω impedence between signal and controller power	Diagnostic Enabled EnabledPowertrain relay Voltage Ignition run crank voltage Engine is not cranking Diagnostic System not Disabled	False >= 11.0 Volts > 5.00 Volts	50 failures out of 63 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.
Internal Control Module SIDI High Pressure Pump min/ max authority	P0089	This DTC Diagnoses pump control windup to its max or min authority	High Pressure Fuel Pump Delivery Angle High Pressure Fuel Pump Delivery Angle	>= 130 ° Or <= 0 °	 Battery Voltage Low Side Fuel Pressure Engine Run Time Barometric Pressure Inlet Air Temp Fuel Temp Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP or TFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) andCam or Crank Sensor Not FA and	High Pressure Pump Performance Diagnostic Enable >= 11 Volts > 0.275 MPa >= **P0089 - P163A - P228C - P228D - P0191 - KtFHPD_t_PumpCntrlEngRunThrsh** (see supporting tables) Enabled when a code clear is not active or not exiting device control Engine is not cranking >= 70.0 KPA >= -10.0 degC -10 <= Temp degC <= 129	Windup High - 750 failures out of 938 samples Windup Low - 750 failures out of 938 Samples 3 samples per engine rotaion	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

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

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
High Pressure Pump Control Solenoid Enable Low Side Open Circuit	P0090	The DTC Diagnoses the High Pressure Pump Control Solenoid Enable Low Side Circuit for circuit faults.	Voltage low during driver off state indicates open circuit	Open Circuit: ≥ 200 K Ω impedance between signal and controller ground	Engine Speed Battery Voltage	>= 50 RPM >= 11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
High Pressure Pump Control Solenoid Enable Low Side Short to Ground	P0091	The DTC Diagnoses the High Pressure Pump Control Solenoid Enable Low Side Circuit for circuit faults.	Voltage low during driver off state indicates short-to-ground	Short to ground: ≤0.1 Amps between signal and controller ground	Engine Speed Battery Voltage	>= 50 RPM >= 11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
High Pressure Pump Cntrl Solenoid Enable Low Side Short to Power	P0092	The DTC Diagnoses the High Pressure Pump Control Solenoid Enable Low Side Circuit for circuit faults.	Voltage high during driver off state indicates short to power	Short to power: ≤1.1 or 15 Amps selectable thershold based on High pressure Pump .	Engine Speed Battery Voltage	>= 50 RPM >= 11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
High Pressure Start Diagnostic	P00C6	The DTC Diagnoses the high side fuel pressure during engine cranking.	The ECM detects that the fuel pressure is not rising or has fallen beyond acceptable limits during engine cranking Pressure Rise Test: High Side Fuel Pressure Pressure Fall Test: High Side Fuel Rail Pressure	 < **P00C6 - KtFHPC_p_HighPressStart** (see Supporting Table) <= **P00C6 - KtFHPD_p_HPS_PressFallLoThrsh** (see Supporting Table)	 Low side feed fuel pressure Engine Run Time Run/Crank Voltage Engine Coolant For each engine start, only 1 diagnostic is performed. The pressure rise test will run if HIgh side fuel pressure is less than KtFHPC_p_HighPressStart, otherwise, the pressure fall diagnostic will run The pressure fall runs when the engine is cranking.	High Pressure Fall Diagnostic during Start Enabled High Pressure Rise Diagnostic during Start Enabled >= 0 KPA < = 0 sec > 8 Volts -100 <= °C <= 129 All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP or TFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) and Cam or Crank Sensor Not FA and IAT, IAT2 and ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not	Pressure Rise Test: Time >= **P00C6 - KtFHPC_t_HighPressStartTmout** (see Supporting Table) 6.25 ms per sample Pressure Fall Test: Injected cylinder events >= **P00C6 - KtFHPD_Cnt_HPS_PressFallLoThrsh** (see Supporting Table) 8 samples per engine rotation	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						active and Device control commanded pressure is false and Device control pump ckt enabled on is false and Engine movement detected is true and Manufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active Barometric Pressure >= 70.0 KPA Inlet Air Temp >= -10.0 DegC		

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Press Regulator Solenoid Supply Voltage Control High Side Circuit Open	P00C8	The DTC Diagnoses the Fuel Press Regulator Solenoid Supply Voltage Control Circuit for circuit faults.	Voltage High during driver off state indicates open circuit	Open circuit: ≥ 200 K Ω impedance between signal and controller ground	Engine Speed Battery Voltage	>= 50 RPM >= 11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Press Regulator Solenoid Supply Voltage Control High Side Circuit Short to ground	P00C9	The DTC Diagnoses the Fuel Press Regulator Solenoid Supply Voltage Control Circuit for circuit faults.	Voltage low during driver on state indicates short to ground	Short to ground: ≤1.1 or 15 Amps selectable thershold based on High pressure Pump.	Engine Speed Battery Voltage	>= 50 RPM >= 11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Press Regulator Solenoid Supply Voltage Control High Side Circuit Short to power	P00CA	The DTC Diagnoses the Fuel Press Regulator Solenoid Supply Voltage Control Circuit for circuit faults.	Voltage high during driver off state indicates short to power	Short to Power: ≤0.1 Amps between signal and controller power	Engine Speed Battery Voltage	>= 50 RPM >= 11 Volts Not in pump device control Enabled when a code clear is not active or not exiting device control	20 failures out of 40 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor 3 Circuit Performance (applications with humidity sensor and manifold temperature sensor)	P00E9	Detects an IAT3 sensor that has stuck in range by comparing to IAT and IAT2 at startup	ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT3)	<= 25 deg C > 25 deg C > 25 deg C	Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B, 2 Trips
			Power Up IAT is between Power Up IAT2 and Power Up IAT3 AND ABS(Power Up IAT2 - Power Up IAT3) AND ABS(Power Up IAT - Power Up IAT3) > ABS(Power Up IAT - Power Up IAT2)	 > 25 deg C	Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA HumTempSnsrCktFA	Executes once at the beginning of each ignition cycle if enable conditions are met	
			Power Up IAT2 is between Power Up IAT and Power Up IAT3 AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 -	 > 25 deg C	Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	> 28,800 seconds >= 11.0 Volts >= 0.9 seconds PowertrainRelayFault ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA	Executes once at the beginning of each ignition cycle if enable conditions are met	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Power Up IAT3) > ABS(Power Up IAT2 - Power Up IAT)			HumTempSnsrCktFA		

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit 3 Low (applications with manifold temperature and humidity)	P00EA	Detects a continuous short to ground in the IAT 3 signal circuit or the IAT 3 sensor	Raw IAT 3 Input	< 57 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

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit 3 High (applications with manifold temperature and humidity)	P00EB	Detects a continuous open circuit in the IAT 3 signal circuit or the IAT 3 sensor	Raw IAT 3 Input	> 162,529 Ohms (~-60 deg C)	Engine Run Time	> 0.00 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor 3 Intermittent In-Range	P00EC	Detects a noisy or erratic IAT 3 signal circuit or IAT 3 sensor	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current IAT 3 reading - IAT 3 reading from 100 milliseconds previous)	> 80.00 deg C 10 consecutive IAT 3 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.
Supercharger Inlet Absolute Pressure (SCIAP) Sensor Performance	P012B	Determines if the Supercharger Inlet Absolute Pressure Sensor input is stuck within the normal operating range	See table **P0101, P0106, P0121, P012B, P1101: Supercharger Intake Flow Rationality Diagnostic Failure Matrix** for combinations of model failures that can set this DTC. TPS model fails when Filtered Throttle Model Error MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered MAP1 model fails when ABS(Measured MAP – MAP Model 1) Filtered MAP2 model fails when ABS(Measured MAP – MAP Model 2) Filtered SCIAP1 model fails when ABS(Measured SCIAP – SCIAP Model 1) Filtered SCIAP2 model fails when ABS(Measured SCIAP – SCIAP Model 2) Filtered	 > 400 kPa*(g/s) > 21.0 grams/sec > 30.0 kPa > 30.0 kPa > 21.0 kPa > 21.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables. -	>= 400 RPM <= 6,200 RPM > -7 Deg C < 129 Deg C > -20 Deg C < 129 Deg C >= 0.50 Modeled Air Flow Error multiplied by **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM** and **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est** MAP Model 1 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM** MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** MAP Model 3 Error multiplied by	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.
						P0101, P0106, P0121, P012B, P0236, P1101: MAP3 Residual Weight Factor based on RPM TIAP Model 1 Error multiplied by **P0101, P0106, P0121, P0236, P1101: TIAP Residual Weight Factor based on RPM** Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM**		
					No Active DTCs: No Pending DTCs:	MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTempSensorFA SCIAP_SensorCircuitFA AmbientAirDefault EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP MnfdTempSensorCktFP SCIAP_SensorCircuitFP		
			Supercharger Inlet Pressure OR Supercharger Inlet Pressure	< 50.0 kPa > 115.0 kPa	Time between current ignition cycle and the last time the engine was running Engine is not rotating	> 8.0 seconds	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.
			OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Supercharger Inlet Pressure - Manifold Pressure) AND ABS(Supercharger Inlet Pressure - Baro Pressure)	 <= 10.0 kPa > 10.0 kPa > 10.0 kPa	No Active DTCs: No Pending DTCs:	EngineModeNotRunTimer Error MAP_SensorCircuitFA SCIAP_SensorCircuitFA AAP2_SnsrCktFA MAP_SensorCircuitFP SCIAP_SensorCircuitFP AAP2_SnsrCktFP		

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Supercharger Inlet Absolute Pressure (SCIAP) Sensor Circuit Low (Gen II)	P012C	Detects a continuous short to low or open in either the signal circuit or the SCIAP sensor.	SCIAP 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

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Supercharger Inlet Absolute Pressure (SCIAP) Sensor Circuit High (Gen II)	P012D	Detects an open sensor ground or continuous short to high in either the signal circuit or the SCIAP sensor.	SCIAP Voltage	> 97.0 % of 5 Volt Range (This is equal to 4.85 Volts, or 124.0 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Sensor "B" Circuit Range/ Performance	P018B	This DTC detects a fuel pressure sensor response stuck within the normal operating range using an intrusive test (see Notes)	Absolute value of fuel pressure change (as sensed during intrusive test)	<= 30 kPa	a] Diagnostic KeFRPD_b _FPSS_DiagEnbld b] Engine Run Time c] Engine Fuel Flow d] Fu Pump Control Enabled e] Fu Pump Control State f] Emissions Fuel Level Low g] Validity status VeFRPD_b_FPSS_ DataIntegrityOK IF [1] FRP Circuit Low Fault Active (DTC P018C) [2] FRP Circuit High Fault Active (DTC P018D) [3] Fu Pump Circuit Low Fault Active (DTC P0231) [4] Fu Pump Circuit High Fault Active (DTC P0232) [5] Fu Pump Circuit Open Fault Active (DTC P023F) [6] Reference Voltage Fault Status (DTC P0641) [7] Fu Pump Control Module Driver Over-temperature Fault Active (DTC P1255) [8] Fu Pump Driver Mod	a] == TRUE b] >= 5 sec c] > calibration value KeFRPD_dm_StkPresMin FuelFlow (0.047 gram/ sec typical) d] == TRUE e] Normal OR Fu Pres Snsr Stk Ctrl (rationality) f] <> TRUE g] == TRUE IF [1] <> TRUE [2] <> TRUE [3] <> TRUE [4] <> TRUE [5] <> TRUE [6] <> Active This Key [7] <> TRUE [8] <> TRUE	1 sample / 12.5 millisec Intrusive Test Duration: Fu Flow -related (5 to 12 sec)	Type B, 2 Trips

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

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Sensor "B" Circuit Low	P018C	This DTC detects if the fuel pressure sensor circuit is shorted low	Fuel Pressure Sensor Voltage Percent, 5.0V Nominal ((Abs(5.0V - SensorV_actual) /5.0V) *100)	< 4.00	Ignition circuit input state	High (Run or Crank)	64 failures / 80 samples 1 sample/12.5 ms	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pressure Sensor "B" Circuit High	P018D	This DTC detects if the fuel pressure sensor circuit is shorted high	Fuel Pressure Sensor Voltage Percent, 5.0V Nominal ((Abs(5.0V - SensorV_actual) /5.0V) *100)	> 96.00	Ignition circuit input state	High (Run or Crank)	64 failures / 80 samples 1 sample/12.5 millisec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SIDI High Pressure Sensor Performance - Dual Sensor	P0191	The DTC Diagnoses a skewed fuel rail sensor 1 via a comparison of sensor 2 continuously when the engine is running and the commanded pressure is steady	Primary sensor (P1) vs. Secondary sensor (P2) performance rationality Low Limit fail Filtered Fuel Control Error (Filtered Absolute delta between sensor1 and sensor2 High Limit Fail: Filtered Fuel Control Error (FIltered Absolute delta between sensor1 and sensor2	Low Limit fail <= **P0191 - KtFHPD_cmp_DPS_FailLoThrsh (Dual sensors)** (See supporting table) >= 1.00 mpa High Limit Fail: >= **P0191 - KtFHPD_cmp_DPS_FailHiThrsh (Dual Sensors)** (see Supporting table) >= 1.00 mpa Note: fuel control error is calcuated based on the squreroot of senor1 divided by sensor2, this value is filter to ensure proper failure	Commanded Pressure rate of change (increasing or dercresing) for a period of time Fuel pump temperature Desired pressure	Dual Analog Pressure Sensor Equipped SIDI High Pressure Sensor Performance Diagnostic Enabled < 0.70 mpa >= 1.25 seconds <= 1,000 degC >= -1.00 mpa Enabled when a code clear is not active or not exiting device control	Filter Fuel Control Error term and Absolute delta between sensor1 and sensor2 exceed Low or High Fail limit for a duration >= 1.50 seconds This is diagnostic runs Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				detection. Absolute delta between sensor1 and sensor2 value is filter to ensure proper failure detection.				

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
High Pressure Sensor Out of Range Low	P0192	This DTC Diagnoses High Pressure Sensor Out of Range Low	High Pressure Fuel Sensor Voltage	<= 5 % of 5Vref	Battery Voltage	SIDI High Pressure Sensor 1 Out of range Time Based Enabled SIDI High Pressure Sensor 1 Out of range Engine Synchronous Enabled >= 11 Volts Engine Running	Both Run Continuously Engine Synchronous Mode 800 failures out of 1,000 samples 8 samples per engine rotation Time Based Mode 400 failures out of 500 samples 6.25 ms Sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
High Pressure Sensor Out of Range High	P0193	This DTC Diagnoses High Pressure Sensor Out of Range High	High Pressure Fuel Sensor Voltage	>= 95 % of 5Vref	Battery Voltage	SIDI High Pressure Sensor 1 Out of range Time Based Enabled SIDI High Pressure Sensor 1 Out of range Engine Synchronous Enabled >= 11 Volts Engine Running	Both Run Continuously Engine Synchronous Mode 800 failures out of 1,000 samples 8 samples per engine rotation Time Based Mode 400 failures out of 500 samples 6.25 ms Sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Oil Temperature (EOT) Circuit Low	P0197	Detects a short to ground in the Engine Oil Temperature (EOT) Sensor signal	Engine Oil Temperature Sensor (EOT) Circuit Resistance	< 25 ohms	Diagnostic Status	Enabled	20 failures out of 50 samples Sampled every 1 second	Type C, No SVS

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Oil Temperature (EOT) Circuit High	P0198	Detects an open circuit or continuous short to high in the Engine Oil Temperature (EOT) Sensor signal	Engine Oil Temperature Sensor (EOT) Circuit Resistance	> 450,000 ohms	Diagnostic Status Engine Run Time OR ECT	Enabled > 20.0 seconds >= -20 Deg C	20 failures out of 50 samples Sampled every 1 second	Type C, No SVS

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 Open Circuit - (SIDI)	P0201	This DTC Diagnoses Injector 1 enable low side driver circuit for circuit faults.	Low current through the low side driver during operation indicates open circuit	Open circuit: ≥ 200 K Ω impedance between signal and controller ground	Battery Voltage Engine Running	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 Open Circuit - (SIDI)	P0202	This DTC Diagnoses Injector 2 enable low side driver circuit for circuit faults.	Low current through the low side driver during operation indicates open circuit	Open circuit: ≥ 200 K Ω impedance between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 Open Circuit - (SIDI)	P0203	This DTC Diagnoses Injector 3 enable low side driver circuit for circuit faults.	Low current through the low side driver during operation indicates open circuit	Open circuit: ≥ 200 K Ω impedance between signal and controller ground	Battery Voltage Engine Running	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 4 Open Circuit - (SIDI)	P0204	This DTC Diagnoses Injector 4 enable low side driver circuit for circuit faults.	Low current through the low side driver during operation indicates open circuit	Open circuit: ≥ 200 K Ω impedance between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 5 Open Circuit - (SIDI)	P0205	This DTC Diagnoses Injector 5 enable low side driver circuit for circuit faults.	Low current through the low side driver during operation indicates open circuit	Open circuit: ≥ 200 K Ω impedance between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Sec P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 6 Open Circuit - (SIDI)	P0206	This DTC Diagnoses Injector 6 enable low side driver circuit for circuit faults.	Low current through the low side driver during operation indicates open circuit	Open circuit: ≥ 200 K Ω impedance between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 7 Open Circuit - (SIDI)	P0207	This DTC Diagnoses Injector 7 enable low side driver circuit for circuit faults.	Low current through the low side driver during operation indicates open circuit	Open circuit: ≥ 200 K Ω impedance between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 8 Open Circuit - (SIDI)	P0208	This DTC Diagnoses Injector 8 enable low side driver circuit for circuit faults.	Low current through the low side driver during operation indicates open circuit	Open circuit: ≥ 200 K Ω impedance between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Secondary Circuit Low	P0231	This DTC detects if the fuel pump control circuit is shorted to low	Power driver output current (Fuel Pump Power Module Driver Circuit Ground Short enumeration)	Current >= 18.0 A (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	a) FPPM configuration KeFRPR_e_ChassisFuel PresSysType b) Diagnostic KeFRPR_b_FPPM_ DrvrGshtDiagEnbld c) Fuel Pump Control Enable command d) Fuel Pump Control Enable time e) System Voltage f] FPPM Driver Status Alive Rolling Count Sample Faulted g] Diagnostic feedback received h] Fuel Pump Power Module output current	a) == CeFRPR_e_ECM_FPPM _Sys b) == TRUE c) == TRUE d) >= calibration value KeFRPR_Cnt_FPPM_ GshtDlyThrsh (0-80 sample loops) e) 9v < System V > 32v f] <> TRUE g] == TRUE h] < 75A	64 failures / 80 samples 1 sample/12.5 millisec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Secondary Circuit High	P0232	This DTC detects if the fuel pump control circuit is shorted to high voltage	Voltage offset relative to low state level of duty cycle pulse measured at fuel pump circuit	> 4.0 V	a) FPPM configuration KeFRPR_e_ChassisFuel PresSysType b) Diagnostic KeFRPR_b_FPPM_ DrvrPshtDiagEnbld c) Fuel Pump Control Enabled d] FPPM Arbitrated Fu Pmp Duty Cycle Rate of Change e] System voltage f] FPPM Driver Status Alive Rolling Count Sample Faulted g] Diagnostic feedback Received	a) == CeFRPR_e_ECM_ FPPM_Sys b) == TRUE c) == TRUE d] >= calibration value KeFRPR_cmp_FPPM_ PshtDC_ROC_Min e] 9v < System V > 32v f] <> TRUE g] == TRUE	64 failures / 80 samples 1 sample / 12.5 millisec	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbo/Super Charger Intercooler Coolant Pump Control Circuit If Intercooler pump are present	P023A	Detect Intercooler Pump - Open Circuit	ECM detects that commanded and actual states of output driver do not match because the output is open circuit	Open circuit: ≥ 200 K Ω impedence between signal and controller ground	Diagnostic Enabled EnabledPowertrain relay Voltage Ignition run crank voltage Engine is not cranking Diagnostic System not Disabled	True >= 11.0 Volts > 5.00 Volts	50 failures out of 63 samples 100ms / sample	Type B, 2 Trips Note: In certain controllers P023B may also set (Turbo/ Super Charger Intercooler Coolant Pump Control Circuit Low)

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbo/Super Charger Intercooler Coolant Pump Control Circuit Low If Intercooler pump are present	P023B	Detect Intercooler Pump - Shorted to Ground	ECM detects that commanded and actual states of output driver do not match because the output is shorted to ground	Short to ground: ≤ 0.5 Ω impedence between signal and controller ground	Diagnostic Enabled EnabledPowertrain relay Voltage Ignition run crank voltage Engine is not cranking Diagnostic System not Disabled	True >= 11.0 Volts > 5.00 Volts	50 failures out of 63 samples 100ms / sample	Type B, 2 Trips Note: In certain controllers P023A may also set (Turbo/ Super Charger Intercooler Coolant Pump Control Circuit)

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbo/Super Charger Intercooler Coolant Pump Control Circuit High If Intercooler pump are present	P023C	Detect Intercooler Pump - Shorted to Power	ECM detects that commanded and actual states of output driver do not match because the output is shorted to power	Short to power: ≤ 0.5 Ω impedence between signal and controller power	Diagnostic Enabled EnabledPowertrain relay Voltage Ignition run crank voltage Engine is not cranking Diagnostic System not Disabled	True >= 11.0 Volts > 5.00 Volts	50 failures out of 63 samples 100ms / sample	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Secondary Circuit Open	P023F	This DTC detects if the fuel pump control circuit is open	Output driver current (Fuel Pump Power Module Driver Circuit Open enumeration)	Current <= 1.0 A (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate)	a) FPPM configuration KeFRPR_e_ChassisFuel PresSysType b) Diagnostic KeFRPR_b_FPPM_ OpenCktDiagEnbld c) Arbitrated Fu Pmp Duty Cycle (%) d] Fuel Pump Control Enable Faulted e] FPPM Fu Pmp Driver Over-temperature Faulted f] FPPM Driver Status Alive Rolling Count Sample Faulted g] Diagnostic feedback received h] System Voltage	a) == CeFRPR_e_ECM_ FPPM_Sys b) == TRUE c) > calibration value KeFRPR_Pct_FPPM_ OpenCktDC_Thrsh (30% - 60%) d] <> TRUE e] <> TRUE f] <> TRUE g] == TRUE h] 9v < System V > 32v	40 test failures / 80 test samples; 1 sample/12.5ms	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

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 (SIDI)	P0261	This DTC Diagnoses Injector 1 enable low side driver circuit for circuit faults.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: ≤1 volt between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

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 (SIDI)	P0262	This DTC Diagnoses Injector 1 enable low side driver circuit for circuit faults.	Voltage High across low side driver during On state indicates short to power	Short to power: 25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

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 (SIDI)	P0264	This DTC Diagnoses Injector 2 enable low side driver circuit for circuit faults.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: ≤1 volt between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

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 (SIDI)	P0265	This DTC Diagnoses Injector 2 enable low side driver circuit for circuit faults.	Voltage High across low side driver during On state indicates short to power	Short to power: 25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

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 (SIDI)	P0267	This DTC Diagnoses Injector 3 enable low side driver circuit for circuit faults.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: ≤1 volt between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

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 (SIDI)	P0268	This DTC Diagnoses Injector 3 enable low side driver circuit for circuit faults.	Voltage High across low side driver during On state indicates short to power	Short to power: 25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger or Supercharger with Intercooler	P026A	Charging Intercooler Efficiency	Manifold Temperature OR Lengthy boost limiting due to elevated manifold temperature	> 200 deg Celsius > 10,000 seconds	Diagnostic Enabled IC Pump Enabled Engine Run Time Coolant Temp No active DTCS:	True 'dynamic' >= 200 seconds >= 129 deg Celsius ECT_Sensor_FA MnfdTempSensorFA	5 failures out of 10 samples. 100ms / sample	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

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 (SIDI)	P0270	This DTC Diagnoses Injector 4 enable low side driver circuit for circuit faults.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: ≤1 volt between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

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 (SIDI)	P0271	This DTC Diagnoses Injector 4 enable low side driver circuit for circuit faults.	Voltage High across low side driver during On state indicates short to power	Short to power: 25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

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 (SIDI)	P0273	This DTC Diagnoses Injector 5 enable low side driver circuit for circuit faults.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: ≤1 volt between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

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 (SIDI)	P0274	This DTC Diagnoses Injector 5 enable low side driver circuit for circuit faults.	Voltage High across low side driver during On state indicates short to power	Short to power: 25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique 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 (SIDI)	P0276	This DTC Diagnoses Injector 6 enable low side driver circuit for circuit faults.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: ≤1 volt between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique 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 power (SIDI)	P0277	This DTC Diagnoses Injector 6 enable low side driver circuit for circuit faults.	Voltage High across low side driver during On state indicates short to power	Short to power: 25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

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 (SIDI)	P0279	This DTC Diagnoses Injector 7 enable low side driver circuit for circuit faults.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: ≤1 volt between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

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 (SIDI)	P0280	This DTC Diagnoses Injector 7 enable low side driver circuit for circuit faults.	Voltage High across low side driver during On state indicates short to power	Short to power: 25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

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 (SIDI)	P0282	This DTC Diagnoses Injector 8 enable low side driver circuit for circuit faults.	Voltage low across low side drive during off state indicates short-to-ground	Short to ground: ≤1 volt between signal and controller ground	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

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 (SIDI)	P0283	This DTC Diagnoses Injector 8 enable low side driver circuit for circuit faults.	Voltage High across low side driver during On state indicates short to power	Short to power: 25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 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 mechanical transfer pump dual fuel tanks)	P0461	This DTC will detect a fuel sender stuck in range in the primary fuel tank.	********** Fuel Level in Primary and Secondary Tanks Remain in an Unreadable Range too Long ********** This subtest is used If fuel volume in primary tank is and fuel volume in secondary tank and remains in this condition for OR ********** After Refuel Event ********** If the secondary fuel volume changes by 10.0 liters from engine “off” to engine “on” the primary volume should change by 3.0 liters. OR ********** Distance Traveled without a Primary Fuel Level Change ********** Delta fuel volume change over 9.6 liters of fuel consumed by the engine.	 ≥ 27.8 liters < 3.0 liters 21.8 liters of fuel consumed by the engine. < 3 liters	Engine Running No active DTCs: The shutdown primary tank volume + 3.0 liters must be	 VehicleSpeedSensor_FA < 27.8 liters	250 ms / sample	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan 1 Relay Control Circuit Open (ODM) (Not used on EREV)	P0480	Diagnoses the cooling fan 1 relay control low side driver circuit for circuit faults	Voltage low during driver off state (indicates open circuit)	Open Circuit: ≥ 200 K Ω impedance between signal and controller ground	Powertrain Relay Voltage	Voltage ≥ 11.00 volts	50 failures out of 63 samples 100 ms / sample	Type B, 2 Trips Note: In certain controllers P0691 may also set (Fan 1 Short to Ground).

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Output Speed Sensor (TOSS)	P0502	No activity in the TOSS circuit	TOSS Raw Speed	≤ 60 RPM	Engine Torque Minimum Throttle opening Engine Speed Ignition voltage PTO EngineTorqureInaccurate P0503	54.0 ≤ N-M ≤ 8,191.8 ≥ 8.0 % 1,500 ≤ RPM ≤ 6,500 9.0 ≤ Volts ≤ 32.00 not active KeETQC_b_MinTransRemedial = TRUE: MSFR_b_EngMisfDtctd_FA, MAFR_b_MAF_SnsrTFTKO, MAPR_b_MAP_SnsrTFTKO KeETQC_b_MinTransRemedial = FALSE: FULR_b_FuelInjCkt_TFTKO, MAFR_b_MAF_SnsrTFTKO, XOYR_b_SecurityFlt, Not failed this key cycle	≥ 4.5 sec	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Output Speed Sensor (TOSS)	P0503	TOSS Signal Intermittent	Loop-to-Loop change in TOSS	≥ 350 RPM	Raw Output SpeedOutput Speed changeTime since transfer case range change Ignition voltage Engine Speed Vehicle Speed PTO	> 300 RPM for ≥ 2.0 sec ≤ 150 RPM for ≥ 2.0 sec ≥ 6.0 sec 9.0 ≤ Volts ≤ 32.00 200 ≤ RPM ≤ 7,500 for ≥ 5.0 seconds ≤ 511.99 MPH for ≥ 5.0 sec not active	≥ 3.3 sec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cold Start Rough Idle	P050D	Monitors the combustion performance when the cold start emission reduction strategy is active by accumulating and determining the percentage of engine cycles that have less than complete combustion relative to the total number of engine cycles in which Dual Pulse is active.	Deceleration index vs. Engine Speed Vs Engine load Deceleration index calculation is tailored to specific vehicle. Tables used are 1st tables encountered that are not max of range. Undetectable region at a given speed/load point is where all tables are max of range point. see Algorithm Description Document for additional details. Incomplete combustion identified by P0300 threshold tables:	(>Idle SCD AND >Idle SCD ddt Tables) OR (>Idle Cyl Mode AND > Idle Cyl Mode ddt Tables)	Misfire Algorithm Enabled (Refer to P0300 for Enablement Requirements) OBD Manufacturer Enable Counter To enable the diagnostic, the Cold Start Emission Reduction Strategy Must Be Active per the following: Catalyst Temperature AND Engine Coolant AND Engine Coolant AND Barometric Pressure In addition, Dual Pulse Strategy Is Enabled and Active Per the following: Engine Speed Accel Position Engine Run Time For the engine speeds and loads in which Dual Pulse is active:	= 0 < 300.00 degC > 17.00 degC <= 43.00 degC >= 75.00 KPa >= 550.00 RPM <= 1,900.00 RPM <= 1.00 Pct < 100 seconds	Runs once per trip when the cold start emission reduction strategy is active and Dual Pulse is enabled and active. Frequency: 100ms Test completes after Dual Pulse is no longer active OR The first 500 engine cycles have been reached	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Dual Pulse Error induced misfires percentage	>= catalyst damaging misfire		
					Dual Pulse Error induced misfires percentage	< 90% of the maximum achieveable catalyst damaging misfire.		
					Engine Cycles	>= 50 < 501		
					The Cold Start Emission Reduction strategy must not be exiting. The strategy will exit per the following:			
					Catalyst Temperature AND Engine Run Time	>= 1,000.00 degC >= 1.00 seconds		
					OR Engine Run Time	> **P050D_P1400_CatalystLightOffExtendedEngineRunTimeExit** This Extended Engine run time exit table is a function of percent ethanol and Catmons NormRatioEWMA. Refer to "Supporting Tables" for details.		
					OR Barometric Pressure	< 75.00 KPa		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Dual Pulse Strategy will exit per the following:			
					Engine Speed OR Accel Position	> 2,000.00 RPM > 3.00 Pct		
					Engine Run Time	>= 100 seconds		
					Dual Pulse Strategy will also exit if the any of the "Additional Dual Pulse Enabling Criteria" is not satisfied:			
					"Additional Dual Pulse Enabling Criteria":			
					Green Engine Enrichment	Not Enabled		
					Misfire Converter Protection strategy	Not being requested		
					Engine Metal Overtemp strategy	Not being requested		
					Fuel control state	Open Loop		
					Output State Control	Not being requested for fuel		
					DOD Or DFCO	Not Active		
					Power Enrichment	Not Active		
					Dynamic Power Enrichment	Not Active		
					Piston Protection	Not Active		
					Hot Coolant Enrichment	Not Active		

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Oil Pressure (EOP) Sensor Performance - Two Stage Oil Pump	P0521	Determines if the Engine Oil Pressure (EOP) Sensor is stuck or biased in range	**Two Stage Oil Pump EOP Sensor Test with Engine Running** If enabled: <u>To Fail when previously passing with the engine running:</u> Filtered Engine Oil Pressure below expected threshold OR Filtered Engine Oil Pressure above expected threshold <u>To pass when previously failing:</u> Filtered Engine Oil Pressure above low threshold plus an offset OR	 Filtered Oil Pressure < **P0521_LowMinOilPresFail - Two Stage Oil Pump** OR Filtered Oil Pressure > (**P0521_P06DD_P06DE_OP_HiStatePressure** * 1.25 + 75.0 kPa) Filtered Oil Pressure > (10.0 kPa+ **P0521_LowMinOilPresFail - Two Stage Oil Pump**) OR	Two Stage Oil Pump is Present = TRUE Engine Running Diagnostic Status Engine Off Rationality Test Diagnostic Reporting Status Oil Pressure Sensor In Use Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 8,000 RPM for longer than 65,000.0 seconds) Filtered Engine Speed within range Modelled Oil Temperature within range No active DTC's	TRUE Enabled Test not report a fail state Yes ≥ 60.0 seconds ≥ 70.0 kPa FALSE 1,000 RPM ≤ Filtered Engine Speed ≤ 6,000 RPM 60.0 deg C ≤ Oil Temp ≤ 100.0 deg C Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA CrankSensor_FA	 ≥ 40 errors out of 50 samples. Performed every 100 msec ≥ 10 passes out of 50 samples. Performed every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Filtered Engine Oil Pressure below high threshold minus an offset	Filtered Oil Pressure < (**P0521_P06DD_P06DE_OP_HiStatePressure** * 1.25 + 75.0 kPa) - 10.0 kPa (Details on Supporting Tables Tab: **P0521_LowMinOilPresFail - Two Stage Oil Pump P0521_P06DD_P06DE_OP_HiStatePressure**)				
			Two Stage Oil Pump EOP Sensor Test with Engine Off If enabled: <u>To Fail when previously passing with the engine off:</u> Filtered Engine Oil Pressure greater than threshold	 Filtered Oil Pressure ≥ 40.0 kPa	Two Stage Oil Pump is Present = TRUE Engine Off Rationality Test Diagnostic Status Engine Running Rationality Test Diagnostic Status Modelled Oil Temperature No Engine Movement No active DTC's	TRUE Enabled Test not report a fail state ≥ 60.0 deg C > 10.0 seconds EngineModeNotRunTimer_FA EngOilTempFA EngOilPressureSensorCktFA CrankSensor_FA	≥ 20 errors out of 40 samples. Run once per trip	

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control On Switch Circuit	P0565		Cruise Control On 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 20.00 seconds	MIL Type C, No SVS

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Cancel Switch Circuit	P056C		Cruise Control Cancel 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 20.00 seconds	MIL: Type C, No SVS

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Multi-function Circuit Low Voltage	P0580	detects short to ground failure for cruise multi-function switch circuit	Cruise Control analog circuit voltage must be in an "Open Short To Ground" 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 2.00 seconds	MIL: Type C, No SVS

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Multi-function Circuit High Voltage	P0581		Cruise Control analog circuit voltage must be in an "Short To Power" 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 2.00 seconds	MIL: Type C, No SVS

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Fuel Injector Control Performance	P062B	This DTC Diagnoses the internal fuel injctor control module circuit for circuit faults.	Internal ECU Boost Voltage OR Internal ECU Boost Voltage OR Driver Status OR Driver Status	>= 90 Volts <= 40 Volts = Not Ready = Uninitialized	Battery Voltage	>= 8 or >= 11 Enabled when a code clear is not active or not exiting device control Engine is not cranking Powertrain Relay Voltage within range	High Voltage - 160 failures out of 200 samples Low Voltage - 160 failures out of 200 samples Driver Status Not Ready- 160 failures out of 200 samples Driver Status Uninitialized - Uninitialized state for >= 100 counts All at 12.5ms per sample	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan 1 Relay Control Circuit Low Voltage (ODM)	P0691	Diagnoses the cooling fan 1 relay control low side driver circuit for circuit faults	Voltage low during driver off state (indicates short-to-ground)	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	Powertrain Relay Voltage	Voltage ≥ 11.00 volts	50 failures out of 63 samples 100 ms / sample	Type B, 2 Trips Note: In certain controllers P0480 may also set (Fan 1 Open Circuit).

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan 1 Relay Control Circuit High Voltage (ODM)	P0692	Diagnoses the cooling fan 1 relay control low side driver circuit for circuit faults	Voltage high during driver on state (indicates short to power)	Short to power: ≤ 0.5 Ω impedance between signal and controller power	Powertrain Relay Voltage	Voltage ≥ 11.00 volts	50 failures out of 63 samples 100 ms / sample	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Two Stage Oil Pump Control Circuit Open	P06DA	Diagnoses the two stage oil pump low side driver for open circuit fault	Voltage low during driver off state (indicates an open circuit)	Open Circuit ≥ 200 k Ω impedance between signal and controller ground	Diagnostic Status Powertrain Relay Voltage Run/Crank Active Cranking State	Enabled ≥ 11.00 = True = False	>= 40 errors out of 50 samples. Performed every 100 msec	Type B, 2 Trips Note: In certain controllers P06DB may also set (Two Stage Oil Pump Control Circuit Short To Ground)

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Two Stage Oil Pump Control Circuit Short To Ground	P06DB	Diagnoses the two stage oil pump low side driver for Short to Ground circuit fault	Voltage low during driver off state (indicates an short circuit to Ground)	Short to Ground Circuit ≤ 0.5 Ω impedance between signal and controller ground	Diagnostic Status Powertrain Relay Voltage Run/Crank Active Cranking State	Enabled ≥ 11.00 = True = False	>= 40 errors out of 50 samples. Performed every 100 msec	Type A, 1 Trips Note: In certain controllers P06DA may also set (Two Stage Oil Pump Control Circuit Open)

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Two Stage Oil Pump Control Circuit Short To Power	P06DC	Diagnoses the two stage oil pump low side driver for Short to Power circuit fault	Voltage low during driver on state (indicates an short to power)	Short to Power ≤ 0.5 Ω impedance between signal and controller power	Diagnostic Status Powertrain Relay Voltage Run/Crank Active Cranking State	Enabled ≥ 11.00 = True = False	>= 40 errors out of 50 samples. Performed every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Two Stage Oil Pump Control Circuit Performance - One Sided	P06DD	Diagnoses the two stage oil pump is stuck in the high pressure state	<u>Fail from passing state:</u> Oil Pressure delta is less than a minimum delta pressure on a state change and the measured filtered oil pressure is above a threshold	Oil Pressure delta = ABS [Filtered Oil Pressure at beginning of state change - filtered oil pressure after 1.7 seconds] Oil Pressure delta < **P06DD_P06DE_OP_StateChangeMin** AND Filtered Oil Pressure ≥ **P06DD_P06DE_MinOilPressThresh** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_OP_StateChangeMin** **P06DD_P06DE_MinOilPressThresh**)	<u>Common Criteria:</u> Two Stage Oil Pump is Present Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 8,000 RPM for longer than 65,000.0 seconds) No active DTC's for diagnsotic enable: Check oil pump TFTKO as a diagnostic enable when Enabled. No active DTC's for control enable: <u>Active Criteria:</u> One Sided Performance Test = Enabled	TRUE ≥ 60.0 seconds ≥ 70.0 kPa FALSE Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA CrankSensor_FA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA Enabled : OilPmpTFTKO Enabled Fault bundles for control disable : OilPmpTFTKO EngineTorqueEstInaccurate EngOilPressureSensorFA PowertrainRelayFault CrankSensor_FA EngOilTempFA Enabled	≥ 12 errors out of 15 samples. Run once per trip or activiated by the Passive Test	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Oil Pump in Low State	> 1.7 seconds		
					Modelled Oil Temperature within range	60.0 deg C ≤ Oil Temp ≤ 110.0 deg C		
					Filtered Engine Speed within range	1,250 RPM ≤ Filtered Engine Speed ≤ 4,000 RPM		
					Engine Torque within range	**P06DD_P06DE_MinEnableTorque_OP** ≤ Indicated Requested Engine Torque ≤ **P06DD_P06DE_MaxEnableTorque_OP** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_MinEnableTorque_OP** **P06DD_P06DE_MaxEnableTorque_OP**)		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds] ≤ 250 RPM		
					Filtered Oil Pressure within range	Filtered Engine Oil Pressure > **P06DD_P06DE_MinOilPressThresh** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_MinOilPressThresh**)		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Expected Oil Pressure Delta within range	65.0 kPa < ABS[**P0521_P06DD_P06DE_OP_HiStatePressure** - **P06DD_P06DE_OP_LoStatePressure**] < 125.0 kPa		
					<u>Passive Criteria:</u>			
					Active Test Passed	TRUE		
					Filtered Engine Speed within range	1,000 RPM ≤ Filtered Engine Speed ≤ 6,000 RPM		
					Modelled Oil Temperature within range	60.0 deg C ≤ Oil Temp ≤ 100.0 deg C		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.70 seconds] ≤ 1,000 RPM		
					Oil Pressure Delta within a range	Oil Pressure Delta < **P06DD_P06DE_OP_StateChangeMin** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_OP_StateChangeMin**)		
			<u>Fast Pass Condition</u> Oil Pressure delta is less than a minimum delta pressure on a state	Oil Pressure delta = ABS [Filtered Oil Pressure at beginning	<u>Common Criteria:</u> Two Stage Oil Pump is Present	TRUE	0 errors out of 5 samples. Run once per trip	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			change and the measured filtered oil pressure is above a threshold	of state change - filtered oil pressure after 1.7 seconds] Oil Pressure delta < **P06DD_P06DE_OP_StateChangeMin** AND Filtered Oil Pressure ≥ **P06DD_P06DE_MinOilPressThresh** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_OP_StateChangeMin** **P06DD_P06DE_MinOilPressThresh**)	Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 8,000 RPM for longer than 65,000.0 seconds) No active DTC's for diagnsotic enable: Check oil pump TFTKO as a diagnostic enable when Enabled. No active DTC's for control enable: <u>Active Criteria:</u> One Sided Performance Test = Enabled Oil Pump in Low State Modelled Oil Temperature within range	≥ 60.0 seconds ≥ 70.0 kPa FALSE Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA CrankSensor_FA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA Enabled : OilPmpTFTKO Enabled Fault bundles for control disable : OilPmpTFTKO EngineTorqueEstInaccurate EngOilPressureSensorFA PowertrainRelayFault CrankSensor_FA EngOilTempFA Enabled > 1.7 seconds 60.0 deg C ≤ Oil Temp ≤ 110.0 deg C	or activiated by the Passive Test	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Filtered Engine Speed within range	1,250 RPM ≤ Filtered Engine Speed ≤ 4,000 RPM		
					Engine Torque within range	**P06DD_P06DE_MinEnableTorque_OP** ≤ Indicated Requested Engine Torque ≤ **P06DD_P06DE_MaxEnableTorque_OP** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_MinEnableTorque_OP** **P06DD_P06DE_MaxEnableTorque_OP**)		
					Expected Oil Pressure Delta within range	65.0 kPa < ABS[**P0521_P06DD_P06DE_OP_HiStatePressure** - **P06DD_P06DE_OP_LoStatePressure**] < 125.0 kPa		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds] ≤ 250 RPM		
					Filtered Oil Pressure within range	Filtered Engine Oil Pressure > **P06DD_P06DE_MinOilPressThresh** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_MinOilPressThresh**)		

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear 6 incorrect ratio	P0729	Detects when the N/V gear ratio indicates 6th gear but the Gear Position Sensor does not indicate 6th gear	Gear Position Sensor	≠ Gear 6	Gear Position Sensor learn status Ignition voltage Ignition voltage Engine Torque Inaccurate Engine actual torque Transmission output speed Throttle position Clutch pedal displacement If four wheel drive low AND Transmission gear ratio Transmission gear ratio If four wheel drive low AND Transmission gear ratio Transmission gear ratio The above conditions are met for DTC's Not Set	= Learned ≥ 9.00 volts ≤ 32.00 volts = False ≥ 50.00 Nm ≥ 120.00 rpm ≥ 8.00 Pct ≤ 10.00 Pct = TRUE ≥ 5.00 ratio < 5.50 ratio = FALSE ≥ 0.64 ratio < 0.71 ratio ≥ 1.50 seconds TransmissionOutputRotationalStatusValidity EngineTorqueEstInaccurate ClutchPstnSnsr FA ClutchPstnSnsrNotLearned P18C4 P18C5 P18C6	≥ 1.00 seconds Once the above fail time is achieved then increment the fail counter once ≥ 1.00 fail counts	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P18C7 P18C8 P2771		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear 1 incorrect ratio	P0731	Detects when the N/V gear ratio indicates 1st gear but the Gear Position Sensor does not indicate 1st gear	Gear Position Sensor	≠ Gear 1	Gear Position Sensor learn status Ignition voltage Ignition voltage Engine Torque Inaccurate Engine actual torque Transmission output speed Throttle position Clutch pedal displacement If four wheel drive low AND Transmission gear ratio Transmission gear ratio If four wheel drive low AND Transmission gear ratio Transmission gear ratio The above conditions are met for DTC's Not Set	= Learned ≥ 9.00 volts ≤ 32.00 volts = False ≥ 50.00 Nm ≥ 120.00 rpm ≥ 8.00 Pct ≤ 10.00 Pct = TRUE ≥ 5.00 ratio < 5.50 ratio = FALSE ≥ 2.18 ratio < 2.40 ratio ≥ 1.50 seconds TransmissionOutputRotationalStatusValidity EngineTorqueEstInaccurate ClutchPstnSnsr FA ClutchPstnSnsrNotLearned P18C4 P18C5 P18C6	≥ 1.00 seconds Once the above fail time is achieved then increment the fail counter once ≥ 1.00 fail counts	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P18C7 P18C8 P2771		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear 2 incorrect ratio	P0732	Detects when the N/V gear ratio indicates 2nd gear but the Gear Position Sensor does not indicate 2nd gear	Gear Position Sensor	≠ Gear 2	Gear Position Sensor learn status Ignition voltage Ignition voltage Engine Torque Inaccurate Engine actual torque Transmission output speed Throttle position Clutch pedal displacement If four wheel drive low AND Transmission gear ratio Transmission gear ratio If four wheel drive low AND Transmission gear ratio Transmission gear ratio The above conditions are met for DTC's Not Set	= Learned ≥ 9.00 volts ≤ 32.00 volts = False ≥ 50.00 Nm ≥ 120.00 rpm ≥ 8.00 Pct ≤ 10.00 Pct = TRUE ≥ 5.00 ratio < 5.50 ratio = FALSE ≥ 1.53 ratio < 1.69 ratio ≥ 1.50 seconds TransmissionOutputRotationalStatusValidity EngineTorqueEstInaccurate ClutchPstnSnsr FA ClutchPstnSnsrNotLearned P18C4 P18C5 P18C6	≥ 1.00 seconds Once the above fail time is achieved then increment the fail counter once ≥ 1.00 fail counts	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P18C7 P18C8 P2771		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear 3 incorrect ratio	P0733	Detects when the N/V gear ratio indicates 3rd gear but the Gear Position Sensor does not indicate 3rd gear	Gear Position Sensor	≠ Gear 3	Gear Position Sensor learn status Ignition voltage Ignition voltage Engine Torque Inaccurate Engine actual torque Transmission output speed Throttle position Clutch pedal displacement If four wheel drive low AND Transmission gear ratio Transmission gear ratio If four wheel drive low AND Transmission gear ratio Transmission gear ratio The above conditions are met for DTC's Not Set	= Learned ≥ 9.00 volts ≤ 32.00 volts = False ≥ 50.00 Nm ≥ 120.00 rpm ≥ 8.00 Pct ≤ 10.00 Pct = TRUE ≥ 5.00 ratio < 5.50 ratio = FALSE ≥ 1.15 ratio < 1.26 ratio ≥ 1.50 seconds TransmissionOutputRotationalStatusValidity EngineTorqueEstInaccurate ClutchPstnSnsr FA ClutchPstnSnsrNotLearned P18C4 P18C5 P18C6	≥ 1.00 seconds Once the above fail time is achieved then increment the fail counter once ≥ 1.00 fail counts	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P18C7 P18C8 P2771		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear 4 incorrect ratio	P0734	Detects when the N/V gear ratio indicates 4th gear but the Gear Position Sensor does not indicate 4th gear	Gear Position Sensor	≠ Gear 4	Gear Position Sensor learn status Ignition voltage Ignition voltage Engine Torque Inaccurate Engine actual torque Transmission output speed Throttle position Clutch pedal displacement If four wheel drive low AND Transmission gear ratio Transmission gear ratio If four wheel drive low AND Transmission gear ratio Transmission gear ratio The above conditions are met for DTC's Not Set	= Learned ≥ 9.00 volts ≤ 32.00 volts = False ≥ 50.00 Nm ≥ 120.00 rpm ≥ 8.00 Pct ≤ 10.00 Pct = TRUE ≥ 5.00 ratio < 5.50 ratio = FALSE ≥ 0.95 ratio < 1.05 ratio ≥ 1.50 seconds TransmissionOutputRotationalStatusValidity EngineTorqueEstInaccurate ClutchPstnSnsr FA ClutchPstnSnsrNotLearned P18C4 P18C5 P18C6	≥ 1.00 seconds Once the above fail time is achieved then increment the fail counter once ≥ 1.00 fail counts	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P18C7 P18C8 P2771		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear 5 incorrect ratio	P0735	Detects when the N/V gear ratio indicates 5th gear but the Gear Position Sensor does not indicate 5th gear	Gear Position Sensor	≠ Gear 5	Gear Position Sensor learn status Ignition voltage Ignition voltage Engine Torque Inaccurate Engine actual torque Transmission output speed Throttle position Clutch pedal displacement If four wheel drive low AND Transmission gear ratio Transmission gear ratio If four wheel drive low AND Transmission gear ratio Transmission gear ratio The above conditions are met for DTC's Not Set	= Learned ≥ 9.00 volts ≤ 32.00 volts = False ≥ 50.00 Nm ≥ 120.00 rpm ≥ 8.00 Pct ≤ 10.00 Pct = TRUE ≥ 5.00 ratio < 5.50 ratio = FALSE ≥ 0.77 ratio < 0.85 ratio ≥ 1.50 seconds TransmissionOutputRotationalStatusValidity EngineTorqueEstInaccurate ClutchPstnSnsr FA ClutchPstnSnsrNotLearned P18C4 P18C5 P18C6	≥ 1.00 seconds Once the above fail time is achieved then increment the fail counter once ≥ 1.00 fail counts	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P18C7 P18C8 P2771		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear 7 incorrect ratio	P076F	Detects when the N/V gear ratio indicates 7th gear but the Gear Position Sensor does not indicate 7th gear	Gear Position Sensor	≠ Gear 7	Gear Position Sensor learn status Ignition voltage Ignition voltage Engine Torque Inaccurate Engine actual torque Transmission output speed Throttle position Clutch pedal displacement If four wheel drive low AND Transmission gear ratio Transmission gear ratio If four wheel drive low AND Transmission gear ratio Transmission gear ratio The above conditions are met for DTC's Not Set	= Learned ≥ 9.00 volts ≤ 32.00 volts = False ≥ 50.00 Nm ≥ 120.00 rpm ≥ 8.00 Pct ≤ 10.00 Pct = TRUE ≥ 5.00 ratio < 5.50 ratio = FALSE ≥ 0.43 ratio < 0.48 ratio ≥ 1.50 seconds TransmissionOutputRotationalStatusValidity EngineTorqueEstInaccurate ClutchPstnSnsr FA ClutchPstnSnsrNotLearned P18C4 P18C5 P18C6	≥ 1.00 seconds Once the above fail time is achieved then increment the fail counter once ≥ 1.00 fail counts	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P18C7 P18C8 P2771		

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reverse Inhibit Control Circuit Open (Manual Transmission Only)	P0801	Diagnoses reverse inhibit control circuit for open faults	Reverse inhibit control open circuit	Controller internal diagnostic	Reverse inhibit control open circuit diagnostic enabled Run/Crank Run/Crank Voltage Engine Speed	= 1.00 = TRUE 9 volts ≤ Voltage ≤ 32 volts > 250 RPM	20.00 failures out of 25.00 samples 250 ms / sample	Type C, No SVS

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Skip Shift Solenoid Control Circuit Open (Manual Transmission Only)	P0803	Diagnoses the skip shift solenoid 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 Engine Speed	9 volts ≤ Voltage ≤ 32 volts > 250 RPM	5 failures out of 6 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P080C may also set (Skip Shift Solenoid Circuit Short to Ground).

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Clutch Pedal Position Sensor Circuit Range / Performance	P0806	Detects if Clutch Pedal Position Sensor is Stuck in a range indicative of a vehicle NOT in gear, when the vehicle is determined to be in gear. Gear determination is made by verifying that the ratio of engine RPM versus Transmission Output Speed (N/TOS) represents a valid gear.	Filtered Clutch Pedal Position Error when the vehicle is determined to be in gear	> 4 %	N/TOS Ratio: Transfer Case: Vehicle speed: Engine Torque: Clutch Pedal Position: OR No Active DTCs:	Must match actual gear (i.e. vehicle in gear) Not in 4WD Low range > 5.6 MPH > **P0806 EngTorqueThreshold Table** (see Supporting Tables) < **P0806 ResidualErrEnableLow Table** (see Supporting Tables) > **P0806 ResidualErrEnableHigh Table** (see Supporting Tables) ClutchPstnSnsrCktHi FA ClutchPstnSnsrCktLo FA CrankSensor_FA Transmission Output Shaft Angular Velocity Validity VehicleSpeedSensor_FA	25 ms loop Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Clutch Pedal Position Sensor Circuit Low	P0807	Detects Continuous Circuit Out-of-Range Low or Open	Clutch Position Sensor Circuit for	< 4 % of Vref 200 counts out of 250 samples	Engine Not Cranking System Voltage	 > 9.0 Volts	25 ms loop Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Clutch Pedal Position Sensor Circuit High	P0808	Detects Continuous Circuit Out-of-Range High	Clutch Position Sensor Circuit for	> 96 % of Vref 200 counts out of 250 samples	Engine Not Cranking System Voltage	> 9.0 Volts	25 ms loop Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Clutch Pedal Position Not Learned	P080A	Detects Invalid Clutch Pedal Fully Applied Learn Position values	Fully Applied Learn Position OR	< 9.0 % > 36.0 %	OBD Manufacturer's Enable Counter	= 0	250 ms loop Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Skip Shift Solenoid Control Circuit Low (Manual Transmission Only)	P080C	Diagnoses the skip shift solenoid 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 Engine Speed	9 volts ≤ Voltage ≤ 32 volts > 250 RPM	5 failures out of 6 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0803 may also set (Skip Shift Solenoid Circuit Open Circuit).

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Skip Shift Solenoid Control Circuit High (Manual Transmission Only)	P080D	Diagnoses the skip shift solenoid 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 Engine Speed	9 volts ≤ Voltage ≤ 32 volts > 250 RPM	5 failures out of 6 samples 250 ms / sample	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reverse Inhibit Control Circuit Low (Manual Transmissio n Only)	P088C	Diagnoses reverse inhibit control circuit for short to ground faults	Reverse inhibit control circuit short low	Controller internal diagnostic	Reverse inhibit control open circuit diagnostic enabled Run/Crank Run/Crank Voltage Engine Speed	= 1.00 = TRUE 9 volts ≤ Voltage ≤ 32 volts > 250 RPM	20.00 failures out of 25.00 samples 250 ms / sample	Type C, No SVS

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Reverse Inhibit Control Circuit High (Manual Transmission Only)	P088D	Diagnoses reverse inhibit control circuit for short to ground faults	Reverse inhibit control circuit short high	Controller internal diagnostic	Reverse inhibit control open circuit diagnostic enabled Run/Crank Run/Crank Voltage Engine Speed	= 1.00 = TRUE 9 volts ≤ Voltage ≤ 32 volts > 250 RPM	20.00 failures out of 25.00 samples 250 ms / sample	Type C, No SVS

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

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 high side circuit	P1248	This DTC Diagnoses Injector 1 enable low side driver shorted to high side driver circuit faults.	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	Low side shorted to High Side: 25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

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 high side circuit	P1249	This DTC Diagnoses Injector 2 enable low side driver shorted to high side driver circuit faults.	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	Low side shorted to High Side: 25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

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 high side circuit	P124A	This DTC Diagnoses Injector 3 enable low side driver shorted to high side driver circuit faults.	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	Low side shorted to High Side: 25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

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 high side circuit	P124B	This DTC Diagnoses Injector 4 enable low side driver shorted to high side driver circuit faults.	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	Low side shorted to High Side: 25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

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 high side circuit	P124C	This DTC Diagnoses Injector 5 enable low side driver shorted to high side driver circuit faults.	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	Low side shorted to High Side: 25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique 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 high side circuit	P124D	This DTC Diagnoses Injector 6 enable low side driver shorted to high side driver circuit faults.	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	Low side shorted to High Side: 25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 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 high side circuit	P124E	This DTC Diagnoses Injector 7 enable low side driver shorted to high side driver circuit faults.	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	Low side shorted to High Side: 25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 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 high side circuit	P124F	This DTC Diagnoses Injector 8 enable low side driver shorted to high side driver circuit faults.	Voltage high across low side and High side drivers during on state indicates low side shorted to high side	Low side shorted to High Side: 25 amp >= through low side driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Over Temperature	P1255	To detect if an internal fuel pump driver over-temperature condition exists under normal operating conditions	Fuel Pump Driver Circuit Board temperature (FP Driver Overtemperature enumeration)	T>= 160 degC (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate)	a) FPPM configuration KeFRPR_e_ChassisFuel PresSysType b) Diagnostic KeFRPR_b_FPPM_ OvertempDiagEnbld c] FPPM Driver Status Alive Rolling Count Sample Faulted d] Diagnostic feedback received e] System Voltage	a) == CeFRPR_e_ECM _FPPM_Sys b) == TRUE c] <> TRUE d] == TRUE e] 9V < System V < 32V	3 failures / 15 samples 1 sample / 12.5 millisec	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
High Pressure Sensor 2 Out of Range Low - Dual Sensor	P127C	This DTC Diagnoses High Pressure Sensor Out of Range Low	High Pressure Fuel Sensor 2	<= 5 % of 5Vref	Battery Voltage	SIDI High Pressure Sensor 2 Out of range Enabled >= 11 Volts Engine Running	Time Based Mode 400 failures out of 500 samples 6.25 ms per Sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
High Pressure Sensor 2 Out of Range High - Dual Sensor	P127D	This DTC Diagnoses High Pressure Sensor Out of Range High	High Pressure Fuel Sensor 2	>= 95 % of 5Vref	Battery Voltage	SIDI High Pressure Sensor 2 Out of range Enabled >= 11 Volts Engine Running	Time Based Mode 400 failures out of 500 samples 6.25 ms per Sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Module- Ignition Switch Run/ Start Position Circuit Low	P129D	To detect if the Run/ Start position circuit voltage is short to low / open	FPPM Run_Crank Active status	<> ECM Run_Crank Active status	a) FPPM configuration KeFRPR_e_ChassisFuel PresSysType b) Diagnostic KeFRPR_b_FPPM_RunC rnkRatlEnbld c) FPPM Control Status Alive Rolling Count result d) Diagnostic feedback received e) System Voltage	a) == CeFRPR_e_ECM_FPPM _Sys b) == TRUE c) == Valid d) == TRUE e) >= 0.0 v	64 failures / 80 samples 1 sample / 12.5 millisec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Signal Message Counter Incorrect	P129E	To detect if the command message received as serial data from the engine control module is valid	FPPM Received Duty Cycle Rolling Count	<> Transmitted Duty Cycle Rolling Count (ECM) (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	a) FPPM configuration KeFRPR_e_ChassisFuel PresSysType b) Fault state determination enabled c) FPPM Received Duty Cycle Count result d) FPPM Diagnostic feedback received e) CAN communication f) System Voltage	a) == CeFRPR_e_ECM_FPPM _Sys b) == TRUE c) == Valid d) == TRUE e) == Valid f) 9v < Sys Voltage > 32v	64 failures / 80 samples 1 sample / 12.5 millisec	Type B, 2 Trips
			FPPM Received Duty Cycle Protection Value	<> Transmitted Duty Cycle Protection Value (ECM) (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	a) FPPM configuration KeFRPR_e_ChassisFuel PresSysType b) Fault state determination enabled c) FPPM Received Duty Cycle Protection Value result d) FPPM Diagnostic feedback received e) CAN communication f) System Voltage	a) == CeFRPR_e_ECM_FPPM _Sys b) == TRUE c) == Valid d) == TRUE e) == Valid f) 9v < Sys Voltage > 32v	64 failures / 80 samples 1 sample / 12.5 millisec	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Enable Circuit Performance	P12A6	To detect a driver control circuit signal stuck in normal operating range	FPPM Fuel Control Enable Active boolean	<> Fuel Control Enable variable (ECM)	a) FPPM configuration KeFRPR_e_ChassisFuelPresSysType b) Diagnostic KeFRPR_b_FPPM_FuelCntrlEnblEnbld c) FPPM Control Data Rolling Count result d) Diagnostic feedback received e) System Voltage	a) == CeFRPR_e_ECM_FPPM_Sys b) == TRUE c) == Valid d) == TRUE e) >= 9.0 v	40 failures / 80 samples 1 sample / 12.5 millisec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Control Status Signal Message Counter Incorrect	P12A8	To detect if the control status message transmitted as serial data from the driver control module is valid	FPPM Control Status Alive Rolling Count	<> ECM Control Status Alive Rolling Count (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	a) FPPM configuration KeFRPR_e_ChassisFuelPresSysType b) Fault state determination enabled c) FPPM Diagnostic feedback received	a) == CeFRPR_e_ECM_FPPM_Sys b) == TRUE c) == TRUE	64 failures / 80 samples 1 sample / 12.5 millisec	Type B, 2 Trips
			FPPM Power Consumption Alive Rolling Count	<> ECM Power Consumption Alive Rolling Count (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	a) FPPM configuration KeFRPR_e_ChassisFuelPresSysType b) Fault state determination enabled c) FPPM Diagnostic feedback received	a) == CeFRPR_e_ECM_FPPM_Sys b) == TRUE c) == TRUE	64 failures / 80 samples 1 sample / 12.5 millisec	
			FPPM Driver Status Alive Rolling Count	<> ECM Driver Status Alive Rolling Count (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	a) FPPM configuration KeFRPR_e_ChassisFuelPresSysType b) Fault state determination enabled c) FPPM Diagnostic feedback received	a) == CeFRPR_e_ECM_FPPM_Sys b) == TRUE c) == TRUE	64 failures / 80 samples 1 sample / 12.5 millisec	
			FPPM Hardware Status Alive Rolling Count	<> ECM Hardware Status Alive Rolling Count (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate test state)	a) FPPM configuration KeFRPR_e_ChassisFuelPresSysType b) Fault state determination enabled c) FPPM Diagnostic feedback received	a) == CeFRPR_e_ECM_FPPM_Sys b) == TRUE c) == TRUE	64 failures / 80 samples 1 sample / 12.5 millisec	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Coil Positive Voltage Circuit Group 1 * * SIDI ONLY * *	P135A	This diagnostic checks for voltage supply to the Ignition Coils (applicable only for SIDI applications)	Common Enable Criteria		Diagnostic Enabled	Yes	50 Failures out of 63 Samples 6.25 msec rate	Type A, 1 Trips
			Ignition Module Supply Voltage.	< 2.5 Volts				
			Three possible power supply sources for Ignition Coils (only 1 used): Case 1: Battery Case 2: Ignition Run/ Crank Case 3: PT Relay	Ignition Coil Power Source = (see corresponding case specific enable criteria below)	PT Relay			
			Case Specific Enable Criteria	Case 1: Battery	Delay starting at Key-On	5 Engine Revs		
				Case 2: Ignition Run/ Crank	Ignition Run/Crank Voltage	> 5.0 volts		
				Case 3: PT Relay	PT Relay Voltage	> 11.0 volts		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Coil Positive Voltage Circuit Group 2 * * SIDI ONLY * *	P135B	This diagnostic checks for voltage supply to the Ignition Coils (applicable only for SIDI applications)	Common Enable Criteria		Diagnostic Enabled	Yes	50 Failures out of 63 Samples 6.25 msec rate	Type: Type A, 1 Trips
			Ignition Module Supply Voltage.	< 2.5 Volts				
			Three possible power supply sources for Ignition Coils (only 1 used): Case 1: Battery Case 2: Ignition Run/ Crank Case 3: PT Relay	Ignition Coil Power Source = (see corresponding case specific enable criteria below)	PT Relay			
			Additional Case Specific Enable Criteria	Case 1: Battery	Delay starting at Key-On	5 Engine Revs		
				Case 2: Ignition Run/ Crank	Ignition Run/Crank Voltage	> 5.0 volts		
				Case 3: PT Relay	PT Relay Voltage	> 11.0 volts		

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

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 Load RunCrankActive Active DTC	VSS ≥ 5 mph rpm < 8,192 load < 100 = TRUE P0300, MIL Request	40 failures out of 80 samples 250 ms /sample Continuous	Type C, No SVS "Special Type C"

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
ABS System Rough Road Detection Communication Fault	P1381	This diagnostic detects if the rough road information is no longer being received from the ABS controller, and misfire is present. When this occurs, misfire will continue to run. If Misfire P0300 then sets while the communication fault is present, P1381 will set as a diagnostic aid.	Loss of GMLan Message: "Wheel Sensor Rough Road Magnitude"	= TRUE	Vehicle Speed Engine Speed Engine Load RunCrankActive Active DTC	VSS ≥ 5 mph rpm < 8,192 load < 100 = TRUE P0300, MIL Request	40 failures out of 80 samples 250 ms /sample Continuous	Type C, No SVS "Special Type C"

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Analog Mode Switch Circuit Low	P159F	This DTC will detect an analog mode switch input that is too low out of range.	Analog Mode Switch % of 5V range The normal operating range of the analog mode switch is: Switch depressed % of 5V range: Switch released % of 5V range:	< 24.3 % < 66.8 % ≥ 24.3 % < 94.1 % ≥ 72.8 %			200 failures out of 250 samples 25 ms / sample	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Analog Mode Switch Circuit High	P15A0	This DTC will detect an analog mode switch input that is too high out of range.	Analog Mode Switch % of 5V range The normal operating range of the analog mode switch is: Switch depressed % of 5V range: Switch released % of 5V range:	≥ 94.1 % < 66.8 % ≥ 24.3 % < 94.1 % ≥ 72.8 %			200 failures out of 250 samples 25 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Analog Mode Switch Performance	P15A1	This DTC will detect an analog mode switch input that is in an indeterminate range.	Fuel Saver Switch % of 5V is in an indeterminate range: The normal operating range of the fuel saver mode switch is: Switch depressed % of 5V range: Switch released % of 5V range:	66.8 % ≤ % of 5 volts < 72.8 % < 66.8 % ≥ 24.3 % < 94.1 % ≥ 72.8 %			200 failures out of 250 samples 25 ms / sample	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 SIDI High Pressure Pump current monitor	P163A	This DTC Diagnoses the current from the control area and compares it with calibrated thresholds to set current high and low flags	SIDI fuel pump High Current Test Current SIDI fuel pump Low Current Test Current	 >= 11.00 Amps <= 0.10 Amps	Battery Voltage Low Side Fuel Pressure Engine Run Time Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP or TFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) and Cam or Crank Sensor Not FA and IAT,IAT2,ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and Device control commanded pressure is false and Device control pump ckt enabled on is false andEngine movement	>= 11 Volts > 0.275 MPa >= **P0089 - P163A - P228C - P228D - P0191 - KtFHPD_t_PumpCntrlEngRunThrsh** (see supporting tables) Enabled when a code clear is not active or not exiting device control Engine is not cranking	Current High - 750 failures out of 938 samples Current Low - 750 failures out of 938 Samples 3 samples per engine rotaion	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					detected is true and Manufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active and Barometric Pressure Inlet Air Temp Fuel Temp	 >= 70.0 KPA >= -10.0 degC -10 <= Temp degC <= 129		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear Position Sensor Circuit A Low	P18C4	Detects when the Gear Position Sensor Circuit A is failed low	Sensor type used If sensor type = Direct Proportional and Gear Position Sensor A duty cycle If sensor type = Indrect Proportional and Gear Position Sensor A duty cycle	CeSPMI_e_VoltageDirectProp ≤ 9.00 Pct ≥ 9.00 Pct	 Ignition voltage Ignition voltage	 ≥ 9.00 volts ≤ 32.00 volts	≥ 3.00 seconds of fail time out of 5.00 seconds of sample time	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear Position Sensor Circuit A High	P18C5	Detects when the Gear Position Sensor Circuit A is failed high	Sensor type used If sensor type = Direct Proportional and Gear Position Sensor A duty cycle If sensor type = Indrect Proportional and Gear Position Sensor A duty cycle	CeSPMI_e_VoltageDirectProp ≥ 90.00 Pct ≤ 90.00 Pct	Ignition voltage Ignition voltage	≥ 9.00 volts ≤ 32.00 volts	≥ 3.00 seconds of fail time out of 5.00 seconds of sample time	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear Position Sensor Circuit B Low	P18C6	Detects when the Gear Position Sensor Circuit B is failed low	Sensor type used If sensor type = Direct Proportional and Gear Position Sensor B duty cycle If sensor type = Indrect Proportional and Gear Position Sensor B duty cycle	CeSPMI_e_VoltageDirectProp ≤ 9.00 Pct ≥ 9.00 Pct	Ignition voltage Ignition voltage	≥ 9.00 volts ≤ 32.00 volts	≥ 3.00 seconds of fail time out of 5.00 seconds of sample time	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear Position Sensor Circuit B High	P18C7	Detects when the Gear Position Sensor Circuit B is failed high	Sensor type used If sensor type = Direct Proportional and Gear Position Sensor B duty cycle If sensor type = Indrect Proportional and Gear Position Sensor B duty cycle	CeSPMI_e_VoltageDirectProp ≥ 90.00 Pct ≤ 90.00 Pct	Ignition voltage Ignition voltage	≥ 9.00 volts ≤ 32.00 volts	≥ 3.00 seconds of fail time out of 5.00 seconds of sample time	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear Position Sensor Indicates Incorrect Gear Ratio	P18C9	Detects when transmission is in neutral and Gear Position Sensor is not indicating neutral	Gear Position Sensor	= In Gear	Gear Position Sensor learn status Ignition voltage Ignition voltage Transmission output speed Clutch pedal displacement Engine speed DTCs not set	= Learned ≥ 9.00 volts ≤ 32.00 volts ≤ 10.00 rpm ≤ 10.00 pct ≥ 450.00 rpm TransmissionOutputRotationalStatusValidity ClutchPstnSnsr FA ClutchPstnSnsrNotLearned P18C4 P18C5 P18C6 P18C7 P18C8	≥ 3.00 seconds Once the above fail time is achieved then increment the fail counter once ≥ 2.00 fail counts	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Gear Position Sensor Not Learned	P18CA	Detects when the Gear Position Sensor has not been learned	Gear Position Sensor Learn status	= Not Learned	Manufacturer Enable Counter (MEC) Service learn timer The service learn timer will increment while a learn is in progress. If the learn is not completed in less than 120.00 seconds then the learn will abort	= 0 Counts = 0 seconds	Immediate Frequency 500ms	Type A, 1 Trips Note: MIL will be extinguished immediately once sensor is learned

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 2 Performance (For use on vehicles with mechanical transfer pump dual fuel tanks)	P2066	This DTC will detect a fuel sender stuck in range in the secondary fuel tank.	********** Fuel Level in Primary and Secondary Tanks Remain in an Unreadable Range too Long ********** This subtest is used If fuel volume in primary tank is and fuel volume in secondary tank is and remains in this condition for of fuel consumed by the engine. OR ********** Fuel Level is in a Readable Range for both Primary and Secondary Tanks too Long ********** This subtest is used Volume in primary tank is and volume in secondary tank is and remains in this condition for OR ********** Distance Traveled without a Secondary Fuel Level Change	 ≥ 27.8 liters < 3.0 liters 21.8 liters < 28 liters > 3 liters 1,800 seconds	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.
			********** If the vehicle is driven with the fuel consumed by the engine of without the secondary fuel level changing by 3 liters, then the sender must be stuck.	13 liters	Volume in secondary tank	≥ 3.0 liters		

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 2 Circuit Low Voltage (For use on vehicles with dual fuel tanks)	P2067	This DTC will detect a fuel sender stuck out of range low in the secondary fuel tank.	Fuel level Sender % of 5V range	< 10 %			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 2 Circuit High Voltage (For use on vehicles with dual fuel tanks)	P2068	This DTC will detect a fuel sender stuck out of range low in the secondary fuel tank.	Fuel level Sender % of 5V range	> 60 %			100 failures out of 125 samples 100 ms / sample	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 high side circuit shorted to ground	P2147	This DTC Diagnoses Injector 1 high side driver circuit for circuit faults.	Voltage high across High Side Driver during On state indicates short to ground	Short to Ground: 25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 high side circuit shorted to power	P2148	This DTC Diagnoses Injector 1 high side driver circuit for circuit faults.	Voltage low across High side drive during off state indicates short to power.	Short to Power: ≤1 volt between signal and controller power	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 high side circuit shorted to ground	P2150	This DTC Diagnoses Injector 2 high side driver circuit for circuit faults.	Voltage high across High Side Driver during On state indicates short to ground	Short to Ground: 25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 high side circuit shorted to power	P2151	This DTC Diagnoses Injector 2 high side driver circuit for circuit faults.	Voltage low across High side drive during off state indicates short to power.	Short to Power: ≤1 volt between signal and controller power	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 high side circuit shorted to ground	P2153	This DTC Diagnoses Injector 3 high side driver circuit for circuit faults.	Voltage high across High Side Driver during On state indicates short to ground	Short to Ground: 25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 high side circuit shorted to power	P2154	This DTC Diagnoses Injector 3 high side driver circuit for circuit faults.	Voltage low across High side drive during off state indicates short to power.	Short to Power: ≤1 volt between signal and controller power	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 4 high side circuit shorted to ground	P2156	This DTC Diagnoses Injector 4 high side driver circuit for circuit faults.	Voltage high across High Side Driver during On state indicates short to ground	Short to Ground: 25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 4 high side circuit shorted to power	P2157	This DTC Diagnoses Injector 4 high side driver circuit for circuit faults.	Voltage low across High side drive during off state indicates short to power.	Short to Power: ≤1 volt between signal and controller power	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 5 high side circuit shorted to ground	P216B	This DTC Diagnoses Injector 5 high side driver circuit for circuit faults.	Voltage high across High Side Driver during On state indicates short to ground	Short to Ground: 25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 5 high side circuit shorted to power	P216C	This DTC Diagnoses Injector 5 high side driver circuit for circuit faults.	Voltage low across High side drive during off state indicates short to power.	Short to Power: ≤1 volt between signal and controller power	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 6 high side circuit shorted to ground	P216E	This DTC Diagnoses Injector 6 high side driver circuit for circuit faults.	Voltage high across High Side Driver during On state indicates short to ground	Short to Ground: 25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 6 high side circuit shorted to power	P216F	This DTC Diagnoses Injector 6 high side driver circuit for circuit faults.	Voltage low across High side drive during off state indicates short to power.	Short to Power: ≤1 volt between signal and controller power	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 7 high side circuit shorted to ground	P217B	This DTC Diagnoses Injector 7 high side driver circuit for circuit faults.	Voltage high across High Side Driver during On state indicates short to ground	Short to Ground: 25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 7 high side circuit shorted to power	P217C	This DTC Diagnoses Injector 7 high side driver circuit for circuit faults.	Voltage low across High side drive during off state indicates short to power	Short to Power: ≤1 volt between signal and controller power	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 8 high side circuit shorted to ground	P217E	This DTC Diagnoses Injector 8 high side driver circuit for circuit faults.	Voltage high across High Side Driver during On state indicates short to ground	Short to Ground: 25 amp >= through High Side Driver	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 8 high side circuit shorted to power	P217F	This DTC Diagnoses Injector 8 high side driver circuit for circuit faults.	Voltage low across High side drive during off state indicates short to power	Short to Power: ≤1 volt between signal and controller power	Battery Voltage Engine Run Time	>= 11 Volts >= 0 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	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 (supercharged)	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 OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Supercharger Inlet Pressure - Manifold Pressure) AND ABS(Supercharger Inlet Pressure - Baro Pressure)	< 50.0 kPa > 115.0 kPa > 10.0 kPa <= 10.0 kPa > 10.0 kPa	Time between current ignition cycle and the last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	> 8.0 seconds EngineModeNotRunTimer Error MAP_SensorCircuitFA SCIAP_SensorCircuitFA AAP2_SnsrCktFA MAP_SensorCircuitFP SCIAP_SensorCircuitFP AAP2_SnsrCktFP	4 failures out of 5 samples 1 sample every 12.5 msec	

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure (BARO) Sensor Circuit Low (boosted applications, Gen II)	P2228	Detects a continuous short to low or open in either the signal circuit or the BARO sensor.	BARO Voltage	< 40.0 % of 5 Volt Range (2.0 Volts = 50.9 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 (boosted applications, Gen II)	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 = 115.0 kPa)			320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

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)	> 150 kPa 80 consecutive BARO samples			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.
SIDI High Pressure Pump	P228C	This DTC Diagnoses the measured fuel rail pressure bias too low from desired fuel pressure.	Desired Pressure - Measure Pressure	>= 3.00 Mpa	Battery Voltage Low Side Fuel Pressure Engine Run Time Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP or TFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) andCam or Crank Sensor Not FA and IAT,IAT2,ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and Device control commanded pressure is false and Device control pump ckt enabled on is false and Engine movement	High Pressure Pump Performance Diagnostic Enable >= 11 Volts > 0.275 MPa >= **P0089 - P163A - P228C - P228D - P0191 - KtFHPD_t_PumpCntrlEngRunThrsh** (see supporting tables) Enabled when a code clear is not active or not exiting device control Engine is not cranking	Pressure Error - 750 0 failures out of 938 samples 3 samples per engine rotaion	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					detected is true and Manufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active Barometric Pressure Inlet Air Temp Fuel Temp	 >= 70.0 KPA >= -10.0 degC -10 <=Temp degC <= 129		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
SIDI High Pressure Pump	P228D	This DTC Diagnoses the measured fuel rail pressure bias too high from desired fuel pressure	Desired Pressure - Measure Pressure	<= -3.00 Mpa		High Pressure Pump Performance Diagnostic Enable	Pressure Error - 750 failures out of 938 samples	Type A, 1 Trips
					Battery Voltage	>= 11 Volts	3 samples per engine rotaion	
					Low Side Fuel Pressure	> 0.275 MPa		
					Engine Run Time	>= **P0089 - P163A - P228C - P228D - P0191 - KtFHPD_t_PumpCntrlEngRunThrsh** (see supporting tables)		
					Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP or TFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) and Cam or Crank Sensor Not FA and IAT,IAT2,ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and Device control	Enabled when a code clear is not active or not exiting device control Engine is not cranking		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					commanded pressure is false and Device control pump ckt enabled on is false and Engine movement detected is true andManufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active Barometric Pressure Inlet Air Temp Fuel Temp	 >= 70.0 KPA >= -10.0 DegC -10 <= Temp degC <= 129		

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump "A" Low Flow / Performance	P2635	This DTC detects degradation in the performance of the SIDI electronically regulated fuel system	Filtered fuel rail pressure error	<= Low Threshold (see Supporting Calibration tab) OR >= High Threshold (see Supporting Calibration tab) (tabulated result: function of desired fuel rail pressure and fuel flow rate)	a] Fu Rail Pres Snsr Circuit Low Fault Active (DTC P018C) b] Fu Rail Pres Snsr Circuit High Fault Active (DTC P018D) c] Fu Rail Pres Snsr Perf Fault Active (DTC P018B) d] Fu Pump Circuit Low Fault Active (DTC P0231) e] Fu Pump Circuit High Fault Active (DTC P0232) f] Fu Pump Circuit Open Fault Active (DTC P023F) g] Reference Voltage Fault Status (DTC P0641) h] Fu Pump Driver Control Module Overtemperature Fault Active (DTC P1255) j] Barometric Pressure Signal Valid (PPEI $4C1) k] Engine run time l] Emissions Fuel Level Low (PPEI $3FB) m] Fu Pump Control Enabled	a] <> TRUE b] <> TRUE c] <> TRUE d] <> TRUE e] <> TRUE f] <> TRUE g] <> Active This Key h] <> TRUE j] == TRUE (for absolute fuel pressure sensor) k] >= 30 sec l] <> TRUE m] == TRUE	1 sample / 12.5 millisec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					n] Fu Pump Control state p] System Voltage q] Fuel flow rate r] Fuel Pressure Control System	n] == Normal p] 11V< System V <32V q1] > 0.047 gram/sec AND q2] <= Max allowed fuel flow rate (function of desired pressure and system voltage)(typically 11-50 gram/sec) r1] Not responding to overperformance due to pressure buildup during Deceleration Fuel Cut Off OR r2] Not responding to a decreasing desired fuel pres commnad		

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Chassis Control Module 1 Requested MIL Illumination	P26C8	Monitors the Chassis Contol Module 1 MIL request line to determine when the Chassis Control Module 1 has detected a MIL illuminating fault.	Chassis Control Module 1 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.
Deactivation System Performance	P3400	Detects a “failed to deactivate” condition when Deactivation Mode is active	Current MAP Model 2 Error AND (All Cylinder MAP Model 2 Error) - (Current MAP Model 2 Error) Where: Current MAP Model 2 Error = (Measured MAP – MAP Model 2) Filtered Where: All Cylinder MAP Model 2 Error = (Measured MAP – MAP Model 2) Filtered stored the last time that all cylinders were active for a time greater than	< -8 kPa > -8 kPa > 2.0 seconds	**ReducedEngineCapacityMode_Enable** = TRUE for a time Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables. No Active DTCs: No Pending DTCs:	> 2.0 seconds >= 400 RPM <= 6,200 RPM > -7 Deg C < 129 Deg C > -20 Deg C < 129 Deg C >= 0.50 MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP	100 failures out of 200 samples Performed every 100 msec	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 1 Deactivation Solenoid Control Circuit/Open	P3401	Diagnoses cylinder 1 deactivation solenoid 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	Diagnostic Status Powertrain Relay Voltage Engine RPM	Enabled ≥ 11.00 volts ≥ 400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips Note: In certain controllers P3403 may also set (Cylinder 1 Deactivation Solenoid Control Circuit/ Low)

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 1 Deactivation Solenoid Control Circuit/Low	P3403	Diagnoses cylinder 1 deactivation solenoid control low side driver circuit for circuit faults	Voltage low during driver off state (indicates an short circuit to Ground)	Short to Ground Circuit ≤ 0.5 Ω impedance between signal and controller ground	Diagnostic Status Powertrain Relay Voltage Engine RPM	Enabled ≥ 11.00 volts ≥ 400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips Note: In certain controllers P3401 may also set (Cylinder 1 Deactivation Solenoid Control Circuit/ Open)

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 1 Deactivation Solenoid Control Circuit/High	P3404	Diagnoses cylinder 1 deactivation solenoid control low side driver circuit for circuit faults	Voltage low during driver on state (indicates an short to power)	Short to Power ≤ 0.5 Ω impedance between signal and controller power	Diagnostic Status Powertrain Relay Voltage Engine RPM	Enabled ≥ 11.00 volts ≥ 400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 4 Deactivation Solenoid Control Circuit/Open	P3425	Diagnoses cylinder 4 deactivation solenoid 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	Diagnostic Status Powertrain Relay Voltage Engine RPM	Enabled ≥ 11.00 volts ≥ 400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips Note: In certain controllers P3427 may also set (Cylinder 4 Deactivation Solenoid Control Circuit/ Low)

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 4 Deactivation Solenoid Control Circuit/Low	P3427	Diagnoses cylinder 4 deactivation solenoid control low side driver circuit for circuit faults	Voltage low during driver off state (indicates an short circuit to Ground)	Short to Ground Circuit ≤ 0.5 Ω impedance between signal and controller ground	Diagnostic Status Powertrain Relay Voltage Engine RPM	Enabled ≥ 11.00 volts ≥ 400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips Note: In certain controllers P3425 may also set (Cylinder 4 Deactivation Solenoid Control Circuit/ Open)

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 4 Deactivation Solenoid Control Circuit/High	P3428	Diagnoses cylinder 4 deactivation solenoid control low side driver circuit for circuit faults	Voltage low during driver on state (indicates an short to power)	Short to Power ≤ 0.5 Ω impedance between signal and controller power	Diagnostic Status Powertrain Relay Voltage Engine RPM	Enabled ≥ 11.00 volts ≥ 400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 7 Deactivation Solenoid Control Circuit/Open	P3449	Diagnoses cylinder 7 deactivation solenoid 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	Diagnostic Status Powertrain Relay Voltage Engine RPM	Enabled ≥ 11.00 volts ≥ 400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips Note: In certain controllers P3451 may also set (Cylinder 7 Deactivation Solenoid Control Circuit/ Low)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 7 Deactivation Solenoid Control Circuit/Low	P3451	Diagnoses cylinder 7 deactivation solenoid control low side driver circuit for circuit faults	Voltage low during driver off state (indicates an short circuit to Ground)	Short to Ground Circuit ≤ 0.5 Ω impedance between signal and controller ground	Diagnostic Status Powertrain Relay Voltage Engine RPM	Enabled ≥ 11.00 volts ≥ 400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips Note: In certain controllers P3449 may also set (Cylinder 7 Deactivation Solenoid Control Circuit/ Open)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 7 Deactivation Solenoid Control Circuit/High	P3452	Diagnoses cylinder 7 deactivation solenoid control low side driver circuit for circuit faults	Voltage low during driver on state (indicates an short to power)	Short to Power ≤ 0.5 Ω impedance between signal and controller power	Diagnostic Status Powertrain Relay Voltage Engine RPM	Enabled ≥ 11.00 volts ≥ 400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Chassis Control Module A	U012A	This DTC monitors for a loss of communication with the Chassis Control Module A.	Message is not received from controller for Message $4DB	≥ 12.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 0 (1 indicates enabled) = Active > 11.00 Volts > 0.4000 seconds	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					U012A CHCM A	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.
Outside Air Temperature (OAT) Sensor Circuit Performance (OAT wired to ECM)	P0071	Detects an OAT sensor that has stuck in range by comparing to IAT when conditions are appropriate	OAT-to-IAT engine off equilibrium counter (see below for description of this counter) If IAT >= OAT: IAT - OAT If IAT < OAT: OAT - IAT The "OAT-to-IAT engine off equilibrium counter" is a counter that is incremented or decremented based on vehicle speed when the engine is off. When this counter is high enough, the vehicle has reached an equilibrium where IAT and OAT can be compared. The value that is added or subtracted to the counter every 100 msec is contained in table **P0071: OAT Performance Drive Equilibrium Engine Off**	>= 300.0 counts > 15.0 deg C > 15.0 deg C	Time between current ignition cycle and the last time the engine was running Engine is not running Vehicle Speed Coolant Temperature - IAT IAT - Coolant Temperature No Active DTCs:	>= 28,800.0 seconds >= 15.5 MPH < 15.0 deg C < 15.0 deg C VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_DefaultDetected MAF_SensorFA EngineModeNotRunTimerError	Executed every 100 msec	Type B, 2 Trips
			OAT-to-IAT engine running equilibrium counter (see below for description of this counter) If IAT >= OAT: IAT - OAT If IAT < OAT:	>= 300.0 counts > 15.0 deg C	Engine is running Vehicle Speed Engine air flow No Active DTCs:	 >= 15.5 MPH >= 10.0 grams/second VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_DefaultDetected MAF_SensorFA	Executed every 100 msec	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			OAT - IAT The "OAT-to-IAT engine running equilibrium counter" is a counter that is incremented or decremented based on vehicle speed and engine air flow when the engine is running. When this counter is high enough, the vehicle has reached an equilibrium where IAT and OAT can be compared. The value that is added or subtracted to the counter every 100 msec is contained in table **P0071: OAT Performance Drive Equilibrium Engine Running**	> 15.0 deg C		EngineModeNotRunTimerError		

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Outside Air Temperature (OAT) Sensor Circuit Low	P0072	Detects a continuous short to ground in the OAT signal circuit or the OAT sensor	Raw OAT Input	<= 52 Ohms (~150 deg C)	Continuous		40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Outside Air Temperature (OAT) Sensor Circuit High	P0073	Detects a continuous open circuit in the OAT signal circuit or the OAT sensor	Raw OAT Input	>= 403,672 Ohms (~-60 deg C)	Continuous		40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Outside Air Temperature (OAT) Sensor Intermittent In-Range	P0074	Detects a noisy or erratic OAT signal circuit or OAT sensor	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current OAT reading - OAT reading from 100 milliseconds previous)	> 100 deg C 10 consecutive OAT 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.
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) > 28.0 grams/sec > 19.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables. No Active DTCs: -	>= 400 RPM <= 4,500 RPM >= -7 Deg C <= 129 Deg C >= -20 Deg C <= 129 Deg C >= 0.50 Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** Modeled Air Flow Error multiplied by **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM** and **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est** MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** MAP_SensorCircuitFA	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.
						EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA		
					No Pending DTCs:	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.
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) > 19.0 kPa > 19.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables. No Active DTCs: No Pending DTCs:	>= 400 RPM <= 4,500 RPM >= -7 Deg C <= 129 Deg C >= -20 Deg C <= 129 Deg C >= 0.50 Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** MAP Model 1 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM** MAP Model 2 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM** MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA EGRValve_FP ECT_Sensor_Ckt_FP	Continuous Calculations 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.
						IAT_SensorCircuitFP		
			Manifold Pressure OR Manifold Pressure	< 50.0 kPa > 115.0 kPa	Time between current ignition cycle and the last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	 > 5.0 seconds EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA MAP_SensorCircuitFP AAP_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.
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) > 28.0 grams/sec <= 19.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables. No Active DTCs: No Pending DTCs:	>= 400 RPM <= 4,500 RPM > -7 Deg C < 129 Deg C > -20 Deg C < 129 Deg C >= 0.50 Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** Modeled Air Flow Error multiplied by **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM** and **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est** MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA EGRValve_FP	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

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

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Composition Sensor Circuit Low	P0178	Detects Out of Range Low Frequency Signal The ethanol sensor is designed to measure ethanol concentrations from E0 (50Hz) to E100 (150Hz), with a specified accuracy of 5% ethanol (i.e. 5Hz). Therefore, values less than 45Hz or greater than 155Hz are considered as faults.	Flex Fuel Sensor Output Frequency	< 45 Hertz	Powertrain Relay	> 11.00 Volts	50 failures out of 63 samples 100 ms loop Continuous	Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Composition Sensor Circuit High	P0179	Detects Out of Range High Frequency Signal The ethanol sensor is designed to measure ethanol concentrations from E0 (50Hz) to E100 (150Hz), with a specified accuracy of 5% ethanol (i.e. 5Hz). Therefore, values less than 45Hz or greater than 155Hz are considered as faults.	Flex Fuel Sensor Output Frequency	> 155 Hertz <= 185	Powertrain Relay	> 11.00 Volts	50 failures out of 63 samples 100 ms loop Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Two Stage Oil Pump Control Circuit Short To Ground	P06DB	Diagnoses the two stage oil pump low side driver for Short to Ground circuit fault	Voltage low during driver off state (indicates an short circuit to Ground)	Short to Ground Circuit ≤ 0.5 Ω impedance between signal and controller ground	Diagnostic Status Powertrain Relay Voltage Run/Crank Active Cranking State	Enabled ≥ 11.00 = True = False	>= 40 errors out of 50 samples. Performed every 100 msec	Type B, 2 Trips Note: In certain controllers P06DA may also set (Two Stage Oil Pump Control Circuit Open)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Two Stage Oil Pump Control Circuit Performance - One Sided	P06DD	Diagnoses the two stage oil pump is stuck in the high pressure state	<u>Fail from passing state:</u> Oil Pressure delta is less than a minimum delta pressure on a state change and the measured filtered oil pressure is above a threshold	Oil Pressure delta = ABS [Filtered Oil Pressure at beginning of state change - filtered oil pressure after 1.7 seconds] Oil Pressure delta < **P06DD_P06DE_OP_StateChangeMin** AND Filtered Oil Pressure ≥ **P06DD_P06DE_MinOilPressThresh** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_OP_StateChangeMin** **P06DD_P06DE_MinOilPressThresh**)	<u>Common Criteria:</u> Two Stage Oil Pump is Present Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 8,000 RPM for longer than 65,000.0 seconds) No active DTC's for diagnsotic enable: Check oil pump TFTKO as a diagnostic enable when Enabled. No active DTC's for control enable: <u>Active Criteria:</u> One Sided Performance Test = Enabled	TRUE ≥ 60.0 seconds ≥ 70.0 kPa FALSE Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA CrankSensor_FA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA Enabled : OilPmpTFTKO Enabled Fault bundles for control disable : OilPmpTFTKO EngineTorqueEstInaccurate EngOilPressureSensorFA PowertrainRelayFault CrankSensor_FA EngOilTempFA Enabled	≥ 12 errors out of 15 samples. Run once per trip or activiated by the Passive Test	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Oil Pump in Low State	> 1.7 seconds		
					Modelled Oil Temperature within range	40.0 deg C ≤ Oil Temp ≤ 106.0 deg C		
					Filtered Engine Speed within range	1,200 RPM ≤ Filtered Engine Speed ≤ 2,500 RPM		
					Engine Torque within range	**P06DD_P06DE_MinEnableTorque_OP** ≤ Indicated Requested Engine Torque ≤ **P06DD_P06DE_MaxEnableTorque_OP** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_MinEnableTorque_OP** **P06DD_P06DE_MaxEnableTorque_OP**)		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds] ≤ 50 RPM		
					Filtered Oil Pressure within range	Filtered Engine Oil Pressure > **P06DD_P06DE_MinOilPressThresh** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_MinOilPressThresh**)		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Expected Oil Pressure Delta within range	86.0 kPa < ABS[**P0521_P06DD_P06DE_OP_HiStatePressure** - **P06DD_P06DE_OP_LoStatePressure**] < 200.0 kPa		
					<u>Passive Criteria:</u>			
					Active Test Passed	TRUE		
					Filtered Engine Speed within range	1,000 RPM ≤ Filtered Engine Speed ≤ 4,500 RPM		
					Modelled Oil Temperature within range	40.0 deg C ≤ Oil Temp ≤ 120.0 deg C		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.70 seconds] ≤ 1,000 RPM		
					Oil Pressure Delta within a range	Oil Pressure Delta < **P06DD_P06DE_OP_StateChangeMin** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_OP_StateChangeMin**)		
			<u>Fast Pass Condition</u> Oil Pressure delta is less than a minimum delta pressure on a state	Oil Pressure delta = ABS [Filtered Oil Pressure at beginning	<u>Common Criteria:</u> Two Stage Oil Pump is Present	TRUE	0 errors out of 5 samples. Run once per trip	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			change and the measured filtered oil pressure is above a threshold	of state change - filtered oil pressure after 1.7 seconds] Oil Pressure delta < **P06DD_P06DE_OP_StateChangeMin** AND Filtered Oil Pressure ≥ **P06DD_P06DE_MinOilPressThresh** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_OP_StateChangeMin** **P06DD_P06DE_MinOilPressThresh**)	Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 8,000 RPM for longer than 65,000.0 seconds) No active DTC's for diagnsotic enable: Check oil pump TFTKO as a diagnostic enable when Enabled. No active DTC's for control enable: <u>Active Criteria:</u> One Sided Performance Test = Enabled Oil Pump in Low State Modelled Oil Temperature within range	≥ 60.0 seconds ≥ 70.0 kPa FALSE Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA CrankSensor_FA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA Enabled : OilPmpTFTKO Enabled Fault bundles for control disable : OilPmpTFTKO EngineTorqueEstInaccurate EngOilPressureSensorFA PowertrainRelayFault CrankSensor_FA EngOilTempFA Enabled > 1.7 seconds 40.0 deg C ≤ Oil Temp ≤ 106.0 deg C	or activiated by the Passive Test	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Filtered Engine Speed within range	1,200 RPM ≤ Filtered Engine Speed ≤ 2,500 RPM		
					Engine Torque within range	**P06DD_P06DE_MinEnableTorque_OP** ≤ Indicated Requested Engine Torque ≤ **P06DD_P06DE_MaxEnableTorque_OP** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_MinEnableTorque_OP** **P06DD_P06DE_MaxEnableTorque_OP**)		
					Expected Oil Pressure Delta within range	86.0 kPa < ABS[**P0521_P06DD_P06DE_OP_HiStatePressure** - **P06DD_P06DE_OP_LoStatePressure**] < 200.0 kPa		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.0 seconds] ≤ 50 RPM		
					Filtered Oil Pressure within range	Filtered Engine Oil Pressure > **P06DD_P06DE_MinOilPressThresh** (see P06DD details on Supporting Tables Tab **P06DD_P06DE_MinOilPressThresh**)		

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

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

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) > 28.0 grams/sec > 19.0 kPa) > 19.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) See Residual Weight Factor tables.	>= 400 RPM <= 4,500 RPM > -7 Deg C < 129 Deg C > -20 Deg C < 129 Deg C >= 0.50 Filtered Throttle Model Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: TPS Residual Weight Factor based on RPM** Modeled Air Flow Error multiplied by **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on RPM** and **P0101, P0106, P010B, P0121, P012B, P0236, P1101: MAF1 Residual Weight Factor based on MAF Est** MAP Model 1 Error multiplied by **P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM** MAP Model 2 Error multiplied by	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P0101, P0106, P0121, P012B, P0236, P1101: MAP2 Residual Weight Factor based on RPM		
					No Active DTCs: No Pending DTCs:	MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Front Object Detection Control Module Torque Request Signal Message Counter Incorrect	P15F6	Detects rolling count or protection value errors in Collision Preparation System Axle Torque Command serial data signal	If x of y rolling count / protection value faults occur, disable collision preparation system for duration of fault		Front Object Detection Module Torque Request Serial Data Error Diagnostic Enable	1.00	4 / 10 counts	MIL: Type C, No SVS

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Automatic Braking Engine Torque Request Signal Message Incorrect	P15F8	Detects rolling count or protection value errors Rear Virtual Bumper Axle Torque Command serial data signal	If x of y rolling count / protection value faults occur, disable rear virtual bumper or collision preparation system for duration of fault		Automatic Braking Engine Torque Request Serial Data Error Diagnostic Enable	1.00	4 / 10 counts	MIL: Type C, No SVS

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Mode Switch Signal Circuit Include for programs that are NOT hybrid start stop conventional	P1762	Vehicles that are not hybrid start stop conventional applications, this diagnoses the transmission mode switch signal circuit (BCM to ECM Rolling Count check)	Rolling count value received from BCM does not match expected value	= TRUE	Engine Speed Engine Speed Engine speed between min/max for Vehicle Speed for	≥ 200 RPM ≤ 7,500 RPM ≥ 5.0 seconds ≤ 318.14 MPH ≥ 5.0 seconds	> 3 error counts for > 10.0 seconds 100 ms / sample	Type C, No SVS

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transfer Case Speed Sensor Output (TCSS)	P2160	No activity in the TCSS Signal circuit	TCSS Raw Speed	≤ 50 RPM	Engine Torque Throttle Position Transmission gear Garage Shift PTO EngineTorqureInaccurate	240.0 ≤ N-M ≤ 8,191.8 20 ≤ % ≤ 99 Not in Park or Neutral Not active Not active Not a hybrid vehicle FALSE	≥ 5.0 sec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transfer Case Speed Sensor Output (TCSS)	P2161	TCSS Circuit Signal Intermittent	TCSS Loop-to-Loop speed decrease OR TCSS Loop-to-Loop speed increase	≥ 475 RPM ≥ 225 RPM	Engine Speed TCSS Speed Transmission gear Garage Shift PTO P2160	≥ 1,000 RPM > 0 Not in Park or Neutral Not active Not active CrankSensor_FA = FALSE Not Fault Active	≥ 4.0 sec	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Conductivity Out Of Range (water in fuel)	P2269	Detects the presence of High Conductivity Fuel (e.g. water in fuel) via a specific range of sensor frequency. High conductivity in the fuel causes a significant upward shift in the sensor's output frequency.	Flex Fuel Sensor Output Frequency	> 185 Hertz	Powertrain Relay	> 11.00 Volts	50 failures out of 63 samples 100 ms loop Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Four Wheel Drive Low Switch Circuit	P2771	Fail Case 1: Continuous Open (Stuck Off) in the Four Wheel Drive Low Switch CircuitFail Case 2: Ground (Stuck On) in the Four Wheel Drive Low Switch Circuit	4WD Low Switch Transfer case gear ratio 4WD Low Switch Transfer case gear ratio	= TRUE ≥ 2.600 and ≤ 2.800 = FALSE ≥ 0.900 and ≤ 1.100	Engine Torque Engine Speed Ignition voltage Throttle position Transmission Temperature Engine Run time Vehicle Speed TPS_FA VehicleSpeedSensor_FA EngineTorqureInaccurate Transmission gear P0502, P0503, P0722, P0723, P215C, P2160, P2161, U0101 Clutch Transmission Input Speed Signal	80.0 ≤ N-M ≤ 8,191.8 2,000 ≤ RPM ≤ 5,500 9.0 ≤ Volts ≤ 32.00 10.0 ≤ % ≤ 99.0 -7.0 ≤ ºC ≤ 130.0 >= 10.0 Sec >= 15.00 Mph False False FALSE Not in Park, Reverse, or Neutral Not Fault Active Engaged (Manual transmission only) Valid (Automatic transmission only)	≥ 2.0 sec≥ 7.0 sec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transfer Case Control Module Transfer Case Command State Rationality - 4wd high command not 4wd high ratio	P279A	Monitor measures transfer case gear ratio is 4wd low ratio or neutral ratio while the transfer case control module command state is 4wd high.	measured transfer case ratio is 4wd high ratio AND measured transfer case ratio calculation updated (measured transfer case ratio = transmission output speed / transfer case output speed)	= FALSE = TRUE	transfer case contol module transfer case command state weighted fail count measured transfer case ratio is 4wd high ratio set to TRUE AND measured tranfer case ratio calculation updated set to TRUE transfer case output speed sensor configuration = CeFWDD_e_UseTCSS	= 4wd high = **P279A P279B P279C Transfer Case Control Module Transfer Case Command State Rationality (weighting factor)** (see supproting table) measured transfer case ratio >= **P279A Transfer Case Control Module Transfer Case Command State Rationality (margin of error low)** (see supporting table) AND measured transfer case ratio <= **P279A Transfer Case Control Module Transfer Case Command State Rationality (margin of error high)** (see supporting table) transfer case output speed sensor configuration = CeFWDD_e_UseTCSS = FALSE	weighted fail count >= 5 out of sample count >= 280 (12.5 milleseconds per count)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P0502 fault active AND P0503 fault active AND P0722 fault active AND P0723 fault active AND P2160 fault active AND P2616 fault active vehicle drive wheel type configuration NOT CeFWDG_e_No_AWD_Or_FWD AND NOT CeFWDG_e_Versatrak_AWD AND NOT CeFWDG_e_FWD_AWD_SingleSpd	= FALSE = FALSE = FALSE = FALSE = FALSE vehicle drive wheel type configuration = CeFWDR_e_FWD_ECM_TCM_TCCM		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transfer Case Control Module Transfer Case Command State Rationality - 4wd low command not 4wd low ratio	P279B	Monitor measures transfer case gear ratio is 4wd high ratio or neutral ratio while the transfer case control module command state is 4wd low.	measured transfer case ratio is 4wd low ratio AND measured transfer case ratio calculation updated (measured transfer case ratio = transmission output speed / transfer case output speed)	= FALSE = TRUE	transfer case contol module transfer case command state weighted fail count measured transfer case ratio is 4wd low ratio set to TRUE AND measured tranfer case ratio calculation updated set to TRUE transfer case output speed sensor configuration = CeFWDD_e_UseTCSS	= 4wd low = **P279A P279B P279C Transfer Case Control Module Transfer Case Command State Rationality (weighting factor)** (see supproting table) measured transfer case ratio >= **P279A Transfer Case Control Module Transfer Case Command State Rationality (margin of error low)** (see supporting table) AND measured transfer case ratio <= **P279A Transfer Case Control Module Transfer Case Command State Rationality (margin of error high)** (see supporting table) transfer case output speed sensor configuration = CeFWDD_e_UseTCSS = FALSE	weighted fail count >= 5 out of sample count >= 280 (12.5 milleseconds per count)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P0502 fault active AND P0503 fault active AND P0722 fault active AND P0723 fault active AND P2160 fault active AND P2616 fault active vehicle drive wheel type configuration NOT CeFWDG_e_No_AWD_Or_FWD AND NOT CeFWDG_e_Versatrak_AWD AND NOT CeFWDG_e_FWD_AWD_SingleSpd	= FALSE = FALSE = FALSE = FALSE = FALSE vehicle drive wheel type configuration = CeFWDR_e_FWD_ECM_TCM_TCCM		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transfer Case Control Module Transfer Case Command State Rationality - 4wd neutral command not 4wd neutral ratio	P279C	Monitor measures transfer case gear ratio is 4wd high ratio or 4wd low ratio while the transfer case control module command state is 4wd neutral.	measured transfer case ratio is 4wd neutral ratio AND measured transfer case ratio calculation updated (measured transfer case ratio = transmission output speed / transfer case output speed)	= FALSE = TRUE	transfer case contol module transfer case command state weighted fail count measured transfer case ratio is 4wd neutral ratio set to TRUE AND measured tranfer case ratio calculation updated set to TRUE when ratio check 1 AND ratio check 2	= 4wd neutral = **P279A P279B P279C Transfer Case Control Module Transfer Case Command State Rationality (weighting factor)** (see supproting table) ratio check 1: measured transfer case ratio >= **P279C Transfer Case Control Module Transfer Case Command State Rationality (margin of error high 1)** (see supporting table) OR measured transfer case ratio <= **P279C Transfer Case Control Module Transfer Case Command State Rationality (margin of error low 1)** ratio check 2 measured transfer case ratio >=	weighted fail count >= 5 out of sample count >= 280 (12.5 milleseconds per count)	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					transfer case output speed sensor configuration = CeFWDD_e_UseTCSS P0502 fault active AND P0503 fault active AND P0722 fault active AND P0723 fault active AND P2160 fault active AND P2616 fault active vehicle drive wheel type configuration NOT CeFWDG_e_No_AWD_Or_FWD AND NOT CeFWDG_e_Versatrak_AWD AND NOT CeFWDG_e_FWD_AWD_SingleSpd	**P279C Transfer Case Control Module Transfer Case Command State Rationality (margin of error high 2)** (see supporting table) OR measured transfer case ratio <= **P279C Transfer Case Control Module Transfer Case Command State Rationality (margin of error low 2)** transfer case output speed sensor configuration = CeFWDD_e_UseTCSS = FALSE = FALSE = FALSE = FALSE = FALSE vehicle drive wheel type configuration = CeFWDR_e_FWD_ECM_TCM_TCCM		

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					neutral rationality enabled	= 1		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 3 Deactivation Solenoid Control Circuit/Open	P3417	Diagnoses cylinder 3 deactivation solenoid 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	Diagnostic Status Powertrain Relay Voltage Engine RPM	Enabled ≥ 11.00 volts ≥ 400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips Note: In certain controllers P3419 may also set (Cylinder 3 Deactivation Solenoid Control Circuit/ Low)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 3 Deactivation Solenoid Control Circuit/Low	P3419	Diagnoses cylinder 3 deactivation solenoid control low side driver circuit for circuit faults	Voltage low during driver off state (indicates an short circuit to Ground)	Short to Ground Circuit ≤ 0.5 Ω impedance between signal and controller ground	Diagnostic Status Powertrain Relay Voltage Engine RPM	Enabled ≥ 11.00 volts ≥ 400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips Note: In certain controllers P3417 may also set (Cylinder 3 Deactivation Solenoid Control Circuit/ Open)

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 3 Deactivation Solenoid Control Circuit/High	P3420	Diagnoses cylinder 3 deactivation solenoid control low side driver circuit for circuit faults	Voltage low during driver on state (indicates an short to power)	Short to Power ≤ 0.5 Ω impedance between signal and controller power	Diagnostic Status Powertrain Relay Voltage Engine RPM	Enabled ≥ 11.00 volts ≥ 400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 6 Deactivation Solenoid Control Circuit/Open	P3441	Diagnoses cylinder 6 deactivation solenoid 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	Diagnostic Status Powertrain Relay Voltage Engine RPM	Enabled ≥ 11.00 volts ≥ 400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips Note: In certain controllers P3443 may also set (Cylinder 6 Deactivation Solenoid Control Circuit/ Low)

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 6 Deactivation Solenoid Control Circuit/Low	P3443	Diagnoses cylinder 6 deactivation solenoid control low side driver circuit for circuit faults	Voltage low during driver off state (indicates an short circuit to Ground)	Short to Ground Circuit ≤ 0.5 Ω impedance between signal and controller ground	Diagnostic Status Powertrain Relay Voltage Engine RPM	Enabled ≥ 11.00 volts ≥ 400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips Note: In certain controllers P3441 may also set (Cylinder 6 Deactivation Solenoid Control Circuit/ Open)

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cylinder 6 Deactivation Solenoid Control Circuit/High	P3444	Diagnoses cylinder 6 deactivation solenoid control low side driver circuit for circuit faults	Voltage low during driver on state (indicates an short to power)	Short to Power ≤ 0.5 Ω impedance between signal and controller power	Diagnostic Status Powertrain Relay Voltage Engine RPM	Enabled ≥ 11.00 volts ≥ 400 rpm	>= 20 errors out of 25 samples Performed every 250 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication Bus B Off	U0074	This DTC monitors for a BUS B off condition	Bus off failures exceeds before the sample time of is reached	5 counts (equivalent to 0.06 seconds) 0.56 seconds	General Enable Criteria: U0074 Normal CAN transmission on Bus B Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds CAN hardware is bus OFF for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts > 0.1125 seconds	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.
Lost Communication With Transfer Case Control Module	U0102	This DTC monitors for a loss of communication with the transfer case control module	Message is not received from controller for Message $1CB Message $1CC	 ≥ 10.0 seconds ≥ 10.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts	Diagnostic runs in 12.5 ms loop	Type C, No SVS "Special Type C"

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Fuel Pump Driver Control Module	U18A2	This DTC monitors for a loss of communication with the Fuel Pump Driver Control Module on Bus B	Message is not received from controller for Message $0D5 Message $0D7	 ≥ 10.0 seconds ≥ 10.0 seconds	General Enable Criteria: U0074 Normal CAN transmission on Bus B Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) =Active > 11.00 Volts > 0.4000 seconds	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					U18A2 Fuel Pump Driver Control Module	Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Front Object Detection Control Module	U216A	This DTC monitors for a loss of communication with the Front Object Detection Control Module.	Messages are not received from controller for Message $2CB Message $2CD Message $2CF Message $370	 ≥ 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: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts > 0.4000 seconds	Diagnostic runs in 12.5 ms loop	Type C, No SVS

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					U216A EOCM, FCM, or RDCM modules (Front Object Detection Modules)	Not Active on Current Key Cycle are present on the bus		

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Control Module Lost Communication with ECM/PCM	U2616	To detect lost serial data communication from the power driver controller to the ECM	Timer - Fuel System Control message CAN $0D9 not received (FPPM Received Serial Data Communication Status)	t > 10 s (Fu Pmp Pwr Mod smart device reports Faulted, Not Faulted or Indeterminate)	a) FPPM configuration KeFRPR_e_ChassisFuelPresSysType b) Fault state determination enabled c) Run_Crank status d) FPPM Control Status Alive Rolling Count result e) FPPM Diagnostic feedback received f) System Voltage	a) == CeFRPR_e_ECM_FPPM_Sys b) == TRUE c) == Active d) == Valid e) == TRUE f) 9v < Sys Voltage > 32v	64 failures / 80 samples 1 sample / 12.5 millisec	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Active Grill Air Shutter A Performance /Stuck OFF	P059F	Compare commanded shutter A position to sensed position	Consecutive failed intrusive position performance test count	>= 5.00	1. Ignition Run_Crack Active, 2. Ignition Run_Crank AND Ignition Accessory AND ECU Awake, 3. Command Shutter1 Enable	1. = TRUE, 2. = FALSE AND = FALSE AND = TRUE, 3. = TRUE	1 sample / 100 millisec	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Active Grill Air Shutter B Performance /Stuck OFF	P05AE	Compare commanded shutter B position to sensed position	Consecutive failed intrusive position performance test count	>= 5.00	1. Ignition Run_Crack Active, 2. Ignition Run_Crank AND Ignition Accessory AND ECU Awake, 3. Command Shutter1 Enable	1. = TRUE, 2. = FALSE AND = FALSE AND = TRUE, 3. = TRUE	1 sample / 100 millisec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Communication Error with Active Grill Air Shutter Module “A”	P151E	This DTC monitors for an internal error or error in communication with the Active Grill Air Shutter Module A	Communication of the Alive Rolling Count from the Shutter Module over LIN bus is incorrect or the Shutter Module signals it has an internal error for out of total samples	>= 10.00 counts >= 10.00 counts	All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	>= 3.00 seconds = Run >= 11.00 Volts >= 11.00 Volts	LIN bus communication executes in 500ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Communication Error with Active Grill Air Shutter Module “B”	P151F	This DTC monitors for an internal error or error in communication with the Active Grill Air Shutter Module B	Communication of the Alive Rolling Count from the Shutter Module over LIN bus is incorrect or the Shutter Module signals it has an internal error for out of total samples	>= 10.00 counts >= 10.00 counts	All the following conditions are met for Power Mode Powertrain Relay Voltage Run/Crank Ignition Voltage	>= 3.00 seconds = Run >= 11.00 Volts >= 11.00 Volts	LIN bus communication executes in 500ms loop	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Adaptive Cruise Control Signal Circuit	P1553	Detects rolling count or protection value errors in Adaptive Cruise Control Axle Torque Command serial data signal	If x of y rolling count / protection value faults occur, disable adaptive cruise control for duration of fault		Adaptive Cruise Control Command Serial Data Error Diagnostic Enable	1.00	10 / 16 counts	MIL: Type C, No SVS

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transfer Case Shift Pending	P185F	Detects an error in the ECM trasnfer case shift pending command value realative to the ECM transfer case command state	trasnfer case shift pending AND transfer case commnd state OR trasnfer case shift pending AND transfer case commnd state OR trasnfer case shift pending AND transfer case commnd state OR trasnfer case shift pending AND transfer case commnd state	= shift out of 4wd high = 4wd low = shift out of 4wd high = 4wd neutral = shift out of 4wd low = 4wd high = shift out of 4wd neutral = 4wd low	engine mode run run/crank voltage P2771 four wheel drive low circuit, fault fault active transfer case shift pending monitor delay time	= TRUE >= 9.00 volts = FALSE >= 5.00	>= 5 counts (one count per 25 milliseconds)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Cruise Control Module	U0104	This DTC monitors for a loss of communication with the Cruise Control Module.	Message is not received from controller for Message $2CB Message $2CD	 ≥ 10.0 seconds ≥ 10.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 1 (1 indicates enabled) = Active > 11.00 Volts	Diagnostic runs in 12.5 ms loop	Type C, No SVS

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

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communication LIN Bus 1 Off	U1501	This DTC monitors for a LIN bus off condition	LIN bus off failures	>= 3.00 counts	The following criteria have been enabled for Power Mode Run/Crank Voltage	>= 5.00 seconds =Run >= 11.00 Volts	Dependent on bus loading.	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
LIN Bus 1 Lost Communication with Device 0 (Shutter 1)	U1510	This DTC monitors for a loss of communication on the LIN bus with Shutter 1	ECM has lost communication over the LIN bus with Device 0 / Shutter 1 for	>= 3.00 counts	The following criteria have been enabled for Power Mode Run/Crank Voltage	>= 5.00 seconds =Run >= 11.00 Volts	LIN bus communication executes in 500ms loop	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
LIN Bus 1 Lost Communication with Device 1 (Shutter 2)	U1511	This DTC monitors for a loss of communication on the LIN bus with Shutter 2	ECM has lost communication over the LIN bus with Device 1 / Shutter 2 for	>= 3.00 counts	The following criteria have been enabled for Power Mode Run/Crank Voltage	>= 5.00 seconds =Run >= 11.00 Volts	LIN bus communication executes in 500ms loop	Type B, 2 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Pedal Position Sensor Circuit Intermittent/ Erratic	P057E	detects noisy / erratic ouput for brake pedal position sensor	If x of y samples are observed above failure threshold, default brake pedal position to zero percent and set DTC	25.00	Brake Pedal Position Sensor Circuit Intermittent / Erratic Diagnostic Enable	1.00	10.00 / 16.00 counts	MIL: Type A, 1 Trips

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Multi-Function Input B Circuit	P0589	Detect when cruise control multi-function switch circuit B (analog) voltage is in an illegal range	Cruise Control analog circuit B 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	Type C, No SVS ,special type C

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Multi-Function Input B Circuit Low	P0592	detects short to ground failure for cruise multi-function switch circuit B	Cruise Control analog circuit B voltage must be in an "Open Short To Ground" 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 2.00 seconds	Type C, No SVS ,special type C

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Multi-Function Input B Circuit High	P0593		Cruise Control analog circuit B voltage must be in an "Short To Power" 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 2.00 seconds	Type C, No SVS , special type C

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Set/ Coast Signal 2 Circuit	P155B	Detects a failure of the cruise set 2 switch in a continously applied state	Cruise Control Set 2 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 89.000 seconds	Type C, No SVS , special type C

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Resume/ Acceleration Signal 2 Circuit	P155C	Detects a failure of the cruise resume 2 switch in a continously applied state	Cruise Control Resume 2 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 89.000 seconds	MIL: Type C, No SVS , special type C

16 OBDG07A ECM Summary Tables L20 (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Control Module (FPCM) Requested MIL Illumination	P069E	Monitors the FPCM MIL request line to determine when the FPCM has detected a MIL illuminating fault.	Fuel Pump Control Module 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.
Lost Communication With Fuel Pump Control Module	U0109	This DTC monitors for a loss of communication with the fuel pump control module	Message is not received from controller for Message $1EB Message $4D9	 ≥ 12.0 seconds ≥ 12.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Run/Crank Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line and Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is	 Not Active on Current Key Cycle Enabled Not Active Not Active > 6.41 Volts = run = 0 (1 indicates enabled) = Active > 11.00 Volts	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.
					not active for U0109 Fuel Pump Control Module	> 0.4000 seconds Not Active on Current Key Cycle is present on the bus		

16 OBDG07A Fault Bundle Definitions

Bundle Name: 5VoltReferenceB_FA
P0651
Bundle Name: 5VoltReferenceMAP_OOR_Flt
P0697
Bundle Name: A/F Imbalance Bank1
P219A
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: AcceleratorPedalFailure
P2122, P2123, P2127, P2128, P2138, P0697, P06A3
Bundle Name: AfterThrottlePressureFA
Naturally Aspirated or Turbocharged: P0106, P0107, P0108. Supercharged: P012B, P012C, P012D.
Bundle Name: AIR System FA
P0411, P2440, P2444
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: AmbPresSnsrCktFA
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,
Bundle Name: AnyCamPhaser_TFTKO
P0010, P0011, P0013, P0014, P0020, P0021, P0023, P0024, P2088, P2089, P2090, P2091, P2092, P2093, P2094, P2095, P05CC, P05CD, P05CE, P05CF,
Bundle Name: CamLctnExhFA
P0017, P0019, P0365, P0366, P0390, P0391
Bundle Name: CamLctnIntFA
P0016, P0018, P0340, P0341, P0345, P0346
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: CamSnsrExhTFTKO

P0017, P0019, P0365, P0366, P0390, P0391

Bundle Name: CamSnsrIntTFTKO

P0016, P0018, P0340, P0341, P0345, P0346

Bundle Name: Catalyst Warmup Enabled

N/A

Catalyst Warmup Enabled - Other Definitions:
To enable the Cold Start Emission Reduction Strategy:

Catalyst Temperature < 650.00 degC
AND
Engine Coolant > 17.00 degC
AND
Engine Coolant <= 40.00 degC
AND
Barometric Pressure>= 70.00 KPa
AND

DTC's Not Set:

ECT_Sensor_FA
MAP_SensorFA

The Cold Start Emission Reduction Strategy will remain active until:

Engine Run Time > **P050D_P1400_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 >= 725.00 degC
AND
Engine Run Time >= 2.50 seconds

OR

Barometric Pressure < 70.00 KPa

Bundle Name: ClutchPstnSnsr FA

P0806, P0807, P0808

Bundle Name: CrankSensor_FA

P0335, P0336

16 OBDG07A Fault Bundle Definitions

Bundle Name: CrankSensor_TFTKO
P0335, P0336
Bundle Name: ECT_Sensor_Ckt_FA
P0117, P0118
Bundle Name: ECT_Sensor_Ckt_FP
P0117, P0118
Bundle Name: ECT_Sensor_Ckt_TFTKO
P0117, P0118
Bundle Name: ECT_Sensor_FA
P0116, P0117, P0118, P0119, P0128, P111E
Bundle Name: ECT_Sensor_Perf_FA
P0116, P111E
Bundle Name: EGRValve_FP
P0405, P0406, P042E
Bundle Name: EGRValveCircuit_FA
P0403, P0404, P0405, P0406, P0489, P0490
Bundle Name: EGRValvePerformance_FA
P0401, P042E
Bundle Name: EngineMisfireDetected_FA
P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308
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, P06D2, P06DE, P0A1D, P1104, P127A, P127C, P127D, P15F2, P160D, P160E, P1682, P16A0, P16A1, P16A2, P16A7, 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, EGRValvePerformance_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: EngOilPressureSensorCktFA
P0522, P0523
Bundle Name: Ethanol Composition Sensor FA
P0178, P0179, P2269
Bundle Name: EvapEmissionSystem_FA
P0455, P0446
Bundle Name: EvapExcessPurgePsbl_FA

16 OBDG07A Fault Bundle Definitions

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: EvapSmallLeak_FA
P0442
Bundle Name: EvapVentSolenoidCircuit_FA
P0449, P0498, P0499
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: FuelTankPressureSnsrCkt_FA
P0452, P0453
Bundle Name: FuelTrimSystemB1_FA
P0171, P0172, P11E9 , P11EA
Bundle Name: FuelTrimSystemB2_FA
P0174, P0175, P11EB, P11EC
Bundle Name: HumTempSnsrCktFA
P0097, P0098
Bundle Name: IAC_SystemRPM_FA
P0506, P0507
Bundle Name: IAT_SensorCircuitFA
P0112, P0113
Bundle Name: IAT_SensorCircuitFP
P0112, P0113
Bundle Name: IAT_SensorFA
P0111, P0112, P0113, P0114
Bundle Name: IAT_SensorTFTKO
P0111, P0112, P0113, P0114
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: MAF_SensorCircuitFA
P0102, P0103, P010C, P010D

16 OBDG07A Fault Bundle Definitions

Bundle Name: MAF_SensorFA
P0101, P0102, P0103, P010B, P010C, P010D
Bundle Name: MAF_SensorTFTKO
P0101, P0102, P0103, P010B, 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_SensorTFTKO
P0106, P0107, P0108
Bundle Name: MnfdTempSensorCktFP
Turbocharged or Supercharged, with Humidity sensor: P00EA, P00EB. Turbocharged or Supercharged, without Humidity sensor: P0097, P0098. Naturally Aspirated: P0112, P0113.
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_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: PowertrainRelayFault
P1682, P16A7, P16BC
Bundle Name: PowertrainRelayStateOn_FA
P0685, P0686, P0687
Bundle Name: TC_BoostPresSnsrFA
P0236, P0237, P0238
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_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: TPS_FA
P0122, P0123, P0222, P0223, P16A0, P16A1, P16A2, P2135
Bundle Name: TPS_Performance_FA
P0068, P0121, P1104, P2100, P2101, P2102, P2103
Bundle Name: TPS_ThrottleAuthorityDefaulted
P0068, P0122, P0123, P0222, P0223, P16F3, P16A0, P16A1, P16A2, P1104, P2100, P2101, P2102, P2103, P2135
Bundle Name: Transmission Output Shaft Angular Velocity Validity
P0722, P0723, P077C, P077D
Bundle Name: TransmissionEngagedState_FA
P1824, P182A, P182B, P182C, P182D, P182E, P182F, P1838, P1839, P1840, P1841, P18B5, P18B6, P18B7, P18B8, P18B9, P18BA, P18BB, P18BC, P18BD, P18BE, P18BF, P18C0, P18C1, P18C2, P18C3, P1915
Bundle Name: VehicleSpeedSensor_FA
P0502, P0503, P0722, P0723
Bundle Name: WRAF_Bank_1_FA
P0131, P0132, P064D, P223C, P223E
Bundle Name: WRAF_Bank_2_FA
P0151, P0152, P064E, P223D, P223F
Bundle Name: FuelLevelDataFault
P0461, P0462, P0463, P2066, P2067, P2068

16 OBDG07A Fault Bundle Definitions

Bundle Name: EngineModeNotRunTimer_FA
P2610
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: THMR_ECT_Sensor_Ckt_FA
P0116, P0117, P0118, P0119, P111E
Bundle Name: THMR_RCT_Sensor_Ckt_FA
P00B3, P00B4

Bundle Name: AAP2_SnsrCktFA
P2228, P2229
Bundle Name: AAP2_SnsrCktFP
P2228, P2229
Bundle Name: ClutchPstnSnsrCktHi FA
P0808
Bundle Name: ClutchPstnSnsrCktLo FA
P0807
Bundle Name: ClutchPstnSnsrNotLearned
P080A
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: FHPR_b_FRP_SnsrCkt_FA
P0192, P0193, P127C, P127D, P16E4, P16E5, P128A, P128B, 128F
Bundle Name: FHPR_b_FRP_SnsrCkt_TFTKO
P0192, P0193, , P127C, P127D, P16E4, P16E5, P128A, P128B, 128F
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: 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: FuelPumpRlyCktFA
P0627, P0628, P0629
Bundle Name: MnfdTempSensorCktFA
Turbocharged or Supercharged, with Humidity sensor: P00EA, P00EB. Turbocharged or Supercharged, without Humidity sensor: P0097, P0098. Naturally Aspirated: P0112, P0113.
Bundle Name: MnfdTempSensorFA
Turbocharged or Supercharged, with Humidity sensor: P00E9, P00EA, P00EB, P00EC. Turbocharged or Supercharged, without Humidity sensor: P0096, P0097, P0098, P0099. Naturally Aspirated: P0111, P0112, P0113, P0114.
Bundle Name: OilPmpTFTKO
P06DA, P06DB, P06DC, P06DD, P06DE
OilPmpTFTKO - Other Definitions:

TFTKO only for Output Driver and rationality
Bundle Name: SCIAP_SensorCircuitFA
P012C, P012D
Bundle Name: SCIAP_SensorCircuitFP
P012C, P012D
Bundle Name: TransmissionOutputRotationalStatusValidity
P0722, P0723, P077C, P077D

16 OBDG07A Fault Bundle Definitions

Bundle Name: ECT_Sensor_DefaultDetected
P0116, P0117, P0118, P0119, P111E

Engine run time greater than
Closed Loop Enable Clarification - KtFSTA_t_ClosedLoopAutostart **(HYBRID ONLY)**
KtFSTA_t_ClosedLoopAutostart

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
Closed Loop Enable Clarification - KtFSTA_t_ClosedLoopTime
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
Closed Loop Enable Clarification - KfFCLP_U_O2ReadyThrshLo
KfFULC_U_O2_SensorReadyThrsh Lo (Switching Sensor)

Voltage < *XXXX* milliVolts

for
Closed Loop Enable Clarification - KcFULC_O2_SensorReadyEvents
KcFULC_O2_SensorReadyEvents (Switching Sensor)

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

or
Closed Loop Enable Clarification - KeWRSC_T_HtrCntrlCL
KeWRSC_T_HtrCntrlCL (WRAF Sensor)
and
Closed Loop Enable Clarification - KeWRSI_T_PumpCurrentEnable
KeWRSI_T_PumpCurrentEnable (WRAF Sensor)
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
CylDeacSystemTFTKO
O2S_Bank_ 1_TFTKO, O2S_Bank_ 2_TFTKO, FuelInjectorCircuit_FA and CylnderDeacDriverTFTKO = False

Long Term FT Enable Criteria

Closed Loop Enable and
Coolant greater than
Closed Loop Enable Clarification - KfFCLL_T_AdaptiveLoCoolant
KfFCLL_T_AdaptiveLoCoolant

Coolant	> *XXXX* Celcius

or less than
Closed Loop Enable Clarification - KfFCLL_T_AdaptiveHiCoolant
KfFCLL_T_AdaptiveHiCoolant

Coolant	< *XXXX* Celcius

and
Closed Loop Enable Clarification - KtFCLL_p_AdaptiveLowMAP_Limit
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

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
Closed Loop Enable Clarification - KfFCLP_U_O2ReadyThrshLo
KfFCLP_U_O2ReadyThrshLo

Voltage	< *XXXX* milliVolts

for
Closed Loop Enable Clarification - KcFCLP_Cnt_O2RdyCyclesThrsh
KcFCLP_Cnt_O2RdyCyclesThrsh

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

Long Term Secondary Fuel Trim Enable Criteria

Closed Loop Enable Clarification - KtFCLP_t_PostIntglDisableTime
KtFCLP_t_PostIntglDisableTime

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
Closed Loop Enable Clarification - KtFCLP_t_PostIntglRampInTime
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

Closed Loop Enable Clarification - KeFCLP_T_IntegrationCatalystMax

KeFCLP_T_IntegrationCatalystMax

Modeled Catalyst Temperature < *XXXX*Celcius

and

Closed Loop Enable Clarification - KeFCLP_T_IntegrationCatalystMin

KeFCLP_T_IntegrationCatalystMin

Modeled Catalyst Temperature > *XXXX*Celcius

and

PO2S_Bank_1_Snsr_2_FA

PO2S_Bank_1_Snsr_2_FA and

PO2S_Bank_2_Snsr_2_FA

PO2S_Bank_2_Snsr_2_FA = False

and

Closed Loop Enable Clarification - KeFCLP_Pct_CatAccuSlphrPostDsbl

(KeFCLP_Pct_CatAccuSlphrPostDsbl

Modeled converter sulfur percent < XXXX Percent

and

Closed Loop Enable Clarification - KaFCLP_U_SlphrIntglOfst_Thrsh

Post Integral < KaFCLP_U_SlphrIntglOfst_Thrsh)

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

16 OBDG07A OBD Coolant Enable Criteria

OBD Coolant enable
Starting in 11.15A software GM has created a coordinated signal within the ECM that serves as a master enable for diagnostics/controls that use coolant as an enable condition. Controls and diagnostics may choose to enable prior to this calculated signal, but calibrating beyond the OBD limit will not function because of this signal. This enable condition is also put on the CAN bus for other modules to consume as well.

KeTHMG_b_elecstatequipd = 0 for this application

For mechanical thermostat applications (KeTHMG_b_elecstatequipd = 0)
OBD Coolant Enable Temp = P0128 Primary target temp – Calibratable offset (0-32) – 1
OBD Coolant Enable Temp = 75.0 - 10.0 – 1
OBD Coolant Enable Temp = 74.0

For E-stat applications (KeTHMG_b_elecstatequipd = 1)

OBD Coolant Enable Temp = Max(Min(ECT Control Temp) – Primary Warm up delta, Min primary P0128 target) – Calibratable offset (0-32) – 1
OBD Coolant Enable Temp = Max(Min(KaTHMC_T_TMS_EngCoolReq) - KaECTR_T_CTR_WrmUpDeltaTemp[0], KaECTR_T_CTR_WrmUpTargetMin[0]) - KeECTR_T_CTR_GlblMinOffst – 1
OBD Coolant Enable Temp = Max(105.0 - 11.0 , 75.0) - 10.0 – 1
OBD Coolant Enable Temp = 85.0

16 OBDG07A DFCO Conditions

DFCO Enable Conditions

COOLANT ENABLE CRITERIA

Coolant temperature < **DFCO_CoolEnblHi_Temp** °C See Supporting Table

RUN TIME ENEBALE CRIETRIA

Engine run time > **DFCO_DelayAfterStart_Time** seconds See Supporting Table

ENGINE SPEED ENABLE CRITERIA

TORQUE CONVERETR CLUTCH UNLOCK

POPD OFF:

i) enabled when engine speed > (1,800.0 + supporting table value **DFCO_EngSpdEnblOfst**)

ii) once enabled continue to be enabled until engine speed < (1,400.0 + supporting table value **DFCO_EngSpdEnblOfst**)

POPD ON:

i) enabled when engine speed > (1,800.0 + supporting table value **DFCO_EngSpdEnblOfst**)

ii) once enabled continue to be enabled until engine speed < (1,400.0 + supporting table value **DFCO_EngSpdEnblOfst**)

TORQUE CONVERETR CLUTCH LOCK

POPD OFF:

i) enabled when engine speed > (1,000.0 + supporting table value **DFCO_EngSpdEnblOfst**)

ii) once enabled continue to be enabled until engine speed < (800.0 + supporting table value **DFCO_EngSpdEnblOfst**)

POPD ON:

i) enabled when engine speed > (1,050.0 + supporting table value **DFCO_EngSpdEnblOfst**)

ii) once enabled continue to be enabled until engine speed < (800.0 + supporting table value **DFCO_EngSpdEnblOfst**)

VEHICLE SPEED CRITERIA:

i) enabled when vehicle speed >= (**DFCO_EnblHi_Vehicle_Speed**)

ii) once enabled continue to be enabled until vehicle speed < **DFCO_DsblLo_Vehicle_Speed**

TORQUE CRITERIA :

I) enabled when following AND conditions satisfied

(a) driver raw trq delta = raw toqrue - zero pedal torque <= 65,535.0

b) driver shaped trq delta1 = shaped immediate torque - zero pedal torque <= 10.0

c) driver shaped trq delta2 = shaped predicted torque - minimum combustion unmanaged torque = 65,535.0

d) driver shaped trq delta3 = shaped immediate torque - minimum combustion managed torque <= 65,535.0

ii) once enabled, disabled when following OR conditions are satisfied

a) driver raw trq delta1 = raw torque - zero pedal torque > 35.0

b) driver shaped trq delta2 = zero pedal torque - minimum combustion managed torque > 65,535.0

CATALYST TEMPERATURE

i) enabled based on following AND criteria

a) (CatTemp < 1,100.0 °C and vehicle speed < 50.0 kph)

b) CatTemp < 1,150.0 °C

c) CatTemp >= 300.0 °C

d) CatalystWarmupEnabled = FALSE
ii) once enabled, disabled when following OR conditions are met
OTHER CONDITIONS:
a) Transmission is not about to unlock
b) Engine not about to stall
c) Transmission is not shifting if already not in DFCO
d) POPD or EOSD
1) POPD requesting DFCO or neither requesting DFCO OFF nor inhibit DFCO
2) EOSD not active
e) EVAP does not inhibit DFCO
f) O2 response test is not inhibiting DFCO event
g) Throttle is not in default mode

****

Exhaust Cam Phsr Enable

Exhaust Cam Phsr Enable = TRUE if:

DTCs not set:
CrankSensor_TFTKO
CamSnsrExhTFTKO
CamLctnExhFA

AND

CamLctnExhFA diagnostic has executed and passed

AND

Cam edge locations have been learned

AND

[**Intake Cam Phsr Enable** = TRUE
OR
Intake Park Position is Retarded (FALSE)]

AND

[Catalyst Warmup Enabled = TRUE
AND
Engine RPM > 8,000.00
AND
Engine Run Time > **P0011_P0021_P05CC_P05CD_P0014_P0024_P05CE_P05CF_ColdStartEngRunning** sec]

OR

[Engine is running and engine power is requested

AND
ExhEngineSpeed is Enabled (see below)
AND
ExhOilPressure is Enabled (see below)
AND
ExhEngineOilTemp is Enabled (see below)]

****

ExhEngineSpeed is Enabled when

P0014_P0024_P05CE_P05CF_LoRpmHiEnblEc < Engine RPM <**P0014_P0024_P05CE_P05CF_HiEngSpdLoEnblEc**

ExhEngineSpeed is Disabled when

Engine RPM < **P0014_P0024_P05CE_P05CF_LoRpmLoDsblEc**
OR
Engine RPM > **P0014_P0024_P05CE_P05CF_HiEngSpdHiDsblEc**

****

If an oil pressure sensor is present (TRUE) and is being used (TRUE) then

ExhOilPressureEnable is Enabled when
Oil Pressure > **P0014_P0024_P05CE_P05CF_LoPresHiEnblEc** kPa
for **P0014_P0024_P05CE_P05CF_EngOilPressEnblEc** seconds

ExhOilPressureEnable is Disabled when
Oil pressure < **P0014_P0024_P05CE_P05CF_LoPresLoDsblEc** kPa

If an oil pressure sensor is not present (FALSE) OR is not being used (FALSE) then

ExhOilPressureEnable is Enabled when
Engine RPM > **P0014_P0024_P05CE_P05CF_LoRpmHiEnblEc**
for **P0014_P0024_P05CE_P05CF_EngOilPressEnblEc** seconds

****

ExhEngineOilTemp is Enabled when

-10.00 < Engine Oil Temp < 135.00 deg C

ExhEngineOilTemp is Disabled when
Engine Oil Temp < -12.00 deg C
OR
Engine Oil Temp > 140.00 deg C

****
****

Intake Cam Phsr Enable

Intake Cam Phsr Enable = TRUE if:

DTCs not set:
CrankSensor_TFTKO
CamSnsrIntTFTKO
CamLctnIntFA

AND

CamLctnIntFA has executed and passed

AND

Cam edge locations have been learned

AND

[Catalyst Warmup Enabled = TRUE
AND
Engine RPM > 8,000.00
AND
Engine Run Time > **P0011_P0021_P05CC_P05CD_P0014_P0024_P05CE_P05CF_ColdStartEngRunning** sec]

OR

[Engine is running and engine power is requested
AND
IntEngineSpeed is Enabled
AND
IntOilPressure is Enabled
AND
IntEngineOilTemp is Enabled]

****

IntEngineSpeed is Enabled when
P0011_P0021_P05CC_P05CD_LoRpmHiEnblIc < Engine RPM < **P0011_P0021_P05CC_P05CD_HiEngSpdLoEnblIc**

IntEngineSpeed is Disabled when

Engine RPM < **P0011_P0021_P05CC_P05CD_LoRpmLoDsblIc**
OR
Engine RPM > **P0011_P0021_P05CC_P05CD_HiEngSpdHiDsblIc**

****

If an oil pressure sensor is present (TRUE) and is being used (TRUE) then

IntOilPressureEnable is Enabled when
Oil Pressure > **P0011_P0021_P05CC_P05CD_LoPresHiEnblIc** kPa
for **P0011_P0021_P05CC_P05CD_EngOilPressEnblIc** seconds

IntOilPressureEnable is Disabled when
Oil pressure < **P0011_P0021_P05CC_P05CD_LoPresLoDsblIc**

If an oil pressure sensor is not present (FALSE) or is not being used (FALSE) then

IntOilPressureEnable is Enabled when
Engine RPM > **P0011_P0021_P05CC_P05CD_LoRpmHiEnblIc**
for **P0011_P0021_P05CC_P05CD_EngOilPressEnblIc** seconds

****

IntEngineOilTemp is Enabled when

0.00 < Engine Oil Temp < 160.00 deg C

IntEngineOilTemp is Disabled when
Engine Oil Temp < -2.00 deg C
OR
Engine Oil Temp > 170.00 deg C

****

****

ReducedEngineCapacityMode_Enable

REDUCED CAPACITY CONTROL ENABLE CONDITIONS:
Conditions below must be met for >= 0.3 seconds before cylinder deactivation will begin in regular mode

Neutral Idle Mode (NI) operational checks:
Allowed in NI (FALSE)
Time NI mode shall be active >= 1.0 seconds
Vehicle Speed for NI
< 0.0 mph to Enter
> 0.0 mph to Exit
PRNDL position in NI = False **VCE_PRNDL_NI_Disables** (For details see Supporting Tables)
Engine RPM lower limit for NI > 475 rpm
Transmission gear for NI = FALSE **VCE_TransGear_DisablesNI**(For details see Supporting Tables)
Torque based AFM entry conditions: NI Mode Active
Indicated Torque < **VCE_NormalMode_MaxTorque_Gr5** minus 10.0 Nm
(Function of Gear: VCE_NormalMode_MaxTorque_Gr1 - Gr8,for details see Supporting Tables)

Normal Mode operational checks:
Engine running (based on engine off time)
Maximum of 45.0 or > **VCE_StartUpDelayTime** seconds (For details see Supporting Tables)
Engine RPM
> **VCE_EngineRPM_LowerLmt** + 75 RPM AND
< **VCE_EngineRPM_UpperLmt** - 200 RPM (For details see Supporting Tables)
Vehicle Speed (in Gear) >= 6.2 mph
Vehicle Speed (P/N) <= 5.0 mph
Vehicle Speed based on PRNDL < **VCE_VehicleSpeed_PRNDL_Enable**
Engine RPM PRNDL Feature is TRUE (When TRUE, will enable AFM only if transmission is not in a defaulted state)
Engine coolant (deac) >= 40 and <= 252 deg C
Ignition voltage >= 11.0 volts
Engine Oil Temperature >= 20 and <= 128 deg C
Engine Oil Pressure >= 192 and <= 450 KPa
Oil pump intrusive test = FALSE (refer to P06DD and P06DE)
Oil aeration present: Aeration enabled by engine RPM > 3,100 for 5 second(s), disabled by engine RPM < 3,000 for 50 second(s)

Catalyst Warmup Enabled= FALSE
POPD: Not active
Deceleration Fuel Cut Off: Not active
Fuel shut off (FSO) delay: Not active >= 3 second(s)
Green Engine mode: Not active
Pedal Position < 38 pct
Brake booster vacuum >= 0 KPa
Transmission gear = FALSE **VCE_TransGear_Disables**(For details see Supporting Tables)
Gear Shift: not currently in progress
4WD State: not = 4 low range
Time since last AFM mode event >= 3 second(s)
After exiting AFM mode for max time, must be in all cylinder mode for >= 60 second(s)
Tip in Bump: Not active
AFM is disabled at high percent ethanol: Ethanol concentration > 95 % disables AFM. Once disabled, ethanol concentration must be < 90 % to re-enable
If feature is enabled, AFM is allowed only when percent ethanol learn is not in progress: Feature is FALSE
AFIM diagnostic status: Not active
A/C clutch transition: Not currently in progress
ETC power management mode: Not active
Heater performance: Not in heater perforamance mode

Torque based AFM entry conditions:

ECO Mode Active: Indicated Torque < **VCE_ECOMode_MaxTorque_Gr5** minus **VCE_ECOMode_EnableTorqueHyst**
(Function of Gear: VCE_ECOMode_MaxTorque_Gr1 - Gr8, For details see Supporting Tables)

Normal Mode: Indicated Torque < **VCE_NormalMode_MaxTorque_Gr5** minus **VCE_NormalMode_EnableTorqueHyst**
(Function of Gear: VCE_NormalMode_MaxTorque_Gr1 - Gr8, For details see Supporting Tables)

<u>IF DEACTIVATED, ANY OF THE CONDITIONS BELOW WILL FORCE CYLINDER REACTIVATION:</u>
If deactivation mode is active for >= 480 seconds
then reactivation will occur if: >= 600 seconds
Deac mode active or
Delta vacuum > 5 or < -5 kPa
Vehicle Speed for NI exit < 0 Kph
ETC Power management mode: Active
Converter overtemp protect: Active
Hot coolant mode: Active

Engine running = False
Engine overspeed protection: Active
Engine metal overtemp protect: Active
Cat. temp low: Active
Four Wheel Drive: In low range
Engine misfire: Detected
Heater performance: Active
POPD Intrusive tests: Active (see P2270-P2273, P013A-P014B)

Torque based AFM exit conditions:
ECO Mode Active: Indicated Torque < **VCE_ECOMode_MaxTorque_Gr5**
(Function of Gear: VCE_ECOMode_MaxTorque_Gr1 - Gr8, For details see Supporting Tables)

Normal Mode: Indicated Torque < **VCE_NormalMode_MaxTorque_Gr5**
(Function of Gear: VCE_NormalMode_MaxTorque_Gr1 - Gr8, For details see Supporting Tables)

Engine Vacuum: **VCE_MinVacReducedTorqMode** (For details see Supporting Tables)
Ignition voltage < 11 volts
Engine coolant < 36 or > 256 Deg C
Vehicle speed < 5.0 mph
Brake booster vacuum < 0 kPa
Engine oil temperature < 18 or > 130 Deg C
Pedal Position > 40 %
Piston Protection: Active

No active DTC's for control enable:
Fault Bundles:
Catalyst Warmup Enabled
EngOilPressureSensorFA
EnginePowerLimited
CrankSensor_TFTKO
EngineTorqueEstInaccurate
VehicleSpeedSensorError
ECT_Sensor_FA
BrakeBoosterVacuumValid
IAT_SensorFA
CylDeacDriverFault
CylDeacAllDriverFault
MAP_EngineVacuumStatus
PowertrainRelayFault

CamSensorAnyLctnTFTKO
OilPmpStuckHigh
VCER_TorqueSecurity
FourWheelDriveLowStateInvalid

Low Fuel Condition Diagnostic flag

Flag set to TRUE if the fuel level < 10.0 % AND

No Active DTCs: FuelLevelDataFault, P0462, P0463 for at least 30.0 seconds

Transfer Pump is Commanded On Flag

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

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

Description: KaPOPD_PostCellEnbl - A table of adaptive (Block Learn) cells in which to enable the post oxygen sensor tests.

Notes: Note: When Table column headings match the calibration value below it, that individual cell is enabled.
The cell numbers in the table are defined as:

CeFADR_e_Cell00_PurgOnAirMode5 = 0,
CeFADR_e_Cell01_PurgOnAirMode4 = 1,
CeFADR_e_Cell02_PurgOnAirMode3 = 2,
CeFADR_e_Cell03_PurgOnAirMode2 = 3,
CeFADR_e_Cell04_PurgOnAirMode1 = 4,
CeFADR_e_Cell05_PurgOnAirMode0 = 5,
CeFADR_e_Cell06_PurgOnIdle = 6,
CeFADR_e_Cell07_PurgOnDecel = 7,
CeFADR_e_Cell08_PurgOffAirMode5 = 8,
CeFADR_e_Cell09_PurgOffAirMode4 = 9,
CeFADR_e_Cell10_PurgOffAirMode3 = 10,
CeFADR_e_Cell11_PurgOffAirMode2 = 11,
CeFADR_e_Cell12_PurgOffAirMode1 = 12,
CeFADR_e_Cell13_PurgOffAirMode0 = 13,
CeFADR_e_Cell14_PurgOffIdle = 14,
CeFADR_e_Cell15_PurgOffDecel = 15

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

Initial Supporting table - Multiple DTC Use - Response Cell Enable Table

Description: KaEOSD_RespCellEnbl - Block learn cells in which to enable the Oxygen Sensor Response test

Notes: Note: When Table column headings match the calibration value below it, that individual cell is enabled

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

Initial Supporting table - Multiple DTC Use_Green Sensor Delay Criteria - 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	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

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_LoPresHiEnbllc

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	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180

Initial Supporting table - P0011_P0021_P05CC_P05CD_LoPresLoDsbllc

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

Notes: KtPHSC_p_LoPresLoDsbllc

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_LoRpmLoDsbllc

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

Notes: KtPHSC_n_LoRpmLoDsbllc

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 - P0014_P0024_P05CE_P05CF_EngOilPressEnblEc

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

Notes: KtPHSC_t_EngOilPressEnblEc

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	10	5	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - P0014_P0024_P05CE_P05CF_HiEngSpdHiDsblEc

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

Notes: KtPHSC_n_HiEngSpdHiDsblEc

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

Initial Supporting table - P0014_P0024_P05CE_P05CF_HiEngSpdLoEnblEc

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

Notes: KtPHSC_n_HiEngSpdLoEnblEc

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

Initial Supporting table - P0014_P0024_P05CE_P05CF_LoPresHiEnblEc

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

Notes: KtPHSC_p_LoPresHiEnblIc

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

Initial Supporting table - P0014_P0024_P05CE_P05CF_LoPresLoDsblEc

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

Notes: KtPHSC_p_LoPresLoDsblEc

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

Initial Supporting table - P0014_P0024_P05CE_P05CF_LoRpmHiEnblEc

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

Notes: KtPHSC_n_LoRpmHiEnblEc

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 - P0014_P0024_P05CE_P05CF_LoRpmLoDsblEc

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

Notes: KtPHSC_n_LoRpmLoDsblEc

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

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

Description: P0016_P0017_P0018_P0019 Cam Correlation Oil Temperature Threshold

Notes: KtEPSI_t_RtnHomeDlyLmt

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

Initial Supporting table - 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	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.832	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

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

Description: P0101_P0106_P0121_P012B_P0236_P1101 MAP2 Residual Weight Factor based on RPM

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	1.000	1.000	1.000	1.000	1.000	1.000	0.895	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	0.750	0.750	0.872	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 - 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	1	1	1	0	0	0	0
1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
2	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
3	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
4	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
5	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
6	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
7	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
8	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
9	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
10	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
11	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
12	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Initial Supporting table - 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	1	1	1	0	0	0	0
1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
2	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
3	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
4	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
5	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
6	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
7	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
8	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
9	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
10	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
11	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
12	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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

Description: P0101_P0106_P010B_P0121_P012B_P0236_P1101 MAF1 Residual Weight Factor based on MAF Est

Notes:

y/x	0	50	70	73	76	79	82	85	89	95	100	110	120	150	200	280	350
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

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

Description: P0101_P0106_P010B_P0121_P012B_P0236_P1101 MAF1 Residual Weight Factor based on RPM

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	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

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 Energy for Start-up ECT conditions - Alternate

Description: KtECTR_E_CTR_WrmUpEnrgyLimTest1

Notes: Z axis is the cooling system energy failure threshold (kJ), X axis is ECT Temperature at Power up (° C), (Deluxe version)

y/x	-20	-7	10	30	45	60	85
1	4,735	4,248	3,611	2,862	2,300	1,738	1,738

Initial Supporting table - P0128_Maximum Accumulated Energy for Start-up ECT conditions - Primary

Description: KtECTR_E_CTR_WrmUpEnrgyLimTest0

Notes: Z axis is the cooling system energy failure threshold (kJ), X axis is ECT Temperature at Power up (° C) , (Deluxe version)

y/x	-20	-7	10	30	45	60	85
1	6,150	5,565	4,800	3,900	3,225	2,550	1,425

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_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	3

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 - 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, KtEROR_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	51.42	46.97	58.69	62.97	46.48	49.92	52.55	49.97	45.36	40.69	37.83	37.83	37.83	37.83	37.83	37.83
160.00	125.00	42.64	39.77	45.00	48.03	40.08	42.11	41.77	39.42	36.34	34.28	33.03	33.03	33.03	33.03	33.03	33.03
240.00	125.00	34.67	33.89	35.45	36.89	35.22	36.48	34.72	31.80	28.66	29.06	29.31	29.31	29.31	29.31	29.31	29.31
320.00	125.00	27.81	26.86	28.41	29.95	30.98	32.22	29.72	26.67	23.61	24.47	24.98	24.98	24.98	24.98	24.98	24.98
400.00	125.00	23.11	22.06	23.61	25.11	26.02	27.95	25.61	22.81	20.06	20.95	21.48	21.48	21.48	21.48	21.48	21.48
480.00	125.00	19.77	18.72	20.20	21.63	22.42	24.53	22.05	19.64	17.44	18.03	18.41	18.41	18.41	18.41	18.41	18.41
560.00	125.00	17.27	16.25	17.66	18.88	19.63	21.63	19.27	17.13	15.22	15.67	15.94	15.94	15.94	15.94	15.94	15.94
640.00	125.00	15.36	15.00	15.78	16.73	17.42	19.23	17.08	15.84	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
720.00	125.00	15.00	15.00	15.00	15.19	15.84	17.53	15.55	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
800.00	125.00	15.00	15.00	15.00	15.19	15.84	17.53	15.55	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
880.00	125.00	15.00	15.00	15.00	15.19	15.84	17.53	15.55	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
960.00	125.00	15.00	15.00	15.00	15.19	15.84	17.53	15.55	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
1,040.00	125.00	15.00	15.00	15.00	15.19	15.84	17.53	15.55	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
1,120.00	125.00	15.00	15.00	15.00	15.19	15.84	17.53	15.55	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
1,200.00	125.00	15.00	15.00	15.00	15.19	15.84	17.53	15.55	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
1,280.00	125.00	15.00	15.00	15.00	15.19	15.84	17.53	15.55	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
1,360.00	125.00	15.00	15.00	15.00	15.19	15.84	17.53	15.55	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00

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
330.00	306.75	306.75	306.75	306.75	306.75	306.75
450.00	306.75	306.75	306.75	306.75	306.75	306.75
520.00	306.75	306.75	306.75	306.75	306.75	306.75
580.00	306.75	306.75	306.75	306.75	306.75	306.75
680.00	306.75	306.75	306.75	306.75	306.75	306.75
800.00	306.75	306.75	306.75	306.75	272.91	262.13
920.00	306.75	306.75	306.75	306.75	253.31	240.42
1,060.00	306.75	306.75	306.75	306.75	250.08	233.56
1,200.00	306.75	306.75	289.34	302.35	204.99	190.26
1,350.00	306.75	258.65	216.27	219.09	152.70	140.14
1,650.00	198.24	139.61	108.26	100.23	61.96	53.33
1,800.00	-30.00	-50.00	-68.97	-72.75	-74.00	-74.00
2,050.00	-81.00	-132.57	-137.94	-145.50	-148.00	-148.00
2,500.00	-89.10	-145.83	-151.73	-160.05	-162.80	-162.80
3,600.00	-97.20	-159.09	-165.52	-174.60	-177.60	-177.60
4,600.00	-105.30	-172.34	-179.32	-189.15	-192.40	-192.40
5,600.00	-105.30	-172.34	-179.32	-189.15	-192.40	-192.40

Initial Supporting table - 1st_FireAftrMisfr_Acel

Description: Multiplier for establishing the expected acceleration of the cylinder after the misfire

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_dt_CylAftMsfr

y/x	500	600	700	800	900	1,000	1,100	1,200	1,400	1,800	2,200	2,600	3,000	3,001	5,000	6,000	7,000
8	1.25	1.25	1.25	1.25	1.15	1.10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
20	0.50	0.50	0.50	0.50	0.50	0.60	0.60	0.50	0.60	0.65	0.65	0.70	0.75	0.75	0.75	0.75	0.75
24	0.40	0.40	0.40	0.40	0.50	0.50	0.50	0.50	0.55	0.65	0.65	0.65	0.70	0.70	0.70	0.70	0.70
30	0.40	0.40	0.40	0.40	0.50	0.50	0.50	0.50	0.55	0.55	0.55	0.60	0.65	0.65	0.65	0.65	0.65
40	0.30	0.30	0.30	0.30	0.30	0.40	0.45	0.50	0.50	0.50	0.50	0.60	0.65	0.65	0.65	0.65	0.65
60	0.30	0.30	0.30	0.30	0.30	0.40	0.45	0.50	0.50	0.50	0.50	0.60	0.65	0.65	0.65	0.65	0.65
100	0.30	0.30	0.30	0.30	0.30	0.40	0.45	0.50	0.50	0.50	0.50	0.60	0.65	0.65	0.65	0.65	0.65

Initial Supporting table - 1st_FireAftrMisfr_Jerk

Description: Multiplier for establishing the expected Jerk of the cylinder after the misfire

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_ddt_CylAftMsfr

y/x	500	600	700	800	900	1,000	1,100	1,200	1,400	1,800	2,200	2,600	3,000	3,001	5,000	6,000	7,000
8	-0.22	-0.14	-0.14	-0.20	-0.20	-0.20	-0.25	-0.25	-0.80	-0.25	-0.50	-0.22	-0.22	-0.22	-0.22	-0.22	-0.22
12	-0.20	-0.20	-0.40	-0.40	-0.40	-0.40	-0.40	-0.50	-0.80	-0.70	-0.50	-0.45	-0.45	-0.45	-0.45	-0.45	-0.45
16	-0.75	-0.75	-0.75	-0.75	-0.75	-0.75	-0.85	-0.85	-1.00	-1.00	-1.00	-0.75	-0.75	-0.75	-0.75	-0.75	-0.75
20	-0.75	-0.75	-0.75	-0.75	-0.75	-0.75	-0.85	-0.85	-1.00	-1.00	-1.00	-0.85	-0.85	-0.85	-0.85	-0.85	-0.85
24	-0.75	-0.75	-0.75	-0.75	-0.75	-0.75	-0.85	-0.85	-1.00	-1.00	-1.00	-0.90	-0.90	-0.90	-0.90	-0.90	-0.90
30	-0.75	-0.75	-0.75	-0.75	-0.75	-0.75	-0.85	-0.85	-1.00	-1.00	-1.00	-0.90	-0.90	-0.90	-0.90	-0.90	-0.90
40	-0.75	-0.75	-0.75	-0.75	-0.75	-0.75	-0.85	-0.85	-1.00	-1.00	-1.00	-0.90	-0.90	-0.90	-0.90	-0.90	-0.90
60	-0.75	-0.75	-0.75	-0.75	-0.75	-0.75	-0.85	-0.85	-1.00	-1.00	-1.00	-0.90	-0.90	-0.90	-0.90	-0.90	-0.90
100	-0.80	-0.80	-0.80	-0.80	-0.80	-0.80	-0.85	-0.85	-1.00	-1.00	-1.00	-0.90	-0.90	-0.90	-0.90	-0.90	-0.90

Initial Supporting table - Abnormal Cyl 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 - 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	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00

Initial Supporting table - Abnormal SCD Mode

Description: 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 - Bank_SCD_Decel

Description: Mulitplier to SCD decel to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_dt_MEDRES_Bank

y/x	400	500	600	700	800	900	1,000	1,100	1,200
12	0.60	0.60	0.55	0.50	0.44	0.43	0.42	0.42	1.00
16	0.44	0.44	0.44	0.42	0.39	0.38	0.45	0.42	1.00
18	0.40	0.40	0.40	0.41	0.38	0.39	0.43	0.40	1.00
20	0.40	0.40	0.40	0.42	0.36	0.38	0.43	0.38	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - Bank_SCD_Jerk

Description: Mulitplier to Medres SCD jerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_ddt_MEDRES_Bank

y/x	400	500	600	700	800	900	1,000	1,100	1,200
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	0.83	0.83	0.83	0.86	0.73	0.84	1.00	1.00	1.00
18	0.62	0.62	0.62	0.79	0.80	0.83	0.92	0.92	1.00
20	0.62	0.63	0.63	0.84	0.75	0.80	0.86	0.86	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - BankCylModeDecel

Description: Mulitplier to Lores Decel to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_dt_LORES_Bank

y/x	500	600	700	800	900	1,000	1,100	1,200	1,400	1,800	2,200	2,600	3,000	3,001	5,000	6,000	7,000
12	0.44	0.43	0.42	0.40	0.38	0.41	0.32	0.35	0.40	0.44	0.40	0.42	0.60	0.60	0.60	0.60	0.60
16	0.23	0.23	0.31	0.33	0.26	0.33	0.33	0.33	0.43	0.39	0.30	0.31	0.45	0.45	0.45	0.45	0.45
18	0.27	0.27	0.28	0.29	0.29	0.32	0.30	0.33	0.43	0.38	0.40	0.31	0.39	0.39	0.39	0.39	0.39
20	0.26	0.26	0.29	0.28	0.27	0.32	0.27	0.32	0.42	0.39	0.36	0.29	0.35	0.35	0.35	0.35	0.35
24	0.33	0.33	0.29	0.28	0.26	0.31	0.29	0.32	0.41	0.35	0.35	0.29	0.30	0.30	0.30	0.30	0.30
30	0.34	0.34	0.37	0.32	0.30	0.34	0.35	0.40	0.45	0.42	0.28	0.30	0.30	0.30	0.30	0.30	0.30
40	0.34	0.34	0.43	0.46	0.40	0.34	0.40	0.46	0.43	0.38	0.31	0.30	0.31	0.31	0.31	0.31	0.31
60	0.35	0.35	0.42	0.43	0.38	0.35	0.41	0.49	0.46	0.42	0.32	0.30	0.24	0.24	0.24	0.24	0.24
98	0.36	0.36	0.45	0.46	0.40	0.35	0.44	0.53	0.47	0.43	0.32	0.31	0.25	0.25	0.25	0.25	0.25

Initial Supporting table - BankCylModeJerk

Description: Mulitplier to Lores Jerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_ddt_LORES_Bank

y/x	500	600	700	800	900	1,000	1,100	1,200	1,400	1,800	2,200	2,600	3,000	3,001	5,000	6,000	7,000
12	0.98	0.98	1.00	0.87	0.82	0.89	0.89	0.90	1.00	1.00	1.08	1.08	1.08	1.08	1.08	1.08	1.08
16	0.62	0.62	0.75	0.76	0.72	0.74	0.75	0.83	1.00	1.07	0.85	0.90	1.05	1.05	1.05	1.05	1.05
18	0.53	0.53	0.72	0.75	0.71	0.73	0.68	0.82	1.00	1.00	0.90	0.83	0.91	0.91	0.91	0.91	0.91
20	0.50	0.50	0.73	0.74	0.74	0.70	0.67	0.81	0.96	0.96	0.86	0.79	0.80	0.80	0.80	0.80	0.80
24	0.80	0.80	0.77	0.75	0.65	0.69	0.66	0.80	0.84	0.94	0.85	0.75	0.75	0.75	0.75	0.75	0.75
30	0.88	0.88	0.84	0.86	0.74	0.74	0.73	0.91	0.95	1.00	0.80	0.67	0.65	0.65	0.65	0.65	0.65
40	0.89	0.89	0.86	0.96	0.94	0.85	0.89	1.00	0.98	0.92	0.82	0.60	0.65	0.65	0.65	0.65	0.65
60	0.95	0.95	0.87	0.98	0.93	0.85	0.88	1.09	1.01	1.03	0.88	0.60	0.54	0.54	0.54	0.54	0.54
98	0.99	0.99	0.89	1.03	0.98	0.88	0.92	1.17	1.06	1.05	0.89	0.55	0.53	0.53	0.53	0.53	0.53

Initial Supporting table - CalculatedPerfMaxIc1

Description:

Notes:

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 - 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	5.8	5.7	4.8	4.8	4.8
10	10.6	10.6	10.6	5.8	5.7	4.8	4.8	4.8
20	10.6	10.6	10.0	5.8	5.7	4.8	4.8	4.8
30	6.1	6.1	5.7	5.7	4.8	4.8	4.8	4.8
40	6.1	6.1	5.7	4.8	4.8	4.8	4.8	4.8
50	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
60	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
70	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
80	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
90	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
100	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8

Initial Supporting table - ClyAfterAFM_Decel

Description: Mulitplier to Lores decel to account for different pattern of misfire after a deactivated cylider. Similar to the second cylinder of consecutive cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_dt_LORES_PostDeac

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	0.95	1.00	0.89	1.00	1.00	1.00	1.00	1.00
16	0.94	0.74	0.75	1.00	0.78	0.88	1.00	1.00	1.00
20	0.78	0.57	0.51	0.75	0.56	0.50	0.53	1.00	1.00
24	0.76	0.59	0.53	0.60	0.56	0.50	0.50	0.94	0.94
30	0.78	0.54	0.50	0.54	0.57	0.50	0.65	0.95	0.95
40	0.62	0.50	0.50	0.56	0.58	0.50	0.50	0.67	0.67
60	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.60	0.60
98	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.51	0.51

Initial Supporting table - ClyBeforeAFM_Jerk

Description: Mulitplier to Lores decel to account for different pattern of misfire before a deactivated cylider, but after an active cylinder that follows an deactive cylinder on engine that supports cylinder deactivation in non even fire patterns.. Multipliers are a function of engine rpm and % engine Load.

Notes: KtMSFD_K_ddt_LORES_PreDeac KtMSFD_K_ddt_LORES_PreDeac

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

Initial Supporting table - ConsecCylModDecel

Description: Mulitplier to Lores decel to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_dt_LORES_Consec

y/x	500	600	700	800	900	1,000	1,100	1,200	1,400	1,800	2,200	2,600	3,000	3,001	5,000	6,000	7,000
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - ConsecCylModeJerk

Description: Mulitplier to Lores Jerk to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_ddt_LORES_Consec

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

Initial Supporting table - ConsecSCD_Decel

Description: Mulitplier to medres decel to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_dt_MEDRES_Consec

y/x	400	500	600	700	800	900	1,000	1,100	1,200
8	1.00	1.00	1.00	0.95	1.00	0.90	0.95	0.95	1.00
12	1.00	1.00	1.00	0.90	0.85	0.85	0.85	0.85	1.00
16	1.00	1.00	0.85	0.80	0.85	0.80	0.85	0.80	1.00
20	1.00	1.00	0.85	0.80	0.85	0.80	0.80	0.80	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - ConsecSCD_Jerk

Description: Mulitplier to medres Jerk to account for different pattern of the second cylinder of consecutive misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_ddt_MEDRES_Consec

y/x	400	500	600	700	800	900	1,000	1,100	1,200
8	0.25	0.25	0.25	0.16	0.17	-0.04	-0.05	-0.07	1.00
12	0.25	0.25	0.25	0.13	0.16	0.10	-0.03	-0.05	1.00
16	0.25	0.25	0.22	0.10	0.16	0.15	0.04	0.02	1.00
20	0.19	0.19	0.20	0.14	0.16	0.19	0.06	0.04	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - CylAfterAFM_Jerk

Description: Mulitplier to Lores Jerkl to account for different pattern of misfire after a deactivated cylider. Similar to the second cylinder of consecutive cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_ddt_LORES_PostDeac

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
8	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0
98	0	0	0	0	0	0	0	0	0

Initial Supporting table - CylBeforeAFM_Decel

Description: Mulitplier to Lores decel to account for different pattern of misfire before a deactivated cylider, but after an active cylinder that follows an deactive cylinder on engine that supports cylinder deactivation in non even fire patterns.. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_dt_LORES_PreDeac

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

Initial Supporting table - CylModeDecel

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

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

CylModeDecel - Part 1

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
3	1,650	910	600	375	250	180	150	115	80	50	40	30	24
6	1,650	910	600	375	250	180	150	115	80	50	40	30	24
8	1,945	1,045	650	450	300	200	150	115	90	50	40	30	24
10	2,465	1,290	800	525	350	220	170	125	100	60	40	30	24
12	2,600	1,365	850	575	350	230	180	135	105	65	50	30	26
14	3,445	1,760	1,100	650	425	310	210	165	110	80	55	35	28
16	3,940	2,015	1,250	750	475	350	250	200	135	90	57	40	30
18	4,365	2,235	1,400	850	525	400	275	210	145	95	65	45	35
20	4,965	2,530	1,590	950	600	450	300	220	175	110	70	50	40
22	5,300	2,715	1,740	1,040	650	475	325	235	185	120	80	55	42
24	5,515	2,840	1,890	1,150	700	515	350	250	200	130	90	57	45
26	6,005	3,090	2,030	1,250	800	555	375	265	210	140	100	61	48
30	5,620	2,965	2,315	1,365	850	600	405	295	235	160	110	67	54
40	7,115	3,755	3,035	1,770	1,150	750	525	360	300	200	150	85	68
60	11,190	5,800	4,475	2,590	1,730	1,225	600	475	435	300	200	115	95
78	14,150	7,330	5,730	3,300	2,205	1,565	925	550	550	400	285	155	120
97	17,535	9,080	7,170	4,120	2,755	1,955	1,150	750	680	495	355	190	150

CylModeDecel - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,001	3,500	4,000	4,500	5,000	5,500	6,000	7,000
3	19	15	12	9	7	7	5	4	4	3	3	3	3
6	19	15	12	9	7	7	5	4	4	3	3	3	3
8	19	15	12	9	7	7	5	4	4	3	3	3	3
10	19	15	12	9	7	7	5	4	4	3	3	3	3
12	20	16	12	10	8	8	5	4	4	3	3	3	3
14	20	16	13	10	9	8	5	4	4	3	3	3	3
16	26	18	15	12	10	9	6	4	5	3	3	3	3
18	28	21	16	13	11	10	7	4	5	3	3	3	3
20	32	23	18	14	12	11	7	5	5	3	3	3	3
22	35	25	20	16	13	12	7	5	5	3	3	3	3
24	40	28	20	17	14	13	8	5	5	3	3	3	3
26	42	30	22	19	15	14	8	5	5	3	3	3	3
30	47	34	26	22	18	17	9	6	5	4	3	3	3

Initial Supporting table - CylModeDecel

40	58	43	33	26	23	22	12	8	5	4	3	3	3
60	75	60	45	40	37	34	18	11	7	5	5	5	5
78	105	77	58	47	45	37	23	13	11	8	6	6	6
97	130	95	71	60	55	46	28	16	14	9	7	7	7

Initial Supporting table - CylModeJerk

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

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

CylModeJerk - Part 1

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
3	1,585	865	550	375	250	180	135	100	80	45	34	30	16
6	1,585	865	550	375	250	180	135	100	80	45	34	30	16
8	1,770	955	600	400	275	200	135	105	85	45	34	30	16
10	2,170	1,140	750	475	300	210	135	110	100	55	36	30	16
12	2,450	1,275	800	525	325	220	165	125	100	58	38	30	16
14	3,400	1,715	1,050	650	425	300	200	150	110	70	45	30	22
16	3,980	2,010	1,250	750	475	350	250	175	135	80	47	35	25
18	4,450	2,245	1,400	850	525	400	275	200	145	85	55	40	30
20	5,085	2,565	1,590	950	600	450	300	220	175	100	60	45	35
22	5,555	2,795	1,740	1,040	650	475	325	235	185	110	70	50	37
24	5,845	2,955	1,890	1,150	700	515	350	250	200	130	80	55	39
26	6,315	3,200	2,040	1,250	800	555	375	265	210	140	90	60	42
30	6,120	3,165	2,340	1,370	850	600	405	295	235	160	100	65	48
40	7,540	3,925	3,095	1,790	1,150	750	525	360	300	200	140	85	63
60	12,165	6,195	4,595	2,630	1,760	1,230	600	475	435	300	200	105	92
78	15,490	7,885	5,910	3,365	2,255	1,575	950	550	550	400	270	155	118
97	19,290	9,815	7,415	4,205	2,820	1,965	1,180	765	685	500	340	190	145

CylModeJerk - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,001	3,500	4,000	4,500	5,000	5,500	6,000	7,000
3	16	13	11	9	7	7	0	0	0	0	0	0	0
6	16	13	11	9	7	7	0	0	0	0	0	0	0
8	16	13	11	9	7	7	0	0	0	0	0	0	0
10	16	13	11	9	7	7	0	0	0	0	0	0	0
12	16	13	11	10	8	8	0	0	0	0	0	0	0
14	18	15	12	10	8	9	0	0	0	0	0	0	0
16	24	16	14	11	10	10	0	0	0	0	0	0	0
18	26	19	16	12	11	11	0	0	0	0	0	0	0
20	30	21	18	13	12	13	0	0	0	0	0	0	0
22	30	23	20	14	12	14	0	0	0	0	0	0	0
24	35	26	20	16	13	14	0	0	0	0	0	0	0
26	37	28	22	18	14	16	0	0	0	0	0	0	0
30	42	32	25	19	17	20	0	0	0	0	0	0	0

Initial Supporting table - CylModeJerk

40	55	40	32	24	22	26	0	0	0	0	0	0	0
60	70	55	45	30	35	37	0	0	0	0	0	0	0
78	100	73	58	40	40	46	0	0	0	0	0	0	0
97	125	89	71	50	50	57	0	0	0	0	0	0	0

Initial Supporting table - EngineOverSpeedLimit

Description: Engine OverSpeed Limit versus gear

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

EngineOverSpeedLimit - Part 1

y/x	CeTGRR_e_TransGr1	CeTGRR_e_TransGr2	CeTGRR_e_TransGr3	CeTGRR_e_TransGr4	CeTGRR_e_TransGr5	CeTGRR_e_TransGr6	CeTGRR_e_TransGrEVT1
1	5,600	5,600	5,600	5,600	5,600	5,600	5,600

EngineOverSpeedLimit - Part 2

y/x	CeTGRR_e_TransGrEVT2	CeTGRR_e_TransGrNeut	CeTGRR_e_TransGrRvrs	CeTGRR_e_TransGrPark	CeTGRR_e_TransGr7	CeTGRR_e_TransGr8	
1	5,600	4,000	5,600	4,000	5,600	5,600	

Initial Supporting table - IdleCyl_Decel

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	1,400	1,600	1,800	2,000
3	2,090	1,105	650	420	350	195	160	120	80	45	35	34	24
6	2,090	1,105	650	420	350	195	160	120	80	45	35	34	24
8	2,305	1,200	715	475	350	195	160	120	80	45	35	34	24
10	2,675	1,355	800	550	360	215	160	120	80	45	35	34	24
12	2,990	1,500	910	610	400	230	155	130	80	45	40	34	26
14	3,090	1,555	900	600	425	270	180	140	80	45	40	38	28
16	3,835	1,900	1,100	750	500	320	200	150	100	50	45	38	35
18	4,300	2,145	1,300	850	600	350	220	170	120	50	50	53	40
20	5,295	2,595	1,500	1,000	700	425	280	190	120	60	50	59	45
22	5,875	2,850	1,700	1,100	700	450	310	210	120	60	50	62	49
24	6,200	3,075	2,000	1,200	800	550	340	230	120	60	100	72	55
26	6,480	3,225	2,050	1,300	875	575	370	250	120	60	110	80	59
28	6,765	3,315	2,235	1,345	885	600	400	270	120	70	115	82	62
30	7,195	3,525	2,380	1,425	935	650	430	290	120	90	125	90	68
32	7,625	3,730	2,520	1,510	995	700	460	310	120	120	130	91	69
34	8,055	3,935	2,665	1,595	1,050	740	490	330	120	150	135	96	73
36	8,485	4,140	2,805	1,675	1,105	775	510	350	120	160	142	101	77

Initial Supporting table - IdleCyl_Jerk

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	1,400	1,600	1,800	2,000
3	1,880	990	600	400	280	190	129	90	75	45	30	30	20
6	1,880	990	600	400	280	190	120	90	75	45	30	30	20
8	1,880	990	600	400	280	190	120	90	75	45	30	30	20
10	2,145	1,100	700	450	290	190	120	90	75	45	31	30	20
12	2,625	1,305	750	525	375	200	130	90	75	45	31	30	20
14	2,785	1,380	800	550	400	210	135	100	75	45	35	30	22
16	3,415	1,690	950	625	500	320	160	105	100	50	45	30	30
18	2,840	1,915	1,100	825	580	350	170	130	100	50	45	50	35
20	4,765	2,340	1,300	950	650	425	250	150	100	60	45	57	40
22	5,290	2,570	1,400	1,100	650	450	280	170	100	60	45	57	45
24	6,275	3,060	2,000	1,200	800	550	310	190	100	60	95	67	50
26	6,585	3,225	2,050	1,300	875	575	340	210	100	60	105	75	53
28	6,535	3,175	2,220	1,340	870	600	370	230	100	70	110	77	57
30	6,975	3,385	2,380	1,430	935	650	475	250	100	90	125	85	60
32	7,420	3,595	2,510	1,510	980	690	430	270	100	120	127	87	64
34	7,865	3,805	2,655	1,595	1,035	730	460	290	100	150	129	92	69
36	8,310	4,015	2,800	1,680	1,090	765	480	310	100	160	136	97	72

Initial Supporting table - 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	1,400	1,600	1,800	2,000
3	838	424	265	170	117	83	62	50	32,767	32,767	32,767	32,767	32,767
6	810	416	265	170	117	83	62	50	32,767	32,767	32,767	32,767	32,767
8	886	459	280	200	125	90	65	50	32,767	32,767	32,767	32,767	32,767
10	1,126	570	325	200	140	90	65	55	32,767	32,767	32,767	32,767	32,767
12	1,215	615	350	230	160	110	70	65	32,767	32,767	32,767	32,767	32,767
14	1,529	764	375	240	175	120	75	75	32,767	32,767	32,767	32,767	32,767
16	1,745	870	450	300	200	140	85	85	32,767	32,767	32,767	32,767	32,767
18	1,953	963	525	350	240	160	100	100	32,767	32,767	32,767	32,767	32,767
20	2,170	1,061	600	400	280	190	115	110	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
28	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
32	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
34	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
36	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - 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	1,400	1,600	1,800	2,000
3	782	410	200	170	117	80	40	50	32,767	32,767	32,767	32,767	32,767
6	782	410	200	170	117	80	40	50	32,767	32,767	32,767	32,767	32,767
8	785	419	200	150	100	80	40	50	32,767	32,767	32,767	32,767	32,767
10	1,032	526	260	165	110	90	40	55	32,767	32,767	32,767	32,767	32,767
12	1,292	630	250	200	150	100	40	55	32,767	32,767	32,767	32,767	32,767
14	1,541	769	275	200	150	100	40	75	32,767	32,767	32,767	32,767	32,767
16	1,757	876	375	250	200	140	45	85	32,767	32,767	32,767	32,767	32,767
18	1,965	968	425	350	240	160	55	100	32,767	32,767	32,767	32,767	32,767
20	2,195	1,072	550	400	280	190	85	110	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
28	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
32	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
34	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
36	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - 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 - 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 - P0324_PerCyl_ExcessiveKnock_Threshold

Description: Fail threshold for the Knock Performance per-cylinder Excessive Knock Diagnostic

Notes: Used for P0324. Cal Name: KtKNKD_k_PerfCylFiltKnkIntThrsh. X-axis = Engine Speed (RPM), Diagnostic fails when VaKNKD_k_PerCylKnockIntFilt[cyl] > KtKNKD_k_PerfCylFiltKnkIntThrsh

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13

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	31.6738	31.8574	31.8105	31.3887	30.8320	30.7852	30.7676	30.8574	30.8730	29.6797	27.7246	27.7246	27.7246	27.7246	27.7246	27.7246	27.7246

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	12.4746	11.7598	11.5176	11.3730	11.0625	11.0430	11.0645	11.0645	11.0840	10.6895	10.1348	10.1348	10.1348	10.1348	10.1348	10.1348	10.1348

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_2

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

Notes: Used for P0325 and P0330. Cal name: KaKNKD_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 "None" (note: "None" = disabled at that rpm). 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_2 - Part 1					
y/x	0	1	2	3	4
1	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz
P0325_P0330_OpenMethod_2 - Part 2					
y/x	5	6	7	8	9
1	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz
P0325_P0330_OpenMethod_2 - Part 3					
y/x	10	11	12	13	14
1	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz
P0325_P0330_OpenMethod_2 - Part 4					
y/x	15	16			
1	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz			

Initial Supporting table - P0326_P0331_AbnormalNoise_CylsEnabled

Description: Specifies which cylinders will be used for the Abnormal Noise portion of the performance diagnostics (1 = cylinder used, 0 = cylinder not used)

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 - 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	0.349	0.352	0.363	0.374	0.419	0.466	0.575	0.693	0.830	1.147	1.637	1.643	1.643	1.643	1.643	1.643	1.643

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	-442.2	-442.2	-430.1	-417.9	-406.0	-393.8	-381.7	-369.5	-357.3	-345.4	-333.3	-321.1	-308.9	-296.8	-284.8	-272.7	-272.7
2	-442.2	-442.2	-430.1	-417.9	-406.0	-393.8	-381.7	-369.5	-357.3	-345.4	-333.3	-321.1	-308.9	-296.8	-284.8	-272.7	-272.7
3	-442.2	-442.2	-430.1	-417.9	-406.0	-393.8	-381.7	-369.5	-357.3	-345.4	-333.3	-321.1	-308.9	-296.8	-284.8	-272.7	-272.7
4	-442.2	-442.2	-430.1	-417.9	-406.0	-393.8	-381.7	-369.5	-357.3	-345.4	-333.3	-321.1	-308.9	-296.8	-284.8	-272.7	-272.7
5	-442.2	-442.2	-430.1	-417.9	-406.0	-393.8	-381.7	-369.5	-357.3	-345.4	-333.3	-321.1	-308.9	-296.8	-284.8	-272.7	-272.7
6	-442.2	-442.2	-430.1	-417.9	-406.0	-393.8	-381.7	-369.5	-357.3	-345.4	-333.3	-321.1	-308.9	-296.8	-284.8	-272.7	-272.7
7	-442.2	-442.2	-430.1	-417.9	-406.0	-393.8	-381.7	-369.5	-357.3	-345.4	-333.3	-321.1	-308.9	-296.8	-284.8	-272.7	-272.7
8	-442.2	-442.2	-430.1	-417.9	-406.0	-393.8	-381.7	-369.5	-357.3	-345.4	-333.3	-321.1	-308.9	-296.8	-284.8	-272.7	-272.7
9	-442.2	-442.2	-430.1	-417.9	-406.0	-393.8	-381.7	-369.5	-357.3	-345.4	-333.3	-321.1	-308.9	-296.8	-284.8	-272.7	-272.7
10	-442.2	-442.2	-430.1	-417.9	-406.0	-393.8	-381.7	-369.5	-357.3	-345.4	-333.3	-321.1	-308.9	-296.8	-284.8	-272.7	-272.7
11	-442.2	-442.2	-430.1	-417.9	-406.0	-393.8	-381.7	-369.5	-357.3	-345.4	-333.3	-321.1	-308.9	-296.8	-284.8	-272.7	-272.7
12	-442.2	-442.2	-430.1	-417.9	-406.0	-393.8	-381.7	-369.5	-357.3	-345.4	-333.3	-321.1	-308.9	-296.8	-284.8	-272.7	-272.7
13	-442.2	-442.2	-430.1	-417.9	-406.0	-393.8	-381.7	-369.5	-357.3	-345.4	-333.3	-321.1	-308.9	-296.8	-284.8	-272.7	-272.7
14	-442.2	-442.2	-430.1	-417.9	-406.0	-393.8	-381.7	-369.5	-357.3	-345.4	-333.3	-321.1	-308.9	-296.8	-284.8	-272.7	-272.7
15	-442.2	-442.2	-430.1	-417.9	-406.0	-393.8	-381.7	-369.5	-357.3	-345.4	-333.3	-321.1	-308.9	-296.8	-284.8	-272.7	-272.7
16	-442.2	-442.2	-430.1	-417.9	-406.0	-393.8	-381.7	-369.5	-357.3	-345.4	-333.3	-321.1	-308.9	-296.8	-284.8	-272.7	-272.7
17	-442.2	-442.2	-430.1	-417.9	-406.0	-393.8	-381.7	-369.5	-357.3	-345.4	-333.3	-321.1	-308.9	-296.8	-284.8	-272.7	-272.7

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

Description:

Notes: KtOATC_t_EstIdleCondTimePreset

P0442 Estimate of Ambient Temperature Valid Conditioning Time as a Function of Ign 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	300	330	390	450	510	600	600	600	600	600	600	588	575	563	550	538	525

P0442 Estimate of Ambient Temperature Valid Conditioning Time as a Function of Ign 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	513	500	475	450	425	400	375	350	325	300	283	267	250	233	217	200	

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	45	45	45	45	49	57	105	173	340	500	500	500	500	500	500	500	500

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	58	57	55	53	51	49	47	45	44	42	40	38	36	34	32	31	29

Initial Supporting table - P0521_Eng_Load_Stability_Weighting_Factor - Single Stage Oil Pump

Description: Engine Load Stability Weighting Factor - Single Stage Oil Pump

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_Oil_Pred_Weighting_Factor - Single Stage Oil Pump

Description: Oil Pressure Predicted Weighting Factor - Single Stage Oil Pump

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

y/x	160	170	200	275	360	375	400	450	500
1	0.00	0.10	1.00	1.00	1.00	1.00	1.00	0.25	0.00

Initial Supporting table - P0521_Oil_Temp_Weighting_Factor - Single Stage Oil Pump

Description: Oil Temperature Weighting Factor - Single Stage Oil Pump

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	0.25	0.00

Initial Supporting table - P0521_RPM_Weighting_Factor - Single Stage Oil Pump

Description: Engine RPM Weighting Factor - Single Stage Oil Pump

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	5,000	5,100	6,000
1	0.00	0.00	0.00	0.45	0.45	0.45	0.45	0.00	0.00

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

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

Notes: P0606, KaPISD_b_ProgSeqWatchEnbl

y/x	CeTSKR_e_CPU	CeTSKR_e_CPU2
CePISR_e_6p25msSeq	1	0
CePISR_e_12p5msSeq	1	0
CePISR_e_25msSeq	1	0
CePISR_e_LORES_C	1	0

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	0.436	0.416	0.422	0.434	0.447	0.500	0.559	0.953	1.416	1.859	2.729	2.729	2.729	2.729	2.729	2.729	2.729

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	0.168	0.170	0.176	0.189	0.211	0.240	0.328	0.592	1.137	1.559	2.336	2.336	2.336	2.336	2.336	2.336	2.336

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	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000
100	64.75	27.50	27.50	30.00	21.00	12.00	14.75	20.75	4.00	8.50	12.50	10.50	8.25	7.50	8.75	10.00	9,999.00
140	64.75	27.50	39.00	61.50	30.00	12.00	10.00	7.75	5.75	7.50	9.00	10.25	8.25	8.75	10.00	10.00	9,999.00
180	140.00	66.50	50.50	93.00	129.25	27.50	29.25	12.50	17.50	27.50	31.25	11.25	11.25	53.75	39.00	47.00	47.00
220	178.50	161.00	200.00	120.00	131.25	83.50	129.75	155.00	65.00	65.75	102.00	20.25	48.00	53.75	67.75	47.00	47.00
260	227.25	276.25	272.50	94.75	154.50	129.25	124.75	132.25	77.25	73.75	61.25	56.50	70.00	102.75	108.50	89.25	89.25
300	276.25	244.00	211.75	146.00	154.75	136.75	156.50	147.75	98.75	97.00	80.50	53.25	97.50	125.25	128.00	130.25	127.75
340	9,999.00	141.25	141.25	123.00	160.50	228.25	204.50	215.00	132.50	132.75	88.00	77.25	141.50	133.50	157.00	142.25	125.25
380	9,999.00	141.25	125.25	109.25	141.75	245.00	261.25	220.75	179.00	177.25	176.00	95.75	136.25	155.50	167.50	145.25	135.25
420	9,999.00	9,999.00	109.25	102.25	95.25	230.75	205.50	213.25	281.00	239.00	168.00	131.50	160.25	153.25	178.50	158.00	158.00
460	9,999.00	9,999.00	9,999.00	58.75	58.75	135.50	186.00	178.00	289.50	261.00	146.25	131.75	177.50	178.75	173.50	193.25	193.25
500	9,999.00	9,999.00	9,999.00	139.00	139.00	141.50	171.50	164.50	279.00	261.00	249.00	160.00	201.75	180.50	169.25	167.00	167.00
540	9,999.00	9,999.00	9,999.00	139.00	139.00	141.50	171.50	164.50	279.00	261.00	249.00	160.00	201.75	180.50	169.25	167.00	167.00
580	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
620	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
660	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
700	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
740	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00

Initial Supporting table - P219A Quality Factor Bank1 Table

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

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

y/x	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000
100	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
140	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
180	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
220	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
260	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
300	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
340	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
380	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
420	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
460	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
500	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
540	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
580	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
620	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
660	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
700	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
740	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	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000
100	11.75	18.00	18.00	11.25	8.00	4.50	8.50	11.25	3.00	3.50	3.25	8.25	13.50	14.50	12.50	10.50	9,999.00
140	11.75	18.00	15.00	22.00	11.25	4.50	14.00	15.50	4.25	4.25	8.00	12.25	13.50	12.50	10.50	10.50	9,999.00
180	12.50	12.00	12.00	32.75	15.50	9.50	18.00	17.25	9.00	7.50	15.50	16.25	16.25	50.75	19.25	38.75	38.75
220	23.75	21.75	21.00	62.00	24.25	21.50	22.25	29.50	11.25	10.75	27.50	38.50	47.50	50.75	28.25	38.75	38.75
260	35.50	47.25	48.00	109.50	45.50	36.50	45.50	41.00	13.75	18.50	47.50	44.00	53.75	56.00	39.25	53.25	53.25
300	47.25	74.50	101.50	123.25	82.75	67.00	46.50	47.50	20.25	23.50	53.25	62.75	57.75	59.25	62.25	58.00	78.00
340	9,999.00	190.25	190.25	199.00	133.00	69.25	92.25	66.00	24.50	26.50	51.00	68.50	54.75	76.50	50.25	74.50	98.00
380	9,999.00	190.25	224.00	257.50	239.00	95.50	65.00	89.25	39.00	32.75	62.50	62.00	89.75	84.00	61.50	83.25	90.75
420	9,999.00	9,999.00	257.50	254.50	251.50	144.75	150.50	133.50	45.00	39.50	59.00	57.25	85.25	97.50	66.00	92.75	92.75
460	9,999.00	9,999.00	9,999.00	260.00	260.00	238.00	167.50	164.50	51.00	41.50	59.00	75.50	82.00	98.00	73.75	81.00	81.00
500	9,999.00	9,999.00	9,999.00	226.50	226.50	200.00	177.00	186.00	61.00	46.75	56.75	58.75	82.50	101.75	80.50	103.00	103.00
540	9,999.00	9,999.00	9,999.00	226.50	226.50	200.00	177.00	186.00	61.00	46.75	56.75	58.75	82.50	101.75	80.50	103.00	103.00
580	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
620	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
660	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
700	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
740	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00

Initial Supporting table - P219B 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	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000
100	58.25	58.25	41.75	41.75	38.50	25.50	14.00	15.75	8.00	21.25	17.50	17.25	17.00	15.25	16.25	23.50	29.25
140	58.25	63.75	55.50	41.75	38.50	37.00	46.25	40.25	25.25	38.50	34.75	35.75	22.25	24.50	17.50	23.50	29.25
180	86.50	69.25	69.50	131.50	90.50	94.50	90.00	55.50	65.25	95.00	80.50	50.25	61.00	43.00	33.00	37.25	29.25
220	148.00	200.75	201.00	175.50	142.25	114.50	108.50	107.50	107.75	161.75	129.75	104.00	105.50	80.50	51.25	41.25	41.25
260	205.00	262.00	257.00	224.50	172.00	186.25	121.00	109.50	133.50	158.25	112.75	90.00	73.50	89.50	79.75	71.25	71.25
300	262.00	251.50	241.00	230.50	191.75	105.75	117.25	92.00	105.00	167.50	67.25	135.00	148.00	135.25	140.25	123.00	143.75
340	9,999.00	200.50	200.50	184.00	122.75	168.00	187.25	153.50	170.00	213.50	208.50	209.00	196.25	165.75	150.75	150.50	164.75
380	9,999.00	200.50	207.50	214.50	176.00	211.75	203.50	169.25	203.75	243.00	231.00	189.75	172.75	154.00	172.50	148.25	156.50
420	9,999.00	9,999.00	214.50	193.25	172.25	144.50	173.50	188.50	195.25	236.75	212.50	135.50	185.50	167.50	134.50	144.00	144.00
460	9,999.00	9,999.00	9,999.00	164.50	164.50	174.00	260.75	243.75	235.00	233.25	208.50	203.50	201.50	170.50	135.75	130.25	130.25
500	9,999.00	9,999.00	9,999.00	223.75	223.75	220.25	288.00	301.00	250.50	260.75	224.00	198.75	202.25	174.50	190.75	160.50	130.25
540	9,999.00	9,999.00	9,999.00	223.75	223.75	220.25	288.00	301.00	250.50	260.75	224.00	198.75	202.25	174.50	190.75	190.75	9,999.00
580	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
620	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
660	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
700	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
740	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00

Initial Supporting table - P219B Quality Factor Bank2 Table

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

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

y/x	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000
100	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00
140	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00
180	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
220	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
260	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
300	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
340	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
380	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
420	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
460	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
500	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
540	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
580	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
620	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
660	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
700	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
740	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	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000
100	9.50	9.50	7.00	7.00	6.50	6.25	5.50	5.50	4.00	6.25	7.25	7.50	7.75	7.75	10.50	12.00	10.75
140	9.50	10.75	11.25	7.00	6.50	7.25	10.25	10.50	6.00	7.50	9.75	16.25	16.50	15.00	13.25	12.00	10.75
180	15.50	11.75	15.50	12.50	14.75	14.75	16.25	15.00	11.50	11.50	19.50	22.75	25.00	22.50	17.75	17.75	10.75
220	26.50	19.00	27.50	22.25	35.25	31.75	22.50	20.50	20.00	11.50	24.75	22.75	29.50	16.75	20.00	18.00	18.00
260	28.50	30.50	31.25	27.00	43.50	35.25	27.50	20.75	20.00	12.75	20.75	22.75	26.25	18.00	17.25	17.75	17.75
300	30.50	31.00	31.50	43.50	47.00	43.50	29.00	27.50	21.50	25.00	29.50	22.75	30.00	22.50	16.50	13.50	15.25
340	9,999.00	32.25	32.25	38.75	70.00	56.75	36.25	33.50	26.75	22.75	32.00	28.00	36.00	28.00	26.00	22.25	17.00
380	9,999.00	32.25	40.25	48.50	63.75	47.50	40.50	34.25	25.25	24.00	42.00	44.00	55.75	32.00	29.00	26.50	21.75
420	9,999.00	9,999.00	48.50	51.75	55.25	61.00	44.00	33.25	27.50	27.00	56.50	100.50	60.25	38.50	40.50	36.00	36.00
460	9,999.00	9,999.00	9,999.00	71.75	71.75	57.25	45.75	34.50	32.00	29.75	67.50	66.75	61.25	41.00	49.50	48.25	48.25
500	9,999.00	9,999.00	9,999.00	94.25	94.25	73.50	49.50	35.50	39.00	34.00	89.00	55.00	59.00	47.25	61.50	54.75	48.25
540	9,999.00	9,999.00	9,999.00	94.25	94.25	73.50	49.50	35.50	39.00	34.00	89.00	55.00	59.00	47.25	61.50	61.50	9,999.00
580	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
620	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
660	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
700	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
740	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00

Initial Supporting table - Pair_SCD_Decel

Description: Mulitplier to P0300_SCD_Decel to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_dt_MEDRES_Opp

y/x	400	500	600	700	800	900	1,000	1,100	1,200
8	0.90	0.90	0.80	0.90	0.90	0.90	0.90	0.90	1.00
12	0.90	0.90	0.75	0.90	0.90	0.80	0.90	0.80	1.00
16	0.90	0.90	0.70	0.90	0.85	0.80	0.85	0.80	1.00
20	0.90	0.90	0.70	0.80	0.80	0.80	0.80	0.80	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - Pair_SCD_Jerk

Description: Mulitplier to P0300_SCD_Jerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_ddt_MEDRES_Opp

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

Initial Supporting table -PairCylModeDecel

Description: Mulitplier to Cyl Mode Deceleration to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_dt_LORES_Opp

y/x	500	600	700	800	900	1,000	1,100	1,200	1,400	1,800	2,200	2,600	3,000	3,001	5,000	6,000	7,000
8	0.80	0.80	0.80	0.80	0.80	0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	0.80	0.75	0.80	0.80	0.80	0.80	0.80	0.80	0.73	0.73	0.80	0.80	0.80	0.80	0.80	0.80	0.80
16	0.80	0.70	0.80	0.80	0.75	0.80	0.80	0.80	0.70	0.70	0.80	0.80	0.80	0.80	0.80	0.80	0.80
20	0.80	0.70	0.80	0.80	0.80	0.80	0.80	0.80	0.70	0.70	0.80	0.80	0.80	0.80	0.80	0.80	0.80
24	0.80	0.70	0.80	0.80	0.80	0.80	0.80	0.80	0.75	0.75	0.80	0.80	0.80	0.80	0.80	0.80	0.80
30	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.75	0.75	0.80	0.80	0.80	0.80	0.80	0.80	0.80
40	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.75	0.75	0.80	0.80	0.80	0.80	0.80	0.80	0.80
60	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.90	0.90	0.90	0.90	0.90	0.90
98	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.90	0.90	0.90	0.90	0.90	0.90

Initial Supporting table - PairCylModeJerk

Description: Mulitplier to P0300_CylModeJerk to account for different pattern of Paired cylinder misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_ddt_LORES_Opp

y/x	500	600	700	800	900	1,000	1,100	1,200	1,400	1,800	2,200	2,600	3,000	3,001	5,000	6,000	7,000
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - Random_SCD_Decel

Description: Mulitplier to SCD_Decel to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_dt_MEDRES_Emiss

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

Initial Supporting table - Random_SCD_Jerk

Description: Mulitplier to Random_SCD_Jerk to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_ddt_MEDRES_Emiss

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

Initial Supporting table - RandomAFM_Decl

Description: Mulitplier to Cylinder_Decel while in Cylnder Deactivation mode to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_dt_LORES_AFM_Emiss

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
8	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
12	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
16	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
20	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
24	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
30	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
40	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
98	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60

Initial Supporting table - RandomAFM_Jerk

Description: Mulitplier to Cylinder_Jerk while in Cylnder Deactivation mode to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_ddt_LORES_AFM_Emiss

y/x	800	1,000	1,200	1,600	2,000	2,400	2,600	3,000	3,500
8	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
12	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
16	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
20	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
24	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
30	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
40	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
60	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
98	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

Initial Supporting table - RandomCylModDecel

Description: Multiplier to P0300_CylMode_Decel. account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

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

y/x	500	600	700	800	900	1,000	1,100	1,200	1,400	1,800	2,200	2,600	3,000	3,001	5,000	6,000	7,000
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
20	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
24	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
30	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
40	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
60	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
98	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15

Initial Supporting table - RandomCylModJerk

Description: Multiplier to P0300_CylMode_Jerk to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_ddt_LORES_Emiss

y/x	500	600	700	800	900	1,000	1,100	1,200	1,400	1,800	2,200	2,600	3,000	3,001	5,000	6,000	7,000
8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table - RandomRevModDecl

Description: Mulitplier to P0300_RevMode_Decel to account for different pattern of light level misfire. Multipliers are a function of engine rpm and % engine Load.

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_RevModeEmiss

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

Initial Supporting table - RepetSnapDecayAdjst

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

Notes: Used for P0300 - P0308, Cal Name:KtMSFD_K_dddt_PostCylCnscMsfr

y/x	900	1,100	1,400	1,800	2,200	2,600	3,000	4,000	5,000
1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Initial Supporting table -RevMode_Decel

Description: 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	3,001	3,500	4,000	4,500	5,000	5,500	6,000	7,000
3	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	80	55	46	40	30	25	25	25
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	80	55	46	40	30	25	25	25
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	80	55	46	40	30	25	25	25
10	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	80	55	46	40	30	25	25	25
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	85	55	50	40	30	25	25	25
14	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	90	60	50	40	30	25	25	25
16	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	100	65	50	40	30	25	25	25
18	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	110	75	50	40	35	25	25	25
20	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	120	90	55	40	35	30	30	30
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	130	90	60	40	35	32	32	32
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	140	95	65	45	35	32	32	32
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	160	110	70	55	35	32	32	32
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	180	130	80	60	50	35	35	35
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	250	190	125	80	70	50	50	50
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	420	240	190	135	110	75	75	75
78	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	535	370	240	180	145	100	100	100
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	665	455	295	245	180	130	130	130

Initial Supporting table - 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	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00

Initial Supporting table - 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
3	838	424	250	150	100	70	50	40	32,767	32,767	32,767	32,767	32,767
6	810	416	250	150	100	70	55	40	32,767	32,767	32,767	32,767	32,767
8	886	459	260	180	115	80	60	45	32,767	32,767	32,767	32,767	32,767
10	1,126	570	325	200	140	95	70	50	32,767	32,767	32,767	32,767	32,767
12	1,215	615	350	220	150	100	75	55	32,767	32,767	32,767	32,767	32,767
14	1,529	764	450	250	180	125	90	65	32,767	32,767	32,767	32,767	32,767
16	1,745	870	500	300	200	140	100	75	32,767	32,767	32,767	32,767	32,767
18	1,953	963	545	325	220	150	105	80	32,767	32,767	32,767	32,767	32,767
20	2,170	1,061	595	355	240	160	115	85	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
78	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - SCD_Jerk

Description: 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
3	782	410	250	150	100	70	50	40	32,767	32,767	32,767	32,767	32,767
6	782	410	250	150	100	70	50	40	32,767	32,767	32,767	32,767	32,767
8	785	419	250	160	115	80	60	45	32,767	32,767	32,767	32,767	32,767
10	1,032	526	300	200	125	85	65	50	32,767	32,767	32,767	32,767	32,767
12	1,292	630	350	220	135	90	70	50	32,767	32,767	32,767	32,767	32,767
14	1,541	769	450	250	185	125	90	65	32,767	32,767	32,767	32,767	32,767
16	1,757	876	500	300	205	140	100	75	32,767	32,767	32,767	32,767	32,767
18	1,965	968	545	325	225	150	105	80	32,767	32,767	32,767	32,767	32,767
20	2,195	1,072	595	355	250	160	115	85	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
24	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
26	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
30	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
40	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
60	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
78	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
97	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - SnapDecayAfterMisfire

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

Notes: Used for P0300 - P0308, Cal Name: KtMSFD_K_dddt_PostCylAft

y/x	900	1,100	1,400	1,800	2,200	2,600	3,000	4,000	5,000
0	1.11	1.25	1.56	1.52	2.41	2.76	2.13	2.13	2.13
1	1.11	1.25	1.56	1.52	2.41	2.76	2.13	2.13	2.13
1	1.25	1.38	1.54	1.63	1.61	2.34	1.71	1.71	1.71
1	1.54	2.21	3.50	1.88	2.04	1.95	1.94	1.94	1.94
2	1.77	1.90	1.88	2.24	2.24	2.00	2.43	2.43	2.43
2	2.35	2.14	1.90	2.00	2.14	1.88	2.29	2.29	2.29
4	2.33	2.21	2.07	2.17	3.24	2.22	2.41	2.41	2.41
5	2.33	2.21	2.07	2.17	3.24	2.22	2.50	2.50	2.50
5	2.33	2.21	2.07	2.17	3.24	2.22	2.50	2.50	2.50

Initial Supporting table - 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
200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
300	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
500	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
600	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
700	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
800	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
900	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,000	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,100	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,300	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1,400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Initial Supporting table - 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	0.42	0.44	0.46	0.48	0.50	0.52	0.54	0.56	0.58	0.60	0.62	0.64	0.66	0.68	0.70	0.72

Initial Supporting table -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

ZeroTorqueEngLoad - Part 1

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
65	-5.60	-5.60	-5.60	-5.60	-5.60	-4.40	-4.20	-4.00	-4.00	-3.40	-2.80	-1.30	-0.60
75	-4.80	-4.80	-4.80	-4.80	-4.80	-3.60	-3.40	-3.20	-3.20	-2.90	-2.30	-0.80	-0.60
85	-3.80	-3.80	-3.80	-3.80	-3.80	-2.60	-2.80	-2.60	-2.60	-2.30	-2.30	-0.80	-0.60
95	-3.40	-3.40	-3.40	-3.40	-3.40	-2.20	-2.40	-2.20	-2.20	-1.90	-1.90	-0.40	-0.20
105	-3.00	-3.00	-3.00	-3.00	-3.00	-1.80	-2.00	-1.80	-1.80	-1.50	-1.50	0.00	0.20

ZeroTorqueEngLoad - Part 2

y/x	2,200	2,400	2,600	2,800	3,000	3,001	3,500	4,000	4,500	5,000	5,500	6,000	7,000
65	-1.30	-2.30	-1.50	-1.30	-1.50	-1.50	1.00	3.50	6.10	8.60	11.10	13.60	18.70
75	-1.30	-2.30	-1.50	-1.30	-1.50	-1.50	1.00	3.50	6.10	8.60	11.10	13.60	18.70
85	-1.30	-2.30	-1.50	-1.30	-1.50	-1.50	1.00	3.50	6.10	8.60	11.10	13.60	18.70
95	-0.90	-1.90	-1.10	-0.90	-1.10	-1.10	1.40	3.90	6.50	9.00	11.50	14.00	19.10
105	-0.50	-1.50	-0.70	-0.50	-0.70	-0.70	1.80	4.30	6.90	9.40	11.90	14.40	19.50

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	375	375
CiFCLP_Idle	375	375
CiFCLP_Cruise	375	375
CiFCLP_LightAccel	375	375
CiFCLP_HeavyAccel	375	375

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	86

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	550

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	255

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 - 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	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

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	55.0	45.0	35.0	20.0	10.0	8.0	5.0	5.0	8.0	8.0	8.0	8.0

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	55.0	45.0	35.0	20.0	10.0	8.0	5.0	5.0	8.0	8.0	8.0	8.0

Initial Supporting table - P050D_P1400_CatalystLightOffExtendedEngineRunTimeExit

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

Notes: KtCSEC_t_ExtendedEngineExit. Used for both P050D and P1400.

y/x	0	25	50	75	100
0.000	90	90	90	90	90
0.125	90	90	90	90	90
0.250	90	90	90	90	90
0.375	90	90	90	90	90
0.500	90	90	90	90	90
0.625	90	90	90	90	90
0.750	90	90	90	90	90
0.875	90	90	90	90	90
1.000	90	90	90	90	90

Initial Supporting table - P1400_ColdStartDiagnosticDelayBasedOnEngineRunTime

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

Notes: KtCSED_K_TimeWght - This is used for P1400.

y/x	0	1	2	3	3	10	15	20	30
1	0	0	0	1	1	1	1	1	1

Initial Supporting table - P1400_ColdStartDiagnosticDelayBasedOnEngineRunTimeCalAxis

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

Notes: KnCSED_t_TimeWght - This is used for P1400.

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

Initial Supporting table -P1400_EngineSpeedResidual_Table

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

Notes: KtCSED_dm_Exh - This is used for P1400

y/x	500	600	670	710	740	760	780	800	820	840	850	950	1,000	1,100	1,300	1,800	2,200
1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Initial Supporting table - P1400_SparkResidual_Table

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

Notes: KtCSED_E_ExhEngyPerUnitMass

y/x	-8	-5	-2	5	8	14	18	20	25
1	8.00	8.00	8.00	8.00	6.00	2.00	2.00	2.00	2.00

Initial Supporting table - P057B KtBRKI_K_FastTestPointWeight

Description:

Notes:

y/x	0.000	0.050	0.080	0.250	0.350	0.450	0.550	0.750	1.000
1	0	1	1	1	1	1	1	1	1

Initial Supporting table -DFCO_CoolEnblHi_Temp

Description:

Notes:

y/x	-40	0	25
1	30.0	30.0	30.0

Initial Supporting table - DFCO_DelayAfterStart_Time

Description:

Notes:

y/x	-30	-10	20	50	100
1	120.0	84.0	30.0	30.0	30.0

Initial Supporting table - DFCO_DsblLo_Vehicle_Speed

Description:

Notes:

y/x	CeTCOR_e_NonEcoMode	CeTCOR_e_EcoMode
CeTGRR_e_TransGr1	0	0
CeTGRR_e_TransGr2	0	0
CeTGRR_e_TransGr3	0	0
CeTGRR_e_TransGr4	0	0
CeTGRR_e_TransGr5	0	0
CeTGRR_e_TransGr6	0	0
CeTGRR_e_TransGrEVT1	0	0
CeTGRR_e_TransGrEVT2	0	0
CeTGRR_e_TransGrNeut	0	0
CeTGRR_e_TransGrRvrs	0	0
CeTGRR_e_TransGrPark	0	0
CeTGRR_e_TransGr7	0	0
CeTGRR_e_TransGr8	0	0

Initial Supporting table - DFCO_EnblHi_Vehicle_Speed

Description:

Notes:

y/x	CeTCOR_e_NonEcoMode	CeTCOR_e_EcoMode
CeTGRR_e_TransGr1	20.0	20.0
CeTGRR_e_TransGr2	32.0	32.0
CeTGRR_e_TransGr3	35.0	35.0
CeTGRR_e_TransGr4	35.0	35.0
CeTGRR_e_TransGr5	0.0	0.0
CeTGRR_e_TransGr6	0.0	0.0
CeTGRR_e_TransGrEVT1	0.0	0.0
CeTGRR_e_TransGrEVT2	0.0	0.0
CeTGRR_e_TransGrNeut	0.0	0.0
CeTGRR_e_TransGrRvrs	0.0	0.0
CeTGRR_e_TransGrPark	0.0	0.0
CeTGRR_e_TransGr7	0.0	0.0
CeTGRR_e_TransGr8	0.0	0.0

Initial Supporting table - DFCO_EngSpdEnblOfst

Description:

Notes:

y/x	-2,500	-2,150	-1,500	-500	-200	-150	-100	-50	0
1	500	0	0	0	0	0	0	0	0

Unique Supporting table - P0461 P2066 P2636 Transfer Pump Enable Time Table

Description: Data is TransferPumpOnTimeLimit (in seconds) and Axis is Fuel Level in %

Notes: KtFLVC_t_XferFuelPmpOnTmLim

P0461 P2066 P2636 Transfer Pump Enable Time Table - Part 1

y/x	0	3	6	9	13	16	19	22	25	28	31	34	38	41	44	47	50
1	0	450	450	450	450	450	450	450	450	506	563	619	675	731	788	844	900

P0461 P2066 P2636 Transfer Pump Enable Time Table - Part 2

y/x	53	56	59	63	66	69	72	75	78	81	84	88	91	94	97	100	
1	956	1,013	1,069	1,125	1,181	1,238	1,294	1,350	1,406	1,463	1,519	1,575	1,631	1,688	1,744	1,800	

Unique Supporting table - P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM

Description: P0101_P0106_P0121_P012B_P0236_P1101 MAP1 Residual Weight Factor based on RPM

Notes:

y/x	500	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,500	4,000	4,500	5,000	5,500	6,500	7,500
1	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850

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

Description: P0101_P0106_P0121_P012B_P0236_P1101 MAP2 Residual Weight Factor based on RPM

Notes:

y/x	500	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,500	4,000	4,500	5,000	5,500	6,500	7,500
1	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850

Unique 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	250	750	1,250	1,750	2,250	2,750	3,250	3,750	4,250	4,750	5,250	5,750	6,250	6,750	7,250	9,000
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

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

Description: P0101_P0106_P0121_P012B_P0236_P1101 TPS Residual Weight Factor based on RPM

Notes:

y/x	500	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,500	4,000	4,500	5,000	5,500	6,500	7,500
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

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

Description: Supercharger Intake Flow Rationality Diagnostic Failure Matrix

Notes: This table describes combinations of individual model failures that will set P0101, P0106, P012B, P0121 and P1101 on supercharged applications.

y/x	1	2	3	4	5	6	7
1	TPS Model Failure	MAF Model Failure	MAP1 Model Failure	MAP2 Model Failure	SCIAP1 Model Failure	SCIAP2 Model Failure	DTC Set
2	F	F	F	F	F	F	No DTC
3	F	F	F	F	F	T	No DTC
4	F	F	F	F	T	F	No DTC
5	F	F	F	F	T	T	P012B
6	F	F	F	T	F	F	No DTC
7	F	F	F	T	F	T	P1101
8	F	F	F	T	T	F	P1101
9	F	F	F	T	T	T	P1101
10	F	F	T	F	F	F	No DTC
11	F	F	T	F	F	T	P1101
12	F	F	T	F	T	F	P1101
13	F	F	T	F	T	T	P1101
14	F	F	T	T	F	F	P0106
15	F	F	T	T	F	T	P1101
16	F	F	T	T	T	F	P1101
17	F	F	T	T	T	T	P1101
18	F	T	F	F	F	F	No DTC
19	F	T	F	F	F	T	P0101
20	F	T	F	F	T	F	No DTC
21	F	T	F	F	T	T	P0101 & P012B
22	F	T	F	T	F	F	P1101
23	F	T	F	T	F	T	P0101
24	F	T	F	T	T	F	P1101
25	F	T	F	T	T	T	P0101 & P012B
26	F	T	T	F	F	F	P1101
27	F	T	T	F	F	T	P1101
28	F	T	T	F	T	F	P1101
29	F	T	T	F	T	T	P1101
30	F	T	T	T	F	F	P1101
31	F	T	T	T	F	T	P1101
32	F	T	T	T	T	F	P1101
33	F	T	T	T	T	T	P1101
34	T	F	F	F	F	F	P0121

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

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

Unique 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	400	800	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,500
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Unique Supporting table - VCE_ECOMode_EnableTorqueHyst

Description: Entry threshold for torque based VCE mode selection when eco mode is active. VCE will be enabled for torque if the torque request is less than the max VCE torque minus this calibration in Nm.

Notes: P3400: KaVCEC_M_EcoRedTrqEnterThrsh

VCE_ECOMode_EnableTorqueHyst - Part 1

y/x	CeTGRR_e_TransGr1	CeTGRR_e_TransGr2	CeTGRR_e_TransGr3	CeTGRR_e_TransGr4	CeTGRR_e_TransGr5	CeTGRR_e_TransGr6	CeTGRR_e_TransGrEVT1
1	15	15	15	15	15	15	15

VCE_ECOMode_EnableTorqueHyst - Part 2

y/x	CeTGRR_e_TransGrEVT2	CeTGRR_e_TransGrNeut	CeTGRR_e_TransGrRvrs	CeTGRR_e_TransGrPark	CeTGRR_e_TransGr7	CeTGRR_e_TransGr8	
1	15	15	15	15	15	15	

Unique Supporting table - VCE_ECOMode_MaxTorque_Gr5

Description: CeTGRR_e_TransGr5 maximum indicated torque (Nm) allowed in VCE mode when Eco Mode is active. Function of engine speed.

Notes: For P3400: KaVCEC_M_EcoRedTrqMaxIndThrsh

VCE_ECOMode_MaxTorque_Gr5 - Part 1

y/x	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,700
1	75	75	75	75	75	75	171	187	188	189	194	195	196

VCE_ECOMode_MaxTorque_Gr5 - Part 2

y/x	1,800	1,900	2,000	2,100	2,200	2,300	2,400	2,500	2,600	2,700	2,800	2,900	3,000
1	201	204	207	210	214	215	218	220	221	225	226	227	231

Unique Supporting table -VCE_EngineRPM_LowerLmt

Description: Engine speed lower limit for AFM

Notes: For P3400: KaVCEC_n_EngineSpeedLowerLimit with axis defined by gear state. In VCE mode, engine speed less than this will force an exit. In non-VCE mode, engine speed greater than this plus hysteresis enables VCE mode.

VCE_EngineRPM_LowerLmt - Part 1

y/x	CeTGRR_e_TransGr1	CeTGRR_e_TransGr2	CeTGRR_e_TransGr3	CeTGRR_e_TransGr4	CeTGRR_e_TransGr5	CeTGRR_e_TransGr6	CeTGRR_e_TransGrEVT1
1	900	900	900	900	900	900	900

VCE_EngineRPM_LowerLmt - Part 2

y/x	CeTGRR_e_TransGrEVT2	CeTGRR_e_TransGrNeut	CeTGRR_e_TransGrRvrs	CeTGRR_e_TransGrPark	CeTGRR_e_TransGr7	CeTGRR_e_TransGr8	
1	900	900	900	900	900	900	

Unique Supporting table - VCE_EngineRPM_UpperLmt

Description: Engine speed upper limit for AFM

Notes: For P3400: KaVCEC_n_EngineSpeedUpperLimit: with axis defined by gear state. In VCE mode,engine speed greater than this will force an exit. In non-VCE mode, engine speed less than this minus hysteresis enables VCE mode.

VCE_EngineRPM_UpperLmt - Part 1

y/x	CeTGRR_e_TransGr1	CeTGRR_e_TransGr2	CeTGRR_e_TransGr3	CeTGRR_e_TransGr4	CeTGRR_e_TransGr5	CeTGRR_e_TransGr6	CeTGRR_e_TransGrEVT1
1	2,900	2,900	2,900	2,900	2,900	2,900	2,900

VCE_EngineRPM_UpperLmt - Part 2

y/x	CeTGRR_e_TransGrEVT2	CeTGRR_e_TransGrNeut	CeTGRR_e_TransGrRvrs	CeTGRR_e_TransGrPark	CeTGRR_e_TransGr7	CeTGRR_e_TransGr8	
1	2,900	2,900	2,900	2,900	2,900	2,900	

Unique Supporting table - VCE_MinVacReducedTorqMode

Description: Minimum Vacuum allowed in VCE mode

Notes: For P3400: KtVCEC_p_MinVacReducedTrqMode

VCE_MinVacReducedTorqMode - Part 1									
y/x	500	600	700	800	900	1,000	1,100	1,200	1,300
1	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0

VCE_MinVacReducedTorqMode - Part 2									
y/x	1,400	1,500	1,600	1,700	1,800	1,900	2,000	2,100	2,200
1	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0

VCE_MinVacReducedTorqMode - Part 3									
y/x	2,300	2,400	2,500	2,600	2,700	2,800	2,900	3,000	
1	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	

Unique Supporting table - VCE_NormalMode_EnableTorqueHyst

Description: Entry threshold for torque based VCE mode selection when eco mode is NOT active. VCE will be enabled for torque if the torque request is less than the max VCE torque minus this calibration in Nm.

Notes: For P3400: KaVCEC_M_RedTrqEnterThrsh

VCE_NormalMode_EnableTorqueHyst - Part 1

y/x	CeTGRR_e_TransGr1	CeTGRR_e_TransGr2	CeTGRR_e_TransGr3	CeTGRR_e_TransGr4	CeTGRR_e_TransGr5	CeTGRR_e_TransGr6	CeTGRR_e_TransGrEVT1
1	20	20	20	20	20	20	20

VCE_NormalMode_EnableTorqueHyst - Part 2

y/x	CeTGRR_e_TransGrEVT2	CeTGRR_e_TransGrNeut	CeTGRR_e_TransGrRvrs	CeTGRR_e_TransGrPark	CeTGRR_e_TransGr7	CeTGRR_e_TransGr8	
1	20	20	20	20	20	20	

Unique Supporting table - VCE_NormalMode_MaxTorque_Gr5

Description: CeTGRR_e_TransGr5 maximum indicated torque (Nm) allowed in VCE mode when Eco Mode is NOT active. Function of engine speed.

Notes: For P3400: KaVCEC_M_RedTrqMaxIndThrsh

VCE_NormalMode_MaxTorque_Gr5 - Part 1

y/x	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600	1,700
1	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10

VCE_NormalMode_MaxTorque_Gr5 - Part 2

y/x	1,800	1,900	2,000	2,100	2,200	2,300	2,400	2,500	2,600	2,700	2,800	2,900	3,000
1	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10

Unique Supporting table - VCE_PRNDL_NI_Disables

Description: Disables VCE mode in certain PRNDL positions when Neutral Idle Overrides (AFM at Idle) are active.

Notes: For P3400: KaVCEC_b_DisabledForPRNDL_NI

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE

Unique Supporting table - VCE_StartUpDelayTime

Description: Engine running enablement based on an engine off time

Notes: For P3400: KtVCEC_t_StartupDelayTime with axis a function of engine mode not running time (VeEMDC_t_EngModeNotRun)

y/x	0	5	10	30	60	100	120	140	160	180	240	300	360	420	600	700	800
1	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20

Unique Supporting table - VCE_TransGear_Disables

Description: Disables VCE mode for specific transmission gear state.

Notes: For P3400: KaVCEC_b_DisableForTransGr See VCE_TransGear_Axis supporting table for axis definition

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13
1	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE	FALSE	TRUE

Unique Supporting table - VCE_TransGear_DisablesNI

Description: Disables VCE mode for specific transmission gear state when in Neutral Idle

Notes: For P3400: KaVCEC_b_DisableForTransGrNI See VCE_TransGear_Axis supporting table for axis definition

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

Unique Supporting table - VCE_VehicleSpeed_PRNDL_Enable

Description: This disables VCE mode in certain PRNDL positions when vehicle speed is equal to or above this cal.

Notes: For P3400: KaVCEC_v_DisabledForPRNDL See VCE_PRNDL_Axis supporting table for axis definition

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	0	0	68	82	101	122	181	0	0	0	0	0	0	0	0	0	0	0	0	0

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

Description: P0101_P0106_P010B_P0121_P012B_P0236_P1101 MAF1 Residual Weight Factor based on MAF Est

Notes:

y/x	0	50	70	73	76	79	82	85	89	95	100	110	120	150	200	280	350
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

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

Description: P0101_P0106_P010B_P0121_P012B_P0236_P1101 MAF1 Residual Weight Factor based on RPM

Notes:

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

Unique Supporting table - P0089 - P163A - P228C - P228D - P0191 - KtFHPD_t_PumpCntrlEngRunThrsh

Description: The High Pressure Control Performance Diagnostic and Pump Current Diagnostic will not run when the engine run time is below this timer following an engine start.

Notes:

y/x	-30	-20	-10	0	10	20	80	100	110
1	120.0	120.0	80.0	60.0	60.0	60.0	60.0	80.0	120.0

Unique Supporting table - P00C6 - KtFHPC_p_HighPressStart

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

Notes:

y/x	-40	-35	-30	-25	-20	-10	0	8	16	20	24	32	40	60	80	90	112
0	12.0	12.0	12.0	11.0	9.0	6.3	3.4	2.1	1.2	1.2	1.2	1.2	1.1	1.0	1.0	1.0	1.0
13	12.0	12.0	12.0	11.0	9.0	6.3	3.4	2.1	1.2	1.2	1.2	1.2	1.1	1.0	1.0	1.0	1.0
25	12.0	12.0	12.0	12.0	8.0	7.0	5.0	4.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0
38	13.0	13.0	13.0	13.0	10.0	8.6	6.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
50	13.0	13.0	13.0	13.0	10.0	8.6	6.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
63	13.0	13.0	13.0	13.0	10.0	8.6	6.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
75	13.0	13.0	13.0	13.0	10.0	8.6	6.0	5.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
88	13.0	13.0	13.0	13.0	10.0	8.6	7.0	6.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
100	13.0	13.0	13.0	13.0	10.0	8.6	7.5	7.0	6.0	5.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0

Unique Supporting table - P00C6 - KtFHPC_t_HighPressStartTmout

Description: High Pressure Pump Control Mode will exit (Fuel will be delivered) if this timeout in seconds is reached.

Notes:

y/x	-40	-35	-30	-25	-20	-10	0	8	16	20	24	32	40	60	80	90	112
1	10.0	10.0	10.0	10.0	10.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Unique Supporting table - P00C6 - KtFHPD_Cnt_HPS_PressFallLoThrsh

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

Notes:

y/x	-40	-35	-30	-25	-20	-10	0	8	16	20	24	32	40	60	80	90	112
0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
13	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
25	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
38	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
50	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
63	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
75	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
88	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
100	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0

Unique Supporting table - P00C6 - KtFHPD_p_HPS_PressFallLoThrsh

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

Notes: Axes are

y/x	-40	-35	-30	-25	-20	-10	0	8	16	20	24	32	40	60	80	90	112
0	2.0	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
13	2.0	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
25	2.0	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
38	2.0	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
50	2.0	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
63	2.0	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
75	2.0	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
88	2.0	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
100	2.0	2.0	2.0	2.0	2.0	2.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6

Unique Supporting table - P0191 - KtFHPD_cmp_DPS_FailHiThrsh (Dual Sensors)

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

Notes:

y/x	0.00	0.40	2.50	3.00	8.00	20.00	24.00	28.00	32.00
1.00	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19

Unique Supporting table - P0191 - KtFHPD_cmp_DPS_FailLoThrsh (Dual sensors)

Description: Low fail limit of fuel control due to pressure sensor error as Function of desired pressure

Notes:

y/x	0.00	0.40	2.50	3.00	8.00	20.00	24.00	28.00	32.00
1.00	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85

Unique Supporting table - P0521_LowMinOilPresFail - Two Stage Oil Pump

Description: Minimum expected oil presure readings

Notes: For P0521: KtLUBD_p_OP_SnsrMinOilPresFail with X Axis is defined by KnLUBD_n_OP_SnsrMinRPMAxs

y/x	1,000.0	1,500.0	2,000.0	2,500.0	3,000.0	3,500.0	4,000.0	4,500.0	5,500.0
1.0	48.4	77.4	110.0	122.5	135.1	139.8	143.1	141.2	134.0

Unique Supporting table - P0521_P06DD_P06DE_OP_HiStatePressure

Description: Two Stage Oil Pump Oil Pressure in High State

Notes: For P0521, P06DD and P06DE: KtLUBD_p_OP_OilPresHighState with X Axis is defined by KnLUBD_n_OP_OilPresRPMAxs and Y Axis is defined by KnLUBD_T_OP_OilPresTempAxs

y/x	-7.0	0.0	20.0	40.0	60.0	80.0	100.0	120.0	140.0
1,000.0	463.2	463.2	371.0	371.0	339.0	285.0	237.0	180.0	127.0
1,500.0	470.9	470.9	389.0	384.0	372.0	337.0	289.0	246.0	194.0
2,000.0	488.9	488.9	399.0	391.0	382.0	345.0	318.0	272.0	238.0
2,500.0	506.9	506.9	394.0	382.0	382.0	345.0	323.0	294.0	263.0
3,000.0	477.1	477.1	395.0	377.0	366.0	355.0	335.0	302.0	277.0
3,500.0	477.1	477.1	402.0	373.0	369.0	352.0	323.0	299.0	272.0
4,000.0	477.1	477.1	446.0	384.0	372.0	353.0	327.0	303.0	274.0
4,500.0	477.1	477.1	453.0	390.0	374.0	355.0	321.0	290.0	264.0
5,500.0	477.1	477.1	509.0	387.0	370.0	339.0	301.0	270.0	247.0

Unique Supporting table - P06DD_P06DE_MaxEnableTorque_OP

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

Notes: For P06DD and P06DE: KtLUBD_M_OP_InDiagEngTorqMax with X Axis is defined by KnLUBD_n_OP_InDiEngTorqMxRPMAxs

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

Unique Supporting table -P06DD_P06DE_MinEnableTorque_OP

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

Notes: For P06DD and P06DE: KtLUBD_M_OP_InDiagEngTorqMin with X Axis is defined by KnLUBD_n_OP_InDiEngTorqMnRPMAxs

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

Unique Supporting table - P06DD_P06DE_MinOilPressThresh

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

Notes: For P06DD and P06DE: KtLUBD_p_InDiagMinPresThresh with X Axis is defined by KnLUBD_n_OP_OilPresRPMAxs and Y Axis is defined by KnLUBD_T_OP_OilPresTempAxs

y/x	-7	0	20	40	60	80	100	120	140
1,000	39	39	39	39	39	39	39	39	39
1,500	67	67	67	67	67	67	67	67	67
2,000	101	101	101	101	101	101	101	101	101
2,500	116	116	116	116	116	116	116	116	116
3,000	127	127	127	127	127	127	127	127	127
3,500	138	138	138	138	138	138	138	138	138
4,000	148	148	148	148	148	148	148	148	148
4,500	153	153	153	153	153	153	153	153	153
5,500	163	163	163	163	163	163	163	163	163

Unique Supporting table - P06DD_P06DE_OP_LoStatePressure

Description: Two Stage Oil Pump Oil Pressure in Low State

Notes: For P06DD and P06DE: KtLUBD_p_OP_OilPresLowState with X Axis is defined by KnLUBD_n_OP_OilPresRPMAxs and Y Axis is defined by KnLUBD_T_OP_OilPresTempAxs

y/x	-7	0	20	40	60	80	100	120	140
1,000	325	325	251	251	248	243	228	177	131
1,500	333	333	257	257	258	256	246	230	186
2,000	335	335	260	259	260	258	256	238	220
2,500	336	336	265	264	263	259	257	244	233
3,000	331	331	271	266	259	256	262	248	238
3,500	335	335	269	263	261	261	258	246	235
4,000	335	335	297	265	266	264	258	250	241
4,500	335	335	295	269	266	270	258	246	234
5,500	335	335	327	280	272	267	251	238	224

Unique Supporting table - P06DD_P06DE_OP_StateChangeMin

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

Notes: For P06DD and P06DE: KtLUBD_p_OP_StateChangeMin with X Axis is defined by KnLUBD_n_OP_OilPresRPMAxs and Y Axis is defined by KnLUBD_T_OP_OilPresTempAxs

y/x	-7.0	0.0	20.0	40.0	60.0	80.0	100.0	120.0	140.0
1,000.0	5.0	5.0	25.0	40.0	17.0	5.0	5.0	5.0	5.0
1,500.0	5.0	5.0	43.0	42.0	38.0	27.0	5.0	5.0	5.0
2,000.0	5.0	5.0	46.0	43.0	40.0	29.0	20.0	5.0	5.0
2,500.0	5.0	5.0	43.0	39.0	39.0	29.0	19.0	16.0	5.0
3,000.0	5.0	5.0	41.0	36.0	35.0	32.0	24.0	18.0	5.0
3,500.0	5.0	5.0	44.0	36.0	36.0	30.0	21.0	17.0	5.0
4,000.0	5.0	5.0	49.0	39.0	35.0	30.0	23.0	5.0	5.0
4,500.0	5.0	5.0	50.0	40.0	36.0	28.0	21.0	5.0	5.0
5,500.0	5.0	5.0	60.0	35.0	16.0	16.0	16.0	5.0	5.0

Unique Supporting table - P0806 EngTorqueThreshold Table

Description: The diagnostic is inhibited if torque (NM) is less than this value. Prevents false fails in regions where false in-gear N/TOS ratios are possible due to low torque, where high torque would otherwise cause slip and prevent a valid in-gear state.

Notes: DTCs: P0806; Calibration Name: KtMTCI_M_TorqueEnable; Axis label is Percent Clutch Pedal Position (%), where 0% = bottom of pedal travel. Calibration value units are torque (Newton-Meters).

y/x	0.00	6.25	12.50	18.75	25.00	31.25	37.50	43.75	50.00	56.25	62.50	68.75	75.00	81.25	87.50	93.75	100.00
1	50.0	50.0	50.0	53.0	59.0	69.0	83.0	106.0	125.0	130.0	-8,192.0	-8,192.0	-8,192.0	-8,192.0	-8,192.0	-8,192.0	-8,192.0

Unique Supporting table - P0806 ResidualErrEnableHigh Table

Description: Represents the upper threshold of a deadband where the diagnostic will be inhibited to prevent false fails due to clutch slip that can falsely indicate a valid in-gear N/TOS ratio. The lower threshold of the deadband is represented by the table "P0806 ResidualErrEnableLow Table". A lower threshold value that is greater than or equal to the upper threshold for the same gear is an indication that this portion of the diagnostic's enable critera is ignored in that gear. Conversely if the lower threshold value is at or near 0% and the upper threshold for the same gear is at or near 100%, then diagnosis is not enabled in that gear.

Notes: DTCs: P0806; Calibration Name: KaMTCI_Pct_ResidErrCalcEnbHigh; Axis identifies Gear, where "0" - "5" is gear 1 - 6, respectively; "6" is reverse or 7th gear, if equipped, and "7" is neutral. Calibration value units are Percent Clutch Pedal Position (%), where 0% = bottom of pedal travel.

y/x	0	1	2	3	4	5	6	7
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Unique Supporting table - P0806 ResidualErrEnableLow Table

Description: Represents the lower threshold of a deadband where the diagnostic will be inhibited to prevent false fails due to clutch slip that can falsely indicate a valid in-gear N/TOS ratio. The upper threshold of the deadband is represented by the table "P0806 ResidualErrEnableHigh Table". An upper threshold value that is less than or equal to the lower threshold for the same gear is an indication that this portion of the diagnostic's enable critera is ignored in that gear. Conversely if the lower threshold value is at or near 0% and the upper threshold for the same gear is at or near 100%, then diagnosis is not enabled in that gear.

Notes: DTCs: P0806; Calibration Name: KaMTCI_Pct_ResidErrCalcEnbLow; Axis identifies Gear, where "0" - "5" is gear 1 - 6, respectively; "6" is reverse or 7th gear, if equipped, and "7" is neutral. Calibration value units are Percent Clutch Pedal Position (%), where 0% = bottom of pedal travel.

y/x	0	1	2	3	4	5	6	7
1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Unique Supporting table - P050D_P1400_CatalystLightOffExtendedEngineRunTimeExit

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

Notes: KtCSEC_t_ExtendedEngineExit. Used for both P050D and P1400.

y/x	0	25	50	75	100
0.000	70	70	70	70	70
0.125	70	70	70	70	70
0.250	70	70	70	70	70
0.375	70	70	70	70	70
0.500	20	20	20	20	20
0.625	20	20	20	20	20
0.750	20	20	20	20	20
0.875	20	20	20	20	20
1.000	20	20	20	20	20

Unique Supporting table - P0101, P0106, P0121, P012B, P0236, P1101: MAP1 Residual Weight Factor based on RPM

Description: P0101_P0106_P0121_P012B_P0236_P1101 MAP1 Residual Weight Factor based on RPM

Notes:

y/x	0	400	750	1,100	1,450	1,800	2,150	2,500	2,850	3,200	3,550	3,900	4,250	4,600	4,950	5,300	6,000
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.984	1.000	1.000	1.000	0.837	1.000	1.000

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

Description: P0101_P0106_P0121_P012B_P0236_P1101 MAP2 Residual Weight Factor based on RPM

Notes:

y/x	0	400	750	1,100	1,450	1,800	2,150	2,500	2,850	3,200	3,550	3,900	4,250	4,600	4,950	5,300	6,000
1	1.000	1.000	1.000	0.800	0.800	0.800	0.800	0.800	1.000	1.000	0.808	1.000	0.957	0.674	0.676	0.790	1.000

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

Description: P0101_P0106_P0121_P012B_P0236_P1101 TPS Residual Weight Factor based on RPM

Notes:

y/x	0	400	750	1,100	1,450	1,800	2,150	2,500	2,850	3,200	3,550	3,900	4,250	4,600	4,950	5,300	6,000
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.983	0.742	1.000

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

Description: P0101_P0106_P010B_P0121_P012B_P0236_P1101 MAF1 Residual Weight Factor based on RPM

Notes:

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

Unique Supporting table - P0521_P06DD_P06DE_OP_HiStatePressure

Description: Two Stage Oil Pump Oil Pressure in High State

Notes: For P0521, P06DD and P06DE: KtLUBD_p_OP_OilPresHighState with X Axis is defined by KnLUBD_n_OP_OilPresRPMAxs and Y Axis is defined by KnLUBD_T_OP_OilPresTempAxs

y/x	-7.0	0.0	20.0	40.0	60.0	80.0	100.0	105.0	120.0
1,000.0	447.0	447.0	402.0	379.0	361.0	344.0	315.0	298.0	242.0
1,200.0	471.0	471.0	409.0	393.0	378.0	363.0	344.0	332.0	282.0
1,500.0	489.0	489.0	420.0	406.0	394.0	382.0	370.0	365.0	331.0
2,000.0	524.0	524.0	444.0	434.0	424.0	414.0	398.0	392.0	369.0
2,500.0	544.0	544.0	471.0	456.0	441.0	426.0	408.0	400.0	373.0
3,000.0	641.0	641.0	499.0	466.0	446.0	438.0	420.0	412.0	379.0
3,500.0	522.0	522.0	522.0	484.0	467.0	448.0	416.0	408.0	381.0
4,000.0	538.0	538.0	538.0	499.0	471.0	448.0	417.0	408.0	380.0
4,500.0	538.0	538.0	538.0	499.0	471.0	448.0	417.0	408.0	380.0

Unique Supporting table - P06DD_P06DE_MaxEnableTorque_OP

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

Notes: For P06DD and P06DE: KtLUBD_M_OP_InDiagEngTorqMax with X Axis is defined by KnLUBD_n_OP_InDiEngTorqMxRPMAxs

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

Unique Supporting table -P06DD_P06DE_MinEnableTorque_OP

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

Notes: For P06DD and P06DE: KtLUBD_M_OP_InDiagEngTorqMin with X Axis is defined by KnLUBD_n_OP_InDiEngTorqMnRPMAxs

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

Unique Supporting table - P06DD_P06DE_MinOilPressThresh

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

Notes: For P06DD and P06DE: KtLUBD_p_InDiagMinPresThresh with X Axis is defined by KnLUBD_n_OP_OilPresRPMAxs and Y Axis is defined by KnLUBD_T_OP_OilPresTempAxs

y/x	-7	0	20	40	60	80	100	105	120
1,000	81	81	81	81	81	81	81	81	81
1,200	91	91	91	91	91	91	91	91	91
1,500	104	104	104	104	104	104	104	104	104
2,000	118	118	118	118	118	118	118	118	118
2,500	127	127	127	127	127	127	127	127	127
3,000	135	135	135	135	135	135	135	135	135
3,500	145	145	145	145	145	145	145	145	145
4,000	183	183	183	183	183	183	183	183	183
4,500	199	199	199	199	199	199	199	199	199

Unique Supporting table - P06DD_P06DE_OP_LoStatePressure

Description: Two Stage Oil Pump Oil Pressure in Low State

Notes: For P06DD and P06DE: KtLUBD_p_OP_OilPresLowState with X Axis is defined by KnLUBD_n_OP_OilPresRPMAxs and Y Axis is defined by KnLUBD_T_OP_OilPresTempAxs

y/x	-7	0	20	40	60	80	100	105	120
1,000	301	301	275	268	261	251	238	234	221
1,200	306	306	280	274	268	261	250	247	237
1,500	319	319	286	281	276	269	261	259	249
2,000	342	342	300	296	291	286	276	273	260
2,500	368	368	319	310	303	293	281	278	268
3,000	388	388	336	317	306	297	289	286	275
3,500	439	439	348	325	313	305	295	291	277
4,000	359	359	359	336	321	311	300	296	282
4,500	359	359	359	336	321	311	300	296	282

Unique Supporting table - P06DD_P06DE_OP_StateChangeMin

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

Notes: For P06DD and P06DE: KtLUBD_p_OP_StateChangeMin with X Axis is defined by KnLUBD_n_OP_OilPresRPMAxs and Y Axis is defined by KnLUBD_T_OP_OilPresTempAxs

y/x	-7.0	0.0	20.0	40.0	60.0	80.0	100.0	105.0	120.0
1,000.0	43.0	43.0	38.0	34.0	30.0	28.0	23.0	19.0	6.0
1,200.0	47.0	47.0	39.0	36.0	33.0	31.0	28.0	21.0	14.0
1,500.0	48.0	48.0	40.0	38.0	35.0	34.0	33.0	32.0	25.0
2,000.0	52.0	52.0	43.0	41.0	40.0	38.0	36.0	30.0	33.0
2,500.0	56.0	56.0	46.0	44.0	41.0	40.0	38.0	37.0	31.0
3,000.0	67.0	67.0	49.0	45.0	42.0	42.0	39.0	38.0	31.0
3,500.0	52.0	52.0	52.0	48.0	46.0	43.0	36.0	35.0	31.0
4,000.0	52.0	52.0	52.0	49.0	45.0	41.0	35.0	34.0	29.0
4,500.0	52.0	52.0	52.0	49.0	45.0	41.0	35.0	34.0	29.0

Unique Supporting table - P279A P279B P279C Transfer Case Control Module Transfer Case Command State Rationality (weighting factor)

Description: KtFWDD_Cnt_SampleWeigthting: Calibration table that defines the weighting factor used in a sample of the measured transfer case ratio for full range diagnostics, based on vehicle speed and axle torque.

KnFWDD_v_TCaseRatioMarginSpd
KnFWDD_M_TCaseRatioMarginTrq

Notes: KtFWDD_Cnt_SampleWeigthting

y/x	0.00	3.00	5.00	5.10	12.00	15.00	18.00	21.00	24.00
-200.00	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249
-150.00	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249
-100.00	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249
-50.00	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249
0.00	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249
50.00	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249
100.00	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249
150.00	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249
200.00	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249

Unique Supporting table - P279A Transfer Case Control Module Transfer Case Command State Rationality (margin of error high)

Description: LeFWDD_r_RatioHiBound_P279A = KeFWDD_r_TCaseHiRange + KtFWDD_r_TCaseHiRatioMargin

KnFWDD_v_TCaseRatioMarginSpd
KnFWDD_M_TCaseRatioMarginTrq

Notes: LeFWDD_r_RatioHiBound_P279A

y/x	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00
1.00	8.9999	8.9999	8.9999	8.9999	1.3000	1.3000	1.3000	1.3000	1.3000
2.00	8.9999	8.9999	8.9999	8.9999	1.3000	1.3000	1.3000	1.3000	1.3000
3.00	8.9999	8.9999	8.9999	8.9999	1.3000	1.3000	1.3000	1.3000	1.3000
4.00	8.9999	8.9999	8.9999	8.9999	1.3000	1.3000	1.3000	1.3000	1.3000
5.00	8.9999	8.9999	8.9999	8.9999	1.3000	1.3000	1.3000	1.3000	1.3000
6.00	8.9999	8.9999	8.9999	8.9999	1.3000	1.3000	1.3000	1.3000	1.3000
7.00	8.9999	8.9999	8.9999	8.9999	1.3000	1.3000	1.3000	1.3000	1.3000
8.00	8.9999	8.9999	8.9999	8.9999	1.3000	1.3000	1.3000	1.3000	1.3000
9.00	8.9999	8.9999	8.9999	8.9999	1.3000	1.3000	1.3000	1.3000	1.3000

Unique Supporting table - P279A Transfer Case Control Module Transfer Case Command State Rationality (margin of error low)

Description: LeFWDD_r_RatioLoBound_P279A = KeFWDD_r_TCaseHiRange - KtFWDD_r_TCaseHiRatioMargin

KnFWDD_v_TCaseRatioMarginSpd
KnFWDD_M_TCaseRatioMarginTrq

Notes: LeFWDD_r_RatioLoBound_P279A

y/x	1	2	3	4	5	6	7	8	9
1	-7.00	-7.00	-7.00	-7.00	0.70	0.70	0.70	0.70	0.70
2	-7.00	-7.00	-7.00	-7.00	0.70	0.70	0.70	0.70	0.70
3	-7.00	-7.00	-7.00	-7.00	0.70	0.70	0.70	0.70	0.70
4	-7.00	-7.00	-7.00	-7.00	0.70	0.70	0.70	0.70	0.70
5	-7.00	-7.00	-7.00	-7.00	0.70	0.70	0.70	0.70	0.70
6	-7.00	-7.00	-7.00	-7.00	0.70	0.70	0.70	0.70	0.70
7	-7.00	-7.00	-7.00	-7.00	0.70	0.70	0.70	0.70	0.70
8	-7.00	-7.00	-7.00	-7.00	0.70	0.70	0.70	0.70	0.70
9	-7.00	-7.00	-7.00	-7.00	0.70	0.70	0.70	0.70	0.70

Unique Supporting table - P279B Transfer Case Control Module Transfer Case Command State Rationality (margin of error high)

Description: LeFWDD_r_RatioHiBound_P279B = KeFWDD_r_TCaseLoRange + KtFWDD_r_TCaseLoRatioMargin

KnFWDD_v_TCaseRatioMarginSpd
KnFWDD_M_TCaseRatioMarginTrq

Notes: LeFWDD_r_RatioHiBound_P279B

y/x	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00
1.00	10.7098	10.7098	10.7098	10.7098	3.0100	3.0100	3.0100	3.0100	3.0100
2.00	10.7098	10.7098	10.7098	10.7098	3.0100	3.0100	3.0100	3.0100	3.0100
3.00	10.7098	10.7098	10.7098	10.7098	3.0100	3.0100	3.0100	3.0100	3.0100
4.00	10.7098	10.7098	10.7098	10.7098	3.0100	3.0100	3.0100	3.0100	3.0100
5.00	10.7098	10.7098	10.7098	10.7098	3.0100	3.0100	3.0100	3.0100	3.0100
6.00	10.7098	10.7098	10.7098	10.7098	3.0100	3.0100	3.0100	3.0100	3.0100
7.00	10.7098	10.7098	10.7098	10.7098	3.0100	3.0100	3.0100	3.0100	3.0100
8.00	10.7098	10.7098	10.7098	10.7098	3.0100	3.0100	3.0100	3.0100	3.0100
9.00	10.7098	10.7098	10.7098	10.7098	3.0100	3.0100	3.0100	3.0100	3.0100

Unique Supporting table - P279B Transfer Case Control Module Transfer Case Command State Rationality (margin of error low)

Description: LeFWDD_r_RatioLoBound_P279B = KeFWDD_r_TCaseLoRange - KtFWDD_r_TCaseLoRatioMargin

KnFWDD_v_TCaseRatioMarginSpd
KnFWDD_M_TCaseRatioMarginTrq

Notes: LeFWDD_r_RatioLoBound_P279B

y/x	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00
1.00	-5.2899	-5.2899	-5.2899	-5.2899	2.4099	2.4099	2.4099	2.4099	2.4099
2.00	-5.2899	-5.2899	-5.2899	-5.2899	2.4099	2.4099	2.4099	2.4099	2.4099
3.00	-5.2899	-5.2899	-5.2899	-5.2899	2.4099	2.4099	2.4099	2.4099	2.4099
4.00	-5.2899	-5.2899	-5.2899	-5.2899	2.4099	2.4099	2.4099	2.4099	2.4099
5.00	-5.2899	-5.2899	-5.2899	-5.2899	2.4099	2.4099	2.4099	2.4099	2.4099
6.00	-5.2899	-5.2899	-5.2899	-5.2899	2.4099	2.4099	2.4099	2.4099	2.4099
7.00	-5.2899	-5.2899	-5.2899	-5.2899	2.4099	2.4099	2.4099	2.4099	2.4099
8.00	-5.2899	-5.2899	-5.2899	-5.2899	2.4099	2.4099	2.4099	2.4099	2.4099
9.00	-5.2899	-5.2899	-5.2899	-5.2899	2.4099	2.4099	2.4099	2.4099	2.4099

Unique Supporting table - P279C Transfer Case Control Module Transfer Case Command State Rationality (margin of error high 1)

Description: LeFWDD_r_RatioHiBound1_P279C = KeFWDD_r_TCaseHiRange + KtFWDD_r_TCaseNeutRatioMargin

KnFWDD_v_TCaseRatioMarginSpd
KnFWDD_M_TCaseRatioMarginTrq

Notes: LeFWDD_r_RatioHiBound1_P279C

y/x	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00
1.00	8.9999	8.9999	8.9999	8.9999	1.1000	1.1000	1.1000	1.1000	1.1000
2.00	8.9999	8.9999	8.9999	8.9999	2.0000	2.0000	1.5000	1.5000	1.5000
3.00	8.9999	8.9999	8.9999	8.9999	3.0000	3.0000	2.0000	2.0000	2.0000
4.00	8.9999	8.9999	8.9999	8.9999	5.0000	5.0000	3.0000	3.0000	3.0000
5.00	8.9999	8.9999	8.9999	8.9999	8.9999	8.9999	8.9999	8.9999	8.9999
6.00	8.9999	8.9999	8.9999	8.9999	5.0000	5.0000	3.0000	3.0000	3.0000
7.00	8.9999	8.9999	8.9999	8.9999	3.0000	3.0000	2.0000	2.0000	2.0000
8.00	8.9999	8.9999	8.9999	8.9999	2.0000	2.0000	1.5000	1.5000	1.5000
9.00	8.9999	8.9999	8.9999	8.9999	1.1000	1.1000	1.1000	1.1000	1.1000

Unique Supporting table - P279C Transfer Case Control Module Transfer Case Command State Rationality (margin of error high 2)

Description: LeFWDD_r_RatioHiBound2_P279C = KeFWDD_r_TCaseLoRange + KtFWDD_r_TCaseNeutRatioMargin

KnFWDD_v_TCaseRatioMarginSpd
KnFWDD_M_TCaseRatioMarginTrq

Notes: LeFWDD_r_RatioHiBound2_P279C

y/x	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00
1.00	10.7098	10.7098	10.7098	10.7098	2.8099	2.8099	2.8099	2.8099	2.8099
2.00	10.7098	10.7098	10.7098	10.7098	3.7100	3.7100	3.2100	3.2100	3.2100
3.00	10.7098	10.7098	10.7098	10.7098	4.7100	4.7100	3.7100	3.7100	3.7100
4.00	10.7098	10.7098	10.7098	10.7098	6.7100	6.7100	4.7100	4.7100	4.7100
5.00	10.7098	10.7098	10.7098	10.7098	10.7098	10.7098	10.7098	10.7098	10.7098
6.00	10.7098	10.7098	10.7098	10.7098	6.7100	6.7100	4.7100	4.7100	4.7100
7.00	10.7098	10.7098	10.7098	10.7098	4.7100	4.7100	3.7100	3.7100	3.7100
8.00	10.7098	10.7098	10.7098	10.7098	3.7100	3.7100	3.2100	3.2100	3.2100
9.00	10.7098	10.7098	10.7098	10.7098	2.8099	2.8099	2.8099	2.8099	2.8099

Unique Supporting table - P279C Transfer Case Control Module Transfer Case Command State Rationality (margin of error low 1)

Description: LeFWDD_r_RatioLoBound1_P279C = KeFWDD_r_TCaseHiRange - KtFWDD_r_TCaseNeutRatioMargin

KnFWDD_v_TCaseRatioMarginSpd
KnFWDD_M_TCaseRatioMarginTrq

Notes: LeFWDD_r_RatioLoBound1_P279C

y/x	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00
1.00	-6.9999	-6.9999	-6.9999	-6.9999	0.9000	0.9000	0.9000	0.9000	0.9000
2.00	-6.9999	-6.9999	-6.9999	-6.9999	0.0000	0.0000	0.5000	0.5000	0.5000
3.00	-6.9999	-6.9999	-6.9999	-6.9999	-1.0000	-1.0000	0.0000	0.0000	0.0000
4.00	-6.9999	-6.9999	-6.9999	-6.9999	-3.0000	-3.0000	-1.0000	-1.0000	-1.0000
5.00	-6.9999	-6.9999	-6.9999	-6.9999	-6.9999	-6.9999	-6.9999	-6.9999	-6.9999
6.00	-6.9999	-6.9999	-6.9999	-6.9999	-3.0000	-3.0000	-1.0000	-1.0000	-1.0000
7.00	-6.9999	-6.9999	-6.9999	-6.9999	-1.0000	-1.0000	0.0000	0.0000	0.0000
8.00	-6.9999	-6.9999	-6.9999	-6.9999	0.0000	0.0000	0.5000	0.5000	0.5000
9.00	-6.9999	-6.9999	-6.9999	-6.9999	0.9000	0.9000	0.9000	0.9000	0.9000

Unique Supporting table - P279C Transfer Case Control Module Transfer Case Command State Rationality (margin of error low 2)

Description: LeFWDD_r_RatioLoBound2_P279C = KeFWDD_r_TCaseLoRange - KtFWDD_r_TCaseNeutRatioMargin

KnFWDD_v_TCaseRatioMarginSpd
KnFWDD_M_TCaseRatioMarginTrq

Notes: LeFWDD_r_RatioLoBound2_P279C

y/x	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00
1.00	-5.2899	-5.2899	-5.2899	-5.2899	2.6100	2.6100	2.6100	2.6100	2.6100
2.00	-5.2899	-5.2899	-5.2899	-5.2899	1.7100	1.7100	2.2100	2.2100	2.2100
3.00	-5.2899	-5.2899	-5.2899	-5.2899	0.7100	0.7100	1.7100	1.7100	1.7100
4.00	-5.2899	-5.2899	-5.2899	-5.2899	-1.2900	-1.2900	0.7100	0.7100	0.7100
5.00	-5.2899	-5.2899	-5.2899	-5.2899	-5.2899	-5.2899	-5.2899	-5.2899	-5.2899
6.00	-5.2899	-5.2899	-5.2899	-5.2899	-1.2900	-1.2900	0.7100	0.7100	0.7100
7.00	-5.2899	-5.2899	-5.2899	-5.2899	0.7100	0.7100	1.7100	1.7100	1.7100
8.00	-5.2899	-5.2899	-5.2899	-5.2899	1.7100	1.7100	2.2100	2.2100	2.2100
9.00	-5.2899	-5.2899	-5.2899	-5.2899	2.6100	2.6100	2.6100	2.6100	2.6100

16 OBDG07A Coolant Heater Control Module / CHCM LT1/LT4 Corvette with Manual Transmissions

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if any software or calibration check sum is incorrect	Calculated Checksum (CRC16)	≠ stored checksum for any of the parts (boot, software, application calibration, system calibration)	Ignition switch OR Ignition switch	Run or Crank Accessory	1 failure if it occurs during the first ROM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background	DTC Type A 1 trip
Control Module Not Programmed	P0602	Indicates that the ECU needs to be programmed	Calibration KeMEMD_b_NoStartCal	= TRUE	Ignition switch OR Ignition switch	Run or Crank Accessory	Runs once at power up	DTC Type A 1 trip
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up	≠ checksum at power-down	Ignition switch OR Ignition switch	Run or Crank Accessory	1 failure Frequency: Once at power-up	DTC Type A 1 trip
Control Module Random Access Memory (RAM)	P0604	Indicates that control module is unable to correctly write and read data to and from RAM	Data read	≠ Data written	Ignition switch OR Ignition switch	Run or Crank Accessory	1 failure if it occurs during the first RAM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background.	DTC Type A 1 trip
Control Module Internal Performance 1. Main Processor Configuration Register Test	P0606	Indicates the ECU has detected an internal processor fault or external watchdog fault (PID $2032 discriminates the source of fault)	 1. I/O configuration register faults: •Register contents	 =Incorrect value	Ignition switch OR Ignition switch 1. For all I/O configuration register faults: Calibration •KeMEMD_b_ProcFltCfgRegEnbl	(Run or Crank) OR Accessory TRUE	 1. 1 failure Frequency: Continuously (12.5ms)	DTC Type A 1 trip

16 OBDG07A Coolant Heater Control Module / CHCM LT1/LT4 Corvette with Manual Transmissions

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
2. Processor clock test			2. Processor Clock Fault: • EE latch flag in EEPROM OR • RAM latch flag.	 0x5A5A 0x5A	2. For Processor Clock Fault: Calibration •KeMEMD_b_ProcFltCLKDiagEnbl	 TRUE	2. 1 failure Frequency: Continuously (12.5ms)	
3. External watchdog test			3. External Watchdog Fault: • Software control of fuel pump driver	 Control Lost	3. For External Watchdog Fault: Calibration •KeFRPD_b_FPExtWDogDiagEnbl AND •Control Module ROM(P0601) AND •Control Module RAM(P0604)	 TRUE Not active Not active	3. 3 failures out of 15 samples 1 sample/12.5 ms	
Control Module Long Term Memory (EEPROM) Performance	P062F	Indicates that the NVM Error flag has not been cleared	Last EEPROM write	Did not complete	Ignition switch OR Ignition switch	(Run or Crank) OR Accessory	1 test failure Once on controller power-up	DTC Type A 1 trip
Fuel Pump Control Module Driver 1 Over-temperature	P064A	Detects if an internal fuel pump driver overtemperature condition exists under normal operating conditions	Pump Driver Temp	> 150C	Ignition switch OR Ignition switch	(Run or Crank) OR Accessory	3 failures out of 15 samples 1 sample/12.5 ms	DTC Type B 2 trips
					KeFRPD_b_FPOverTempDiagEnbl	TRUE		
					Ignition Run_Crank terminal	9V<voltage<32V		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Cylinder Deactivation Exhaust Flow Valve Control Circuit/Open	P12E3	Monitors for open circuit faults in the AFM valve PWM control circuit	Open circuit fault status AFM_VlvCntrlCktOpenFlt	== Faulted	1. Diagnostic enabled (K_b_AFM_VlvCntrlOpenEnbl) AND 2. Diagnostic system disablement not requested (DiagSystemDisable) AND 3. AFM Valve Initialization complete (AFM_ValveInitDlyCmpt) AND 4. AFM exhaust valve control not disabled remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND 5. AFM control circuit Open circuit fault status (AFM_VlvCntrlCktOpenFlt)	1. = TRUE AND 2. <> TRUE AND 3. = TRUE AND 4. <> TRUE AND 5. <> INDETERMINATE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Control Circuit Low	P12E4	Monitors for short-to-ground faults in the AFM valve PWM control circuit	Short-to-ground fault status AFM_VlvCntrlCktGshtFlt	== Faulted	1. Diagnostic enabled (K_b_AFM_VlvCntrlGshtEnbl) AND 2. Diagnostic system disablement not requested (DiagSystemDisable) AND 3. AFM Valve Initialization complete (AFM_ValveInitDlyCmpt) AND 4. AFM exhaust valve control not disabled for remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND 5. AFM control circuit Short-to-ground fault status not indeterminate (AFM_VlvCntrlCktGshtFlt)	1. = TRUE AND 2. <> TRUE AND 3. = TRUE AND 4. <> TRUE AND 5. <> INDETERMINATE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Cylinder Deactivation Exhaust Flow Valve Control Circuit High	P12E5	Monitors for short-to-power faults in the AFM valve PWM control circuit	Short-to-power fault status AFM_VlvCntrlCktPshtFlt	== Faulted	1. Diagnostic enabled (K_b_AFM_VlvCntrlPshtEnbl) AND 2. Diagnostic system disablement not requested (DiagSystemDisable) AND 3. AFM Valve Initialization complete (AFM_ValveInitDlyCmpt) AND 4. AFM exhaust valve control not disabled remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND 5. AFM control circuit Short-to-power fault status not indeterminate (AFM_VlvCntrlCktPshtFlt)	1. = TRUE AND 2. <> TRUE AND 3. = TRUE AND 4. <> TRUE AND 5. <> INDETERMINATE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feeback Circuit Low Duty Cycle (Bank 1)	P12E7	Monitors for out-of-range low duty cycle values on the AFM valve 1 diagnostic PWM feedback signal	AFM valve 1 diagnostic PWM feedback signal AFM_Valve1FdbkDC	< K_Pct_AFM_Vlv1PstnLoThrsh)	1. Diagnostic enabled (K_b_AFM_Vlv1PstnLoDiagEnbl) AND 2. AFM valve initialization complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit High Duty Cycle (Bank 1)	P12E8	Monitors for out-of-range high duty cycle values on the AFM valve 1 diagnostic PWM feedback signal	AFM valve 1 diagnostic PWM feedback signal AFM_Valve1FdbkDC	> K_Pct_AFM_Vlv1PstnHiThrsh	1. Diagnostic enabled (K_b_AFM_Vlv1PstnHiDiagEnbl) AND 2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Cylinder Deactivation Exhaust Flow Valve Open Position (Bank 1)	P12E9	Monitors the sensed AFM valve 1 position for values that are out-of-range low	AFM_Valve1State	<= ValvePstnOOR_Low)	1. Diagnostic enabled (K_b_AFM_Vlv1PstnOOR_LoEnbl) AND 2. AFM valve initialization period completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable) AND 4. AFM valve 1 position sensor circuit low diagnostic not faulted (AFM_Valve1PstnLoFP) AND 5. AFM valve 1 position sensor circuit high diagnostic not faulted (AFM_Valve1PstnHiFP)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE AND 4. <> TRUE AND 5. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Closed Position (Bank 1)	P12EA	Monitors the sensed AFM valve 1 position for values that are out-of-range high	AFM_Valve1State	>= ValvePstnOOR_High)	1. Diagnostic enabled (K_b_AFM_Vlv1PstnOOR_LoEnbl) AND 2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable) AND 4. AFM valve 1 position sensor circuit low diagnostic not faulted (AFM_Valve1PstnLoFP) AND 5. AFM valve 1 position sensor circuit high diagnostic not faulted (AFM_Valve1PstnHiFP)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE AND 4. <> TRUE AND 5. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit Low Frequency (Bank 1)	P12EB	Monitors for out-of-range high period (i.e. out-of-range low frequency) values on the AFM valve 1 diagnostic PWM feedback signal	Diagnostic PWM feedback signal_AFM_Valve1DiagFdbkSt	>= DiagFdbkPrdHigh)	1. Diagnostic enabled (K_b_AFM_Vlv1FdbkHiDiagEnbl) AND 2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit High Frequency (Bank 1)	P12EC	Monitors for out-of-range low period (i.e. out-of range high frequency) values on the AFM valve 1 diagnostic PWM feedback signal	Diagnostic PWM feedback signal_AFM_Valve1DiagFdbkSt	< = DiagFdbkPrdLow)	1. Diagnostic enabled (K_b_AFM_Vlv1FdbkLoDiagEnbl) AND 2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit Incorrect Frequency (Bank 1)	P12ED	Monitors for in-range errors that result when the sensed period of the diagnostic PWM feedback signal for AFM valve 1 is neither out-of-range low nor out-of-range high and does not fall within any of the calibrated ranges defined for diagnostic feedback data	Diagnostic PWM feedback signal_AFM_Valve1DiagFdbkSt	= DiagFdbkPrdInRngErr)	1. Diagnostic enabled (K_b_AFMV1FdbkInvldDiagEnbl) AND 2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Stuck Closed (Bank 1)	P12EF	Monitors position feedback to determine if AFM valve 1 is stuck in the closed position	Position feedback AFM_Valve1State	<> AFM_ValveCmd	1. AFM valve1 stuck diagnostics enabled (K_b_AFM_Vlv1StuckDiagEnbl) AND 2. Ignition voltage (IgnitionVoltage) AND 3. AFM Valve initialization (AFM_ValveInitDlyCmpt) AND 4. AFM valve control circuit short-to-power diagnostic fault not active (AFM_VlvCntrlPshtFA) AND 5. AFM valve control circuit short-to-ground diagnostic fault not active (AFM_VlvCntrlGshtFA) AND	1. = TRUE AND 2. >= 10.2V AND 3. = TRUE AND 4. <> TRUE AND 5. <> TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					6. AFM valve control circuit open diagnostic fault not active (AFM_VlvCntrlOpenFA) AND	6. <> TRUE AND		
					7. AFM valve1 position sensor circuit low diagnostic fault not active (AFM_Valve1PstnLoFA) AND	7. <> TRUE AND		
					8. AFM valve1 position sensor circuit high diagnostic fault not active (AFM_Valve1PstnHiFA) AND	8. <> TRUE AND		
					9. AFM valve1 position out-of-range low diagnostic fault not active (AFM_Vlv1PstnOOR_LoFA) AND	9. <> TRUE AND		
					10. AFM valve1 position out-of-range high diagnostic fault not active (AFM_Vlv1PstnOOR_HiFA) AND	10. <> TRUE AND		
					11. Diagnostic system disablement (DiagSystemDisable) AND	11. <> TRUE AND		
					12. AFM exhaust valve control not disabled for remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND	12. <> TRUE AND		
					13. AFM valve command (AFM_ValveCmd) AND	13. (= OPEN OR = CLOSED) AND		
					14. AFM valve command not changed (AFM_ValveCmd) AND	14. = AFM_ValveCmdPrev AND		
					15. AFM valve response time (AFM_Valve1ResponseTmr ≥ Ke_t_AFM_Valve1ResponseTm) AND	15. >= 1 sec AND		
					16. AFM valve position not out-of-range (AFM_Valve1State)	16. (<> ValvePstnOOR_Low AND <> ValvePstnOOR_High)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Cylinder Deactivation Exhaust Flow Valve Stuck Open (Bank 1)	P12F0	Monitors position feedback to determine if AFM valve 1 is stuck in an open position	1. (AFM valve command AND AFM_Valve1State) OR 2. (AFM valve command AND AFM_Valve1State) OR 3. (AFM valve command AND AFM_Valve1State)	1. (= Open AND =ValveInTransition) OR 2. (= Closed AND = ValvePositionOpen) OR 3. (= Closed AND =ValveInTransition)	1. The AFM valve 1 stuck diagnostics are enabled through calibration (K_b_AFM_Vlv1StuckDiagEnbl = TRUE) AND	1. = TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
					2. Ignition voltage is greater than or equal to the minimum value required to enable diagnostic execution (IgnitionVoltage ≥ K_U_AFM_Vlv1StuckMinVolt) AND	2. >= 10.2 V		
					3. Sufficient time has been allowed for initialization of the AFM valve (AFM_ValveInitDlyCmpt = TRUE) AND	3. = TRUE AND		
					4. An AFM valve control circuit short-to-power diagnostic fault is not active (AFM_VlvCntrlPshtFA = FALSE) AND	4. <> TRUE AND		
					5. An AFM valve control circuit short-to-ground diagnostic fault is not active (AFM_VlvCntrlGshtFA = FALSE) AND	5. <> TRUE AND		
					6. An AFM valve control circuit open diagnostic fault is not active (AFM_VlvCntrlOpenFA = FALSE) AND	6. <> TRUE AND		
					7. An AFM valve 1 position sensor circuit low diagnostic fault is not active (AFM_Valve1PstnLoFA = FALSE) AND	7. <> TRUE AND		
					8. An AFM valve 1 position sensor circuit high diagnostic fault is not active (AFM_Valve1PstnHiFA = FALSE) AND	8. <> TRUE AND		
					9. An AFM valve 1 position out-of-range low diagnostic fault is not active (AFM_Vlv1PstnOOR_LoFA = FALSE) AND	9. <> TRUE AND		
					10. An AFM valve 1 position out-of-range high diagnostic fault is not active (AFM_Vlv1PstnOOR_HiFA = FALSE) AND	10. <> TRUE AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					11. Diagnostic system disablement is not being requested (DiagSystemDisable = FALSE) AND	11. <> TRUE AND		
					12. Control of the AFM exhaust valve has not been disabled for the remainder of the trip due to an output driver short circuit fault (AFMV_FaultTripDsbl = FALSE) AND	12. <> TRUE AND		
					13. The AFM valve is currently being commanded to the open or closed state (AFM_ValveCmd = Open OR AFM_ValveCmd = Closed) AND	13. (= OPEN OR = CLOSED) AND		
					14. The commanded state of the AFM valve has not changed (AFM_ValveCmd = AFM_ValveCmdPrev) AND	14. <> AFM_ValveCmdPrev AND		
					15. Sufficient time has been allowed for the AFM valve to respond to a change in the commanded AFM valve state (AFM_Valve1ResponseTmr ≥ Ke_t_AFM_Valve1ResponseTm) AND	15. >= 1 sec AND		
					16. The sensed position of the AFM valve is not out-of-range (AFM_Valve1State ≠ ValvePstnOOR_Low AND AFM_Valve1State ≠ ValvePstnOOR_High)	16. (<> ValvePstnOOR_Low AND <> ValvePstnOOR_High)		
Cylinder Deactivation Exhaust Flow Valve Position Not Learned (Bank 1)	P12F1	Monitors diagnostic feedback from AFM valve 1 to determine if the valve end stops have not been learned	AFM valve diagnostic feedback status (AFM_Valve1DiagFdbkSt)	= AlignmentNotComplete	1. Diagnostic enabled (K_b_AFM_Vlv1NotLrndEnbl) AND	1. = TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
					2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND	2. = TRUE AND		
					3. Diagnostic system disablement Not requested (DiagSystemDisable) AND	3. <> TRUE AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					4. Diagnostic PWM feedback signal AFM valve1 Not out-of-range low (AFM_Valve1DiagFdbkSt) AND	4. <> DiagFdbkPrdLow AND		
					5. Diagnostic PWM feedback signal AFM valve1 Not out-of-range high (AFM_Valve1DiagFdbkSt) AND	5. <> DiagFdbkPrdHigh AND		
					6. Diagnostic PWM feedback signal Not out-of-range low, Not out-of-range high AND andNot within any calibrated feedback data range (AFM_Valve1DiagFdbkSt) AND	6. <> DiagFdbkPrdInRngErr AND		
					7. AFM valve state (AFM_Valve1DiagFdbkSt)	7. <> ActuatorFaulted		
Cylinder Deactivation Exhaust Flow Valve Actuator Performance (Bank1)	P12F2	Monitors diagnostic feedback from AFM valve 1 to determine if an internal actuator fault is present or if the AFM valve is stuck in the end stop learning mode	AFM valve command (AFM_ValveCmd) AND Position feedback (AFM_Valve1State)	(= Closed AND = ValveInTransition)	1. Diagnostic enabled (K_b_AFM_Vlv1PerfDiagEnbl) AND	1. = TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
					2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND	2. = TRUE AND		
					3. Diagnostic system disablement Not requested (DiagSystemDisable) AND	3. <> TRUE AND		
					4. AFM exhaust valve control Not disabled for remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND	4. <> TRUE AND		
					5. Diagnostic PWM feedback signal AFM valve1 not out-of-range low (AFM_Valve1DiagFdbkSt) AND	5. <> DiagFdbkPrdLow AND		
					6. Diagnostic PWM feedback signal AFM valve1 Not out-of-range high (AFM_Valve1DiagFdbkSt) AND	6. <> DiagFdbkPrdHigh AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					7. Diagnostic PWM feedback signal Not out-of-range low, Not out-of-range high AND Not in any calibrated feedback data range (AFM_Valve1DiagFdbkSt) AND 8. AFM valve fault state (AFM_Valve1DiagFdbkSt)	7. <> DiagFdbkPrdInRngErr AND 8. <> FaultStIndeterminate		
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit Low Duty Cycle (Bank 2)	P12F4	Monitors for out-of-range low duty cycle values on the AFM valve 2 diagnostic PWM feedback signal	AFM valve 2 diagnostic PWM feedback signal AFM_Valve2FdbkDC	< K_Pct_AFM_Vlv2PstnLoThrsh)	1. Diagnostic enabled (K_b_AFM_Vlv2PstnLoDiagEnbl) AND 2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit High Duty Cycle (Bank 2)	P12F5	Monitors for out-of-range high duty cycle values on the AFM valve 2 diagnostic PWM feedback signal	AFM valve 2 diagnostic PWM feedback signal AFM_Valve2FdbkDC	> K_Pct_AFM_Vlv2PstnHiThrsh)	1. Diagnostic enabled (K_b_AFM_Vlv2PstnHiDiagEnbl) AND 2. AFM valve initialization complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Open Position (Bank 2)	P12F6	Monitors the sensed AFM valve 2 position for values that are out-of-range low	AFM_Valve2State	= ValvePstnOOR_Low	1. Diagnostic enabled (K_b_AFM_Vlv2PstnOOR_LoEnbl) AND 2. AFM valve initialization complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable) AND 4. AFM valve 2 position sensor circuit low diagnostic not faulted (AFM_Valve2PstnLoFP) AND 5. AFM valve2 position sensor circuit high diagnostic unfaulted (AFM_Valve2PstnHiFP)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE AND 4. <> TRUE AND 5. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Cylinder Deactivation Exhaust Flow Valve Closed Position (Bank 2)	P12F7	Monitors the sensed AFM valve 2 position for values that are out-of-range high	AFM_Valve2State	= ValvePstnOOR_High	1. Diagnostic enabled (K_b_AFM_Vlv2PstnOOR_HiEnbl) AND 2. AFM valve initialization complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable) AND 4. AFM valve 2 position sensor circuit low diagnostic unfaulted (AFM_Valve2PstnLoFP) AND 5. AFM valve 2 position sensor circuit high diagnostic unfaulted (AFM_Valve2PstnHiFP)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE AND 4. <> TRUE AND 5. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit Low Frequency (Bank 2)	P12F8	Monitors for out-of-range high period (i.e. out-of-range low frequency) values on the AFM valve 2 diagnostic PWM feedback signal	Diagnostic PWM feedback signal AFM_Valve2DiagFdbkSt	>= DiagFdbkPrdHigh)	1. Diagnostic enabled (K_b_AFM_Vlv2FdbkHiDiagEnbl) AND 2. AFM valve initialization complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit High Frequency (Bank 2)	P12F9	Monitors for out-of-range low period (i.e. out-of-range high frequency) values on the AFM valve 2 diagnostic PWM feedback signal	Diagnostic PWM feedback signal AFM_Valve2DiagFdbkSt	< DiagFdbkPrdLow)	1. Diagnostic enabled through calibration (K_b_AFM_Vlv2FdbkLoDiagEnbl) AND 2. AFM valve initialization period has completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement is not being requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit Incorrect Frequency (Bank 2)	P12FA	Monitors for in-range errors that result when the sensed period of the diagnostic PWM feedback signal for AFM valve 2 is neither out-of-range low nor out-of-range high and does not fall within any of the calibrated ranges defined for diagnostic feedback data	Diagnostic PWM feedback signal_AFM_Valve2DiagFdbkSt	= DiagFdbkPrdInRngErr)	1. Diagnostic enabled (K_b_AFMV2FdbkInvldDiagEnbl) AND 2. AFM valve initialization period complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Stuck Closed (Bank 2)	P12FC	Monitors position feedback to determine if AFM valve 2 is stuck in the closed position	AFM valve command AND AFM Valve2 State (AFM_ValveCmd AND AFM_Valve2State)	(= Open AND = ValvePstnClosed)	1. AFM valve2 stuck diagnostics enabled (K_b_AFM_Vlv2StuckDiagEnbl) AND	1. = TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
					2. IgnitionVoltage ≥ K_U_AFM_Vlv2StuckMinVolt AND	2. V >= 10.2 V AND		
					3. AFM valve initialized (AFM_ValveInitDlyCmplt) AND	3. = TRUE AND		
					4. AFM valve control circuit short-to-power diagnostic fault (AFM_VlvCntrlPshtFA) AND	4. <> TRUE AND		
					5. AFM valve control circuit short-to-ground diagnostic fault (AFM_VlvCntrlGshtFA) AND	5. <> TRUE AND		
					6. AFM valve control circuit open diagnostic fault (AFM_VlvCntrlOpenFA) AND	6. <> TRUE AND		
					7. AFM valve2 position sensor circuit low diagnostic fault (AFM_Valve2PstnLoFA) AND	7. <> TRUE AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					8. AFM valve2 position sensor circuit high diagnostic fault (AFM_Valve2PstnHiFA) AND	8. <> TRUE AND		
					9. AFM valve2 position out-of-range low diagnostic fault (AFM_Vlv2PstnOOR_LoFA) AND	9. <> TRUE AND		
					10. AFM valve2 position out-of-range high diagnostic fault (AFM_Vlv2PstnOOR_HiFA) AND	10. <> TRUE AND		
					11. Diagnostic system disablement Not requested (DiagSystemDisable) AND	11. <> TRUE AND		
					12. AFM exhaust valve control Not disabled for remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND	12. <> TRUE AND		
					13. AFM valve command (AFM_ValveCmd) AND	13. (= Open OR = Closed) AND		
					14. AFM valve command Not changed (AFM_ValveCmd) AND	14. = AFM_ValveCmdPrev AND		
					15. AFM valve response time (AFM_Valve2ResponseTmr) AND	15. >= 1 sec AND		
					16. AFM valve position Not out-of-range (AFM_Valve2State AND AFM_Valve2State)	16. (<> ValvePstnOOR_Low AND <> ValvePstnOOR_High)		
Cylinder Deactivation Exhaust Flow Valve Stuck Open (Bank 2)	P12FD	Monitors position feedback to determine if AFM valve 2 is stuck in an open position	1. (AFM_ValveCmd AND AFM_Valve2State) OR 2. (AFM_ValveCmd AND AFM_Valve2State) OR 3. (AFM_ValveCmd AND AFM_Valve2State)	1. (= Open AND = ValveInTransition) OR 2. (= Closed AND = ValvePstnOpen) OR 3. (= Closed AND = ValveInTransition)	1. AFM valve2 stuck diagnostics enabled (K_b_AFM_Vlv2StuckDiagEnbl) AND	1. = TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
					2. Ignition voltage (IgnitionVoltage) AND	2. V >= 10.2 V AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					3. AFM valve initialization time complete (AFM_ValveInitDlyCmpt) AND	3. = TRUE AND		
					4. AFM valve control circuit short-to-power diagnostic fault (AFM_VlvCntrlPshtFA) AND	4. <> TRUE AND		
					5. AFM valve control circuit short-to-ground diagnostic fault (AFM_VlvCntrlGshtFA) AND	5. <> TRUE AND		
					6. AFM valve control circuit open diagnostic fault (AFM_VlvCntrlOpenFA) AND	6. <> TRUE AND		
					7. AFM valve2 position sensor circuit low diagnostic fault (AFM_Valve2PstnLoFA) AND	7. <> TRUE AND		
					8. AFM valve2 position sensor circuit high diagnostic fault (AFM_Valve2PstnHiFA) AND	8. <> TRUE AND		
					9. AFM valve2 position out-of-range low diagnostic fault (AFM_Vlv2PstnOOR_LoFA) AND	9. <> TRUE AND		
					10. AFM valve2 position out-of-range high diagnostic fault (AFM_Vlv2PstnOOR_HiFA) AND	10. <> TRUE AND		
					11. Diagnostic system disablement (DiagSystemDisable) AND	11. <> TRUE AND		
					12. AFM exhaust valve control not disabled for remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND	12. <> TRUE AND		
					13. AFM valve command (AFM_ValveCmd) AND	13. (= Open OR = Closed) AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					14. AFM valve command unchanged (AFM_ValveCmd) AND 15. AFM valve command response time (AFM_Valve2ResponseTmr) AND 16. AFM valve position not out-of-range (AFM_Valve2State)	14. = AFM_ValveCmdPrev AND 15. >= 1 sec AND 16. (<> ValvePstnOOR_Low AND <> ValvePstnOOR_High)		
Cylinder Deactivation Exhaust Flow Valve Position Not Learned (Bank 2)	P12FE	Monitors diagnostic feedback from AFM valve 2 to determine if the valve end stops have not been learned	AFM Valve Diagnostic Status enumeration (AFM_Valve2DiagFdbkSt)	= AlignmentNotComplete)	1. Diagnostic enabled (K_b_AFM_Vlv2NotLrndEnbl) AND 2. AFM valve initialization complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable) AND 4. AFM Valve2 diagnostic PWM feedback not out-of-range low (AFM_Valve2DiagFdbkSt) AND 5. AFM Valve2 diagnostic PWM feedback signal not out-of-range high (AFM_Valve2DiagFdbkSt) AND 6. AFM Valve2 diagnostic PWM feedback signal Not out-of-range low, Not out-of-range high AND Not in any calibrated feedback data range (AFM_Valve1DiagFdbkSt) AND 7. AFM valve diagnostic feedback state (AFM_Valve2DiagFdbkSt)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE AND 4. <> DiagFdbkPrdLow AND 5. <> DiagFdbkPrdHigh AND 6. <> DiagFdbkPrdInRngErr AND 7. <> Actuator Faulted	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Actuator Performance (Bank2)	P12FF	Monitors diagnostic feedback from AFM valve 2 to determine if an internal actuator fault is present or if the AFM valve is stuck in the end stop learning mode	1. AFM Valve2 Diagnostic Status (AFM_Valve2DiagFdbkSt) OR 2. (AFM Valve2 Diagnostic Status AND AFM Valve Command) OR 3. (AFM Valve2 Diagnostic Status AND AFM Valve Command)	1. = Faulted OR 2. (= OpenEndStopLearned AND <> OpenEndStopLearn) OR 3. (= ClosedEndStopLearned AND <> ClosedEndStopLearn)	1. Diagnostic enabled (K_b_AFM_Vlv2PerfDiagEnbl) AND	1. = TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND	2. = TRUE AND		
					3. Diagnostic system disablement (DiagSystemDisable) AND	3. <> TRUE AND		
					4. AFM exhaust valve control not disabled for remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND	4. <> TRUE AND		
					5. Diagnostic PWM feedback signal AFM Valve2 not out-of-range low (AFM_Valve2DiagFdbkSt) AND	5. <> DiagFdbkPrdLow AND		
					6. Diagnostic PWM feedback signal AFM Valve2 not out-of-range high (AFM_Valve2DiagFdbkSt) AND	6. <> DiagFdbkPrdHigh AND		
					7. Δiagnostic PWM feedback Not out-of-range low, Not out-of-range high AND not within any of the calibrated feedback data range (AFM_Valve2DiagFdbkS) AND	7. <> DiagFdbkPrdInRngErr AND		
					8. AFM valve fault state (AFM_Valve2DiagFdbkSt)	8. <> FaultStIndeterminate		
Ignition 1 Switch Circuit Low Voltage	P2534	Detects if the Ignition1 Switch circuit is shorted to low or open	Ignition 1 voltage	<= 6 V	Engine	Running	180 failures out of 200 samples 1 sample/25.0 ms	DTC Type A 1 trip
Ignition 1 Switch Circuit High Voltage	P2535	Detects if the Ignition1 Switch circuit is shorted to vehicle supply voltage	Ignition 1 voltage	> 11.7 V	Ignition Run_Crank terminal	Off	180 failures out of 200 samples 1 sample/25.0 ms	DTC Type A 1 trip
Control Module Communication Bus “A” Off	U0073	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a	Bus Status	Off	Power mode	Run/Crank	5 failures out of 5 samples (5 seconds)	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Lost Communication With ECM/PCM “A”	U0100	Detects that CAN serial data communication has been lost with the ECM	Message $0C9	Undetected	1. Power mode 2. Ignition Run/Crank Voltage 3. U0073	Run/Crank 11V<voltage<32V not active	12 failures out of 12 samples (12 seconds)	DTC Type B 2 trips

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if any software or calibration check sum is incorrect	Calculated Checksum (CRC16)	≠ stored checksum for any of the parts (boot, software, application calibration, system calibration)	Ignition switch OR Ignition switch	Run or Crank Accessory	1 failure if it occurs during the first ROM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background	DTC Type A 1 trip
Control Module Not Programmed	P0602	Indicates that the ECU needs to be programmed	Calibration KeMEMD_b_NoStartCal	= TRUE	Ignition switch OR Ignition switch	Run or Crank Accessory	Runs once at power up	DTC Type A 1 trip
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up	≠ checksum at power-down	Ignition switch OR Ignition switch	Run or Crank Accessory	1 failure Frequency: Once at power-up	DTC Type A 1 trip
Control Module Random Access Memory (RAM)	P0604	Indicates that control module is unable to correctly write and read data to and from RAM	Data read	≠ Data written	Ignition switch OR Ignition switch	Run or Crank Accessory	1 failure if it occurs during the first RAM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background.	DTC Type A 1 trip
Control Module Internal Performance 1. Main Processor Configuration Register Test	P0606	Indicates the ECU has detected an internal processor fault or external watchdog fault (PID $2032 discriminates the source of fault)	 1. I/O configuration register faults: •Register contents	 =Incorrect value	Ignition switch OR Ignition switch 1. For all I/O configuration register faults: Calibration •KeMEMD_b_ProcFltCfgRegEnbl	(Run or Crank) OR Accessory TRUE	 1. 1 failure Frequency: Continuously (12.5ms)	DTC Type A 1 trip

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
2. Processor clock test			2. Processor Clock Fault: • EE latch flag in EEPROM OR • RAM latch flag.	 0x5A5A 0x5A	2. For Processor Clock Fault: Calibration •KeMEMD_b_ProcFltCLKDiagEnbl	 TRUE	2. 1 failure Frequency: Continuously (12.5ms)	
3. External watchdog test			3. External Watchdog Fault: • Software control of fuel pump driver	 Control Lost	3. For External Watchdog Fault: Calibration •KeFRPD_b_FPExtWDogDiagEnbl AND •Control Module ROM(P0601) AND •Control Module RAM(P0604)	 TRUE Not active Not active	3. 3 failures out of 15 samples 1 sample/12.5 ms	
Control Module Long Term Memory (EEPROM) Performance	P062F	Indicates that the NVM Error flag has not been cleared	Last EEPROM write	Did not complete	Ignition switch OR Ignition switch	(Run or Crank) OR Accessory	1 test failure Once on controller power-up	DTC Type A 1 trip
Fuel Pump Control Module Driver 1 Over-temperature	P064A	Detects if an internal fuel pump driver overtemperature condition exists under normal operating conditions	Pump Driver Temp	> 150C	Ignition switch OR Ignition switch	(Run or Crank) OR Accessory	3 failures out of 15 samples 1 sample/12.5 ms	DTC Type B 2 trips
					KeFRPD_b_FPOverTempDiagEnbl	TRUE		
					Ignition Run_Crank terminal	9V<voltage<32V		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Cylinder Deactivation Exhaust Flow Valve Control Circuit/Open	P12E3	Monitors for open circuit faults in the AFM valve PWM control circuit	Open circuit fault status AFM_VlvCntrlCktOpenFlt	== Faulted	1. Diagnostic enabled (K_b_AFM_VlvCntrlOpenEnbl) AND 2. Diagnostic system disablement not requested (DiagSystemDisable) AND 3. AFM Valve Initialization complete (AFM_ValveInitDlyCmpt) AND 4. AFM exhaust valve control not disabled remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND 5. AFM control circuit Open circuit fault status (AFM_VlvCntrlCktOpenFlt)	1. = TRUE AND 2. <> TRUE AND 3. = TRUE AND 4. <> TRUE AND 5. <> INDETERMINATE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Control Circuit Low	P12E4	Monitors for short-to-ground faults in the AFM valve PWM control circuit	Short-to-ground fault status AFM_VlvCntrlCktGshtFlt	== Faulted	1. Diagnostic enabled (K_b_AFM_VlvCntrlGshtEnbl) AND 2. Diagnostic system disablement not requested (DiagSystemDisable) AND 3. AFM Valve Initialization complete (AFM_ValveInitDlyCmpt) AND 4. AFM exhaust valve control not disabled for remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND 5. AFM control circuit Short-to-ground fault status not indeterminate (AFM_VlvCntrlCktGshtFlt)	1. = TRUE AND 2. <> TRUE AND 3. = TRUE AND 4. <> TRUE AND 5. <> INDETERMINATE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Cylinder Deactivation Exhaust Flow Valve Control Circuit High	P12E5	Monitors for short-to-power faults in the AFM valve PWM control circuit	Short-to-power fault status AFM_VlvCntrlCktPshtFlt	== Faulted	1. Diagnostic enabled (K_b_AFM_VlvCntrlPshtEnbl) AND 2. Diagnostic system disablement not requested (DiagSystemDisable) AND 3. AFM Valve Initialization complete (AFM_ValveInitDlyCmpt) AND 4. AFM exhaust valve control not disabled remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND 5. AFM control circuit Short-to-power fault status not indeterminate (AFM_VlvCntrlCktPshtFlt)	1. = TRUE AND 2. <> TRUE AND 3. = TRUE AND 4. <> TRUE AND 5. <> INDETERMINATE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feeback Circuit Low Duty Cycle (Bank 1)	P12E7	Monitors for out-of-range low duty cycle values on the AFM valve 1 diagnostic PWM feedback signal	AFM valve 1 diagnostic PWM feedback signal AFM_Valve1FdbkDC	< K_Pct_AFM_Vlv1PstnLoThrsh)	1. Diagnostic enabled (K_b_AFM_Vlv1PstnLoDiagEnbl) AND 2. AFM valve initialization complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit High Duty Cycle (Bank 1)	P12E8	Monitors for out-of-range high duty cycle values on the AFM valve 1 diagnostic PWM feedback signal	AFM valve 1 diagnostic PWM feedback signal AFM_Valve1FdbkDC	> K_Pct_AFM_Vlv1PstnHiThrsh	1. Diagnostic enabled (K_b_AFM_Vlv1PstnHiDiagEnbl) AND 2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Cylinder Deactivation Exhaust Flow Valve Open Position (Bank 1)	P12E9	Monitors the sensed AFM valve 1 position for values that are out-of-range low	AFM_Valve1State	<= ValvePstnOOR_Low)	1. Diagnostic enabled (K_b_AFM_Vlv1PstnOOR_LoEnbl) AND 2. AFM valve initialization period completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable) AND 4. AFM valve 1 position sensor circuit low diagnostic not faulted (AFM_Valve1PstnLoFP) AND 5. AFM valve 1 position sensor circuit high diagnostic not faulted (AFM_Valve1PstnHiFP)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE AND 4. <> TRUE AND 5. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Closed Position (Bank 1)	P12EA	Monitors the sensed AFM valve 1 position for values that are out-of-range high	AFM_Valve1State	>= ValvePstnOOR_High)	1. Diagnostic enabled (K_b_AFM_Vlv1PstnOOR_LoEnbl) AND 2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable) AND 4. AFM valve 1 position sensor circuit low diagnostic not faulted (AFM_Valve1PstnLoFP) AND 5. AFM valve 1 position sensor circuit high diagnostic not faulted (AFM_Valve1PstnHiFP)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE AND 4. <> TRUE AND 5. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit Low Frequency (Bank 1)	P12EB	Monitors for out-of-range high period (i.e. out-of-range low frequency) values on the AFM valve 1 diagnostic PWM feedback signal	Diagnostic PWM feedback signal_AFM_Valve1DiagFdbkSt	>= DiagFdbkPrdHigh)	1. Diagnostic enabled (K_b_AFM_Vlv1FdbkHiDiagEnbl) AND 2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit High Frequency (Bank 1)	P12EC	Monitors for out-of-range low period (i.e. out-of range high frequency) values on the AFM valve 1 diagnostic PWM feedback signal	Diagnostic PWM feedback signal_AFM_Valve1DiagFdbkSt	< = DiagFdbkPrdLow)	1. Diagnostic enabled (K_b_AFM_Vlv1FdbkLoDiagEnbl) AND 2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit Incorrect Frequency (Bank 1)	P12ED	Monitors for in-range errors that result when the sensed period of the diagnostic PWM feedback signal for AFM valve 1 is neither out-of-range low nor out-of-range high and does not fall within any of the calibrated ranges defined for diagnostic feedback data	Diagnostic PWM feedback signal_AFM_Valve1DiagFdbkSt	= DiagFdbkPrdInRngErr)	1. Diagnostic enabled (K_b_AFMV1FdbkInvldDiagEnbl) AND 2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Stuck Closed (Bank 1)	P12EF	Monitors position feedback to determine if AFM valve 1 is stuck in the closed position	Position feedback AFM_Valve1State	<> AFM_ValveCmd	1. AFM valve1 stuck diagnostics enabled (K_b_AFM_Vlv1StuckDiagEnbl) AND 2. Ignition voltage (IgnitionVoltage) AND 3. AFM Valve initialization (AFM_ValveInitDlyCmpt) AND 4. AFM valve control circuit short-to-power diagnostic fault not active (AFM_VlvCntrlPshtFA) AND 5. AFM valve control circuit short-to-ground diagnostic fault not active (AFM_VlvCntrlGshtFA) AND	1. = TRUE AND 2. >= 10.2V AND 3. = TRUE AND 4. <> TRUE AND 5. <> TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					6. AFM valve control circuit open diagnostic fault not active (AFM_VlvCntrlOpenFA) AND	6. <> TRUE AND		
					7. AFM valve1 position sensor circuit low diagnostic fault not active (AFM_Valve1PstnLoFA) AND	7. <> TRUE AND		
					8. AFM valve1 position sensor circuit high diagnostic fault not active (AFM_Valve1PstnHiFA) AND	8. <> TRUE AND		
					9. AFM valve1 position out-of-range low diagnostic fault not active (AFM_Vlv1PstnOOR_LoFA) AND	9. <> TRUE AND		
					10. AFM valve1 position out-of-range high diagnostic fault not active (AFM_Vlv1PstnOOR_HiFA) AND	10. <> TRUE AND		
					11. Diagnostic system disablement (DiagSystemDisable) AND	11. <> TRUE AND		
					12. AFM exhaust valve control not disabled for remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND	12. <> TRUE AND		
					13. AFM valve command (AFM_ValveCmd) AND	13. (= OPEN OR = CLOSED) AND		
					14. AFM valve command not changed (AFM_ValveCmd) AND	14. = AFM_ValveCmdPrev AND		
					15. AFM valve response time (AFM_Valve1ResponseTmr ≥ Ke_t_AFM_Valve1ResponseTm) AND	15. >= 1 sec AND		
					16. AFM valve position not out-of-range (AFM_Valve1State)	16. (<> ValvePstnOOR_Low AND <> ValvePstnOOR_High)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Cylinder Deactivation Exhaust Flow Valve Stuck Open (Bank 1)	P12F0	Monitors position feedback to determine if AFM valve 1 is stuck in an open position	1. (AFM valve command AND AFM_Valve1State) OR 2. (AFM valve command AND AFM_Valve1State) OR 3. (AFM valve command AND AFM_Valve1State)	1. (= Open AND =ValveInTransition) OR 2. (= Closed AND = ValvePositionOpen) OR 3. (= Closed AND =ValveInTransition)	1. The AFM valve 1 stuck diagnostics are enabled through calibration (K_b_AFM_Vlv1StuckDiagEnbl = TRUE) AND	1. = TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
					2. Ignition voltage is greater than or equal to the minimum value required to enable diagnostic execution (IgnitionVoltage ≥ K_U_AFM_Vlv1StuckMinVolt) AND	2. >= 10.2 V		
					3. Sufficient time has been allowed for initialization of the AFM valve (AFM_ValveInitDlyCmpt = TRUE) AND	3. = TRUE AND		
					4. An AFM valve control circuit short-to-power diagnostic fault is not active (AFM_VlvCntrlPshtFA = FALSE) AND	4. <> TRUE AND		
					5. An AFM valve control circuit short-to-ground diagnostic fault is not active (AFM_VlvCntrlGshtFA = FALSE) AND	5. <> TRUE AND		
					6. An AFM valve control circuit open diagnostic fault is not active (AFM_VlvCntrlOpenFA = FALSE) AND	6. <> TRUE AND		
					7. An AFM valve 1 position sensor circuit low diagnostic fault is not active (AFM_Valve1PstnLoFA = FALSE) AND	7. <> TRUE AND		
					8. An AFM valve 1 position sensor circuit high diagnostic fault is not active (AFM_Valve1PstnHiFA = FALSE) AND	8. <> TRUE AND		
					9. An AFM valve 1 position out-of-range low diagnostic fault is not active (AFM_Vlv1PstnOOR_LoFA = FALSE) AND	9. <> TRUE AND		
					10. An AFM valve 1 position out-of-range high diagnostic fault is not active (AFM_Vlv1PstnOOR_HiFA = FALSE) AND	10. <> TRUE AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					11. Diagnostic system disablement is not being requested (DiagSystemDisable = FALSE) AND	11. <> TRUE AND		
					12. Control of the AFM exhaust valve has not been disabled for the remainder of the trip due to an output driver short circuit fault (AFMV_FaultTripDsbl = FALSE) AND	12. <> TRUE AND		
					13. The AFM valve is currently being commanded to the open or closed state (AFM_ValveCmd = Open OR AFM_ValveCmd = Closed) AND	13. (= OPEN OR = CLOSED) AND		
					14. The commanded state of the AFM valve has not changed (AFM_ValveCmd = AFM_ValveCmdPrev) AND	14. <> AFM_ValveCmdPrev AND		
					15. Sufficient time has been allowed for the AFM valve to respond to a change in the commanded AFM valve state (AFM_Valve1ResponseTmr ≥ Ke_t_AFM_Valve1ResponseTm) AND	15. >= 1 sec AND		
					16. The sensed position of the AFM valve is not out-of-range (AFM_Valve1State ≠ ValvePstnOOR_Low AND AFM_Valve1State ≠ ValvePstnOOR_High)	16. (<> ValvePstnOOR_Low AND <> ValvePstnOOR_High)		
Cylinder Deactivation Exhaust Flow Valve Position Not Learned (Bank 1)	P12F1	Monitors diagnostic feedback from AFM valve 1 to determine if the valve end stops have not been learned	AFM valve diagnostic feedback status (AFM_Valve1DiagFdbkSt)	= AlignmentNotComplete	1. Diagnostic enabled (K_b_AFM_Vlv1NotLrndEnbl) AND	1. = TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
					2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND	2. = TRUE AND		
					3. Diagnostic system disablement Not requested (DiagSystemDisable) AND	3. <> TRUE AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					4. Diagnostic PWM feedback signal AFM valve1 Not out-of-range low (AFM_Valve1DiagFdbkSt) AND	4. <> DiagFdbkPrdLow AND		
					5. Diagnostic PWM feedback signal AFM valve1 Not out-of-range high (AFM_Valve1DiagFdbkSt) AND	5. <> DiagFdbkPrdHigh AND		
					6. Diagnostic PWM feedback signal Not out-of-range low, Not out-of-range high AND andNot within any calibrated feedback data range (AFM_Valve1DiagFdbkSt) AND	6. <> DiagFdbkPrdInRngErr AND		
					7. AFM valve state (AFM_Valve1DiagFdbkSt)	7. <> ActuatorFaulted		
Cylinder Deactivation Exhaust Flow Valve Actuator Performance (Bank1)	P12F2	Monitors diagnostic feedback from AFM valve 1 to determine if an internal actuator fault is present or if the AFM valve is stuck in the end stop learning mode	AFM valve command (AFM_ValveCmd) AND Position feedback (AFM_Valve1State)	(= Closed AND = ValveInTransition)	1. Diagnostic enabled (K_b_AFM_Vlv1PerfDiagEnbl) AND	1. = TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
					2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND	2. = TRUE AND		
					3. Diagnostic system disablement Not requested (DiagSystemDisable) AND	3. <> TRUE AND		
					4. AFM exhaust valve control Not disabled for remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND	4. <> TRUE AND		
					5. Diagnostic PWM feedback signal AFM valve1 not out-of-range low (AFM_Valve1DiagFdbkSt) AND	5. <> DiagFdbkPrdLow AND		
					6. Diagnostic PWM feedback signal AFM valve1 Not out-of-range high (AFM_Valve1DiagFdbkSt) AND	6. <> DiagFdbkPrdHigh AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					7. Diagnostic PWM feedback signal Not out-of-range low, Not out-of-range high AND Not in any calibrated feedback data range (AFM_Valve1DiagFdbkSt) AND 8. AFM valve fault state (AFM_Valve1DiagFdbkSt)	7. <> DiagFdbkPrdInRngErr AND 8. <> FaultStIndeterminate		
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit Low Duty Cycle (Bank 2)	P12F4	Monitors for out-of-range low duty cycle values on the AFM valve 2 diagnostic PWM feedback signal	AFM valve 2 diagnostic PWM feedback signal AFM_Valve2FdbkDC	< K_Pct_AFM_Vlv2PstnLoThrsh)	1. Diagnostic enabled (K_b_AFM_Vlv2PstnLoDiagEnbl) AND 2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit High Duty Cycle (Bank 2)	P12F5	Monitors for out-of-range high duty cycle values on the AFM valve 2 diagnostic PWM feedback signal	AFM valve 2 diagnostic PWM feedback signal AFM_Valve2FdbkDC	> K_Pct_AFM_Vlv2PstnHiThrsh)	1. Diagnostic enabled (K_b_AFM_Vlv2PstnHiDiagEnbl) AND 2. AFM valve initialization complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Open Position (Bank 2)	P12F6	Monitors the sensed AFM valve 2 position for values that are out-of-range low	AFM_Valve2State	= ValvePstnOOR_Low	1. Diagnostic enabled (K_b_AFM_Vlv2PstnOOR_LoEnbl) AND 2. AFM valve initialization complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable) AND 4. AFM valve 2 position sensor circuit low diagnostic not faulted (AFM_Valve2PstnLoFP) AND 5. AFM valve2 position sensor circuit high diagnostic unfaulted (AFM_Valve2PstnHiFP)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE AND 4. <> TRUE AND 5. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Cylinder Deactivation Exhaust Flow Valve Closed Position (Bank 2)	P12F7	Monitors the sensed AFM valve 2 position for values that are out-of-range high	AFM_Valve2State	= ValvePstnOOR_High	1. Diagnostic enabled (K_b_AFM_Vlv2PstnOOR_HiEnbl) AND 2. AFM valve initialization complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable) AND 4. AFM valve 2 position sensor circuit low diagnostic unfaulted (AFM_Valve2PstnLoFP) AND 5. AFM valve 2 position sensor circuit high diagnostic unfaulted (AFM_Valve2PstnHiFP)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE AND 4. <> TRUE AND 5. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit Low Frequency (Bank 2)	P12F8	Monitors for out-of-range high period (i.e. out-of-range low frequency) values on the AFM valve 2 diagnostic PWM feedback signal	Diagnostic PWM feedback signal AFM_Valve2DiagFdbkSt	>= DiagFdbkPrdHigh)	1. Diagnostic enabled (K_b_AFM_Vlv2FdbkHiDiagEnbl) AND 2. AFM valve initialization complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit High Frequency (Bank 2)	P12F9	Monitors for out-of-range low period (i.e. out-of-range high frequency) values on the AFM valve 2 diagnostic PWM feedback signal	Diagnostic PWM feedback signal AFM_Valve2DiagFdbkSt	< DiagFdbkPrdLow)	1. Diagnostic enabled through calibration (K_b_AFM_Vlv2FdbkLoDiagEnbl) AND 2. AFM valve initialization period has completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement is not being requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit Incorrect Frequency (Bank 2)	P12FA	Monitors for in-range errors that result when the sensed period of the diagnostic PWM feedback signal for AFM valve 2 is neither out-of-range low nor out-of-range high and does not fall within any of the calibrated ranges defined for diagnostic feedback data	Diagnostic PWM feedback signal_AFM_Valve2DiagFdbkSt	= DiagFdbkPrdInRngErr)	1. Diagnostic enabled (K_b_AFMV2FdbkInvldDiagEnbl) AND 2. AFM valve initialization period complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Stuck Closed (Bank 2)	P12FC	Monitors position feedback to determine if AFM valve 2 is stuck in the closed position	AFM valve command AND AFM Valve2 State (AFM_ValveCmd AND AFM_Valve2State)	(= Open AND = ValvePstnClosed)	1. AFM valve2 stuck diagnostics enabled (K_b_AFM_Vlv2StuckDiagEnbl) AND	1. = TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
					2. IgnitionVoltage ≥ K_U_AFM_Vlv2StuckMinVolt AND	2. V >= 10.2 V AND		
					3. AFM valve initialized (AFM_ValveInitDlyCmplt) AND	3. = TRUE AND		
					4. AFM valve control circuit short-to-power diagnostic fault (AFM_VlvCntrlPshtFA) AND	4. <> TRUE AND		
					5. AFM valve control circuit short-to-ground diagnostic fault (AFM_VlvCntrlGshtFA) AND	5. <> TRUE AND		
					6. AFM valve control circuit open diagnostic fault (AFM_VlvCntrlOpenFA) AND	6. <> TRUE AND		
					7. AFM valve2 position sensor circuit low diagnostic fault (AFM_Valve2PstnLoFA) AND	7. <> TRUE AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					8. AFM valve2 position sensor circuit high diagnostic fault (AFM_Valve2PstnHiFA) AND	8. <> TRUE AND		
					9. AFM valve2 position out-of-range low diagnostic fault (AFM_Vlv2PstnOOR_LoFA) AND	9. <> TRUE AND		
					10. AFM valve2 position out-of-range high diagnostic fault (AFM_Vlv2PstnOOR_HiFA) AND	10. <> TRUE AND		
					11. Diagnostic system disablement Not requested (DiagSystemDisable) AND	11. <> TRUE AND		
					12. AFM exhaust valve control Not disabled for remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND	12. <> TRUE AND		
					13. AFM valve command (AFM_ValveCmd) AND	13. (= Open OR = Closed) AND		
					14. AFM valve command Not changed (AFM_ValveCmd) AND	14. = AFM_ValveCmdPrev AND		
					15. AFM valve response time (AFM_Valve2ResponseTmr) AND	15. >= 1 sec AND		
					16. AFM valve position Not out-of-range (AFM_Valve2State AND AFM_Valve2State)	16. (<> ValvePstnOOR_Low AND <> ValvePstnOOR_High)		
Cylinder Deactivation Exhaust Flow Valve Stuck Open (Bank 2)	P12FD	Monitors position feedback to determine if AFM valve 2 is stuck in an open position	1. (AFM_ValveCmd AND AFM_Valve2State) OR 2. (AFM_ValveCmd AND AFM_Valve2State) OR 3. (AFM_ValveCmd AND AFM_Valve2State)	1. (= Open AND = ValveInTransition) OR 2. (= Closed AND = ValvePstnOpen) OR 3. (= Closed AND = ValveInTransition)	1. AFM valve2 stuck diagnostics enabled (K_b_AFM_Vlv2StuckDiagEnbl) AND	1. = TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
					2. Ignition voltage (IgnitionVoltage) AND	2. V >= 10.2 V AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					3. AFM valve initialization time complete (AFM_ValveInitDlyCmpt) AND	3. = TRUE AND		
					4. AFM valve control circuit short-to-power diagnostic fault (AFM_VlvCntrlPshtFA) AND	4. <> TRUE AND		
					5. AFM valve control circuit short-to-ground diagnostic fault (AFM_VlvCntrlGshtFA) AND	5. <> TRUE AND		
					6. AFM valve control circuit open diagnostic fault (AFM_VlvCntrlOpenFA) AND	6. <> TRUE AND		
					7. AFM valve2 position sensor circuit low diagnostic fault (AFM_Valve2PstnLoFA) AND	7. <> TRUE AND		
					8. AFM valve2 position sensor circuit high diagnostic fault (AFM_Valve2PstnHiFA) AND	8. <> TRUE AND		
					9. AFM valve2 position out-of-range low diagnostic fault (AFM_Vlv2PstnOOR_LoFA) AND	9. <> TRUE AND		
					10. AFM valve2 position out-of-range high diagnostic fault (AFM_Vlv2PstnOOR_HiFA) AND	10. <> TRUE AND		
					11. Diagnostic system disablement (DiagSystemDisable) AND	11. <> TRUE AND		
					12. AFM exhaust valve control not disabled for remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND	12. <> TRUE AND		
					13. AFM valve command (AFM_ValveCmd) AND	13. (= Open OR = Closed) AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					14. AFM valve command unchanged (AFM_ValveCmd) AND 15. AFM valve command response time (AFM_Valve2ResponseTmr) AND 16. AFM valve position not out-of-range (AFM_Valve2State)	14. = AFM_ValveCmdPrev AND 15. >= 1 sec AND 16. (<> ValvePstnOOR_Low AND <> ValvePstnOOR_High)		
Cylinder Deactivation Exhaust Flow Valve Position Not Learned (Bank 2)	P12FE	Monitors diagnostic feedback from AFM valve 2 to determine if the valve end stops have not been learned	AFM Valve Diagnostic Status enumeration (AFM_Valve2DiagFdbkSt)	= AlignmentNotComplete)	1. Diagnostic enabled (K_b_AFM_Vlv2NotLrndEnbl) AND 2. AFM valve initialization complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable) AND 4. AFM Valve2 diagnostic PWM feedback not out-of-range low (AFM_Valve2DiagFdbkSt) AND 5. AFM Valve2 diagnostic PWM feedback signal not out-of-range high (AFM_Valve2DiagFdbkSt) AND 6. AFM Valve2 diagnostic PWM feedback signal Not out-of-range low, Not out-of-range high AND Not in any calibrated feedback data range (AFM_Valve1DiagFdbkSt) AND 7. AFM valve diagnostic feedback state (AFM_Valve2DiagFdbkSt)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE AND 4. <> DiagFdbkPrdLow AND 5. <> DiagFdbkPrdHigh AND 6. <> DiagFdbkPrdInRngErr AND 7. <> Actuator Faulted	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Actuator Performance (Bank2)	P12FF	Monitors diagnostic feedback from AFM valve 2 to determine if an internal actuator fault is present or if the AFM valve is stuck in the end stop learning mode	1. AFM Valve2 Diagnostic Status (AFM_Valve2DiagFdbkSt) OR 2. (AFM Valve2 Diagnostic Status AND AFM Valve Command) OR 3. (AFM Valve2 Diagnostic Status AND AFM Valve Command)	1. = Faulted OR 2. (= OpenEndStopLearned AND <> OpenEndStopLearn) OR 3. (= ClosedEndStopLearned AND <> ClosedEndStopLearn)	1. Diagnostic enabled (K_b_AFM_Vlv2PerfDiagEnbl) AND	1. = TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND	2. = TRUE AND		
					3. Diagnostic system disablement (DiagSystemDisable) AND	3. <> TRUE AND		
					4. AFM exhaust valve control not disabled for remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND	4. <> TRUE AND		
					5. Diagnostic PWM feedback signal AFM Valve2 not out-of-range low (AFM_Valve2DiagFdbkSt) AND	5. <> DiagFdbkPrdLow AND		
					6. Diagnostic PWM feedback signal AFM Valve2 not out-of-range high (AFM_Valve2DiagFdbkSt) AND	6. <> DiagFdbkPrdHigh AND		
					7. Δiagnostic PWM feedback Not out-of-range low, Not out-of-range high AND not within any of the calibrated feedback data range (AFM_Valve2DiagFdbkS) AND	7. <> DiagFdbkPrdInRngErr AND		
					8. AFM valve fault state (AFM_Valve2DiagFdbkSt)	8. <> FaultStIndeterminate		
Transmission Cooling Fan Control Circuit Open_Low	P184C	Detects if the transmission cooling fan control circuit is open or shorted low	Transmission Cooling Fan Circuit status enumeration	== Faulted	1) Diagnostic enabled KeFRPR_b_FPPM_OpenCktDiagEnbld 2] Diagnostic System Disabled DRER 3] System Voltage	1) == TRUE 2] <> TRUE 3] 9v < System V > 32v	10 FAILURES OUT OF 16 SAMPLES 1sample / 500ms	DTC Type B 2 trips
Ignition 1 Switch Circuit Low Voltage	P2534	Detects if the Ignition1 Switch circuit is shorted to low or open	Ignition 1 voltage	<= 6 V	Engine	Running	180 failures out of 200 samples 1 sample/25.0 ms	DTC Type A 1 trip
Ignition 1 Switch Circuit High Voltage	P2535	Detects if the Ignition1 Switch circuit is shorted to vehicle supply voltage	Ignition 1 voltage	> 11.7 V	Ignition Run_Crank terminal	Off	180 failures out of 200 samples 1 sample/25.0 ms	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Control Module Communication Bus “A” Off	U0073	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a	Bus Status	Off	Power mode	Run/Crank	5 failures out of 5 samples (5 seconds)	DTC Type B 2 trips
Lost Communication With ECM/PCM “A”	U0100	Detects that CAN serial data communication has been lost with the ECM	Message $0C9	Undetected	1. Power mode 2. Ignition Run/Crank Voltage 3. U0073	Run/Crank 11V<voltage<32V not active	12 failures out of 12 samples (12 seconds)	DTC Type B 2 trips

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if any software or calibration check sum is incorrect	Calculated Checksum (CRC16)	≠ stored checksum for any of the parts (boot, software, application calibration, system calibration)	Ignition switch OR Ignition switch	Run or Crank Accessory	1 failure if it occurs during the first ROM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background	DTC Type A 1 trip
Control Module Not Programmed	P0602	Indicates that the ECU needs to be programmed	Calibration KeMEMD_b_NoStartCal	= TRUE	Ignition switch OR Ignition switch	Run or Crank Accessory	Runs once at power up	DTC Type A 1 trip
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up	≠ checksum at power-down	Ignition switch OR Ignition switch	Run or Crank Accessory	1 failure Frequency: Once at power-up	DTC Type A 1 trip
Control Module Random Access Memory (RAM)	P0604	Indicates that control module is unable to correctly write and read data to and from RAM	Data read	≠ Data written	Ignition switch OR Ignition switch	Run or Crank Accessory	1 failure if it occurs during the first RAM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background.	DTC Type A 1 trip
Control Module Internal Performance	P0606	Indicates the ECU has detected an internal processor fault or external watchdog fault (PID $2032 discriminates the source of fault)			Ignition switch OR Ignition switch	(Run or Crank) OR Accessory		DTC Type A 1 trip
1. Main Processor Configuration Register Test			1. I/O configuration register faults: •Register contents	 =Incorrect value	1. For all I/O configuration register faults: Calibration •KeMEMD_b_ProcFltCfgRegEnbl	 TRUE	1. 1 failure Frequency: Continuously (12.5ms)	

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
2. Processor clock test			2. Processor Clock Fault: • EE latch flag in EEPROM OR • RAM latch flag.	 0x5A5A 0x5A	2. For Processor Clock Fault: Calibration •KeMEMD_b_ProcFltCLKDiagEnbl	 TRUE	2. 1 failure Frequency: Continuously (12.5ms)	
3. External watchdog test			3. External Watchdog Fault: • Software control of fuel pump driver	 Control Lost	3. For External Watchdog Fault: Calibration •KeFRPD_b_FPExtWDogDiagEnbl AND •Control Module ROM(P0601) AND •Control Module RAM(P0604)	 TRUE Not active Not active	3. 3 failures out of 15 samples 1 sample/12.5 ms	
Control Module Long Term Memory (EEPROM) Performance	P062F	Indicates that the NVM Error flag has not been cleared	Last EEPROM write	Did not complete	Ignition switch OR Ignition switch	(Run or Crank) OR Accessory	1 test failure Once on controller power-up	DTC Type A 1 trip
Fuel Pump Control Module Driver 1 Over-temperature	P064A	Detects if an internal fuel pump driver overtemperature condition exists under normal operating conditions	Pump Driver Temp	> 150C	Ignition switch OR Ignition switch	(Run or Crank) OR Accessory	3 failures out of 15 samples 1 sample/12.5 ms	DTC Type B 2 trips
					KeFRPD_b_FPOverTempDiagEnbl	TRUE		
					Ignition Run_Crank terminal	9V<voltage<32V		

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Cylinder Deactivation Exhaust Flow Valve Control Circuit/Open	P12E3	Monitors for open circuit faults in the AFM valve PWM control circuit	Open circuit fault status AFM_VlvCntrlCktOpenFlt	== Faulted	1. Diagnostic enabled (K_b_AFM_VlvCntrlOpenEnbl) AND 2. Diagnostic system disablement not requested (DiagSystemDisable) AND 3. AFM Valve Initialization complete (AFM_ValveInitDlyCmpt) AND 4. AFM exhaust valve control not disabled remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND 5. AFM control circuit Open circuit fault status (AFM_VlvCntrlCktOpenFlt)	1. = TRUE AND 2. <> TRUE AND 3. = TRUE AND 4. <> TRUE AND 5. <> INDETERMINATE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Control Circuit Low	P12E4	Monitors for short-to-ground faults in the AFM valve PWM control circuit	Short-to-ground fault status AFM_VlvCntrlCktGshtFlt	== Faulted	1. Diagnostic enabled (K_b_AFM_VlvCntrlGshtEnbl) AND 2. Diagnostic system disablement not requested (DiagSystemDisable) AND 3. AFM Valve Initialization complete (AFM_ValveInitDlyCmpt) AND 4. AFM exhaust valve control not disabled for remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND 5. AFM control circuit Short-to-ground fault status not indeterminate (AFM_VlvCntrlCktGshtFlt)	1. = TRUE AND 2. <> TRUE AND 3. = TRUE AND 4. <> TRUE AND 5. <> INDETERMINATE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Cylinder Deactivation Exhaust Flow Valve Control Circuit High	P12E5	Monitors for short-to-power faults in the AFM valve PWM control circuit	Short-to-power fault status AFM_VlvCntrlCktPshtFlt	== Faulted	1. Diagnostic enabled (K_b_AFM_VlvCntrlPshtEnbl) AND 2. Diagnostic system disablement not requested (DiagSystemDisable) AND 3. AFM Valve Initialization complete (AFM_ValveInitDlyCmpt) AND 4. AFM exhaust valve control not disabled remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND 5. AFM control circuit Short-to-power fault status not indeterminate (AFM_VlvCntrlCktPshtFlt)	1. = TRUE AND 2. <> TRUE AND 3. = TRUE AND 4. <> TRUE AND 5. <> INDETERMINATE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feeback Circuit Low Duty Cycle (Bank 1)	P12E7	Monitors for out-of-range low duty cycle values on the AFM valve 1 diagnostic PWM feedback signal	AFM valve 1 diagnostic PWM feedback signal AFM_Valve1FdbkDC	< K_Pct_AFM_Vlv1PstnLoThrsh)	1. Diagnostic enabled (K_b_AFM_Vlv1PstnLoDiagEnbl) AND 2. AFM valve initialization complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit High Duty Cycle (Bank 1)	P12E8	Monitors for out-of-range high duty cycle values on the AFM valve 1 diagnostic PWM feedback signal	AFM valve 1 diagnostic PWM feedback signal AFM_Valve1FdbkDC	> K_Pct_AFM_Vlv1PstnHiThrsh	1. Diagnostic enabled (K_b_AFM_Vlv1PstnHiDiagEnbl) AND 2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Cylinder Deactivation Exhaust Flow Valve Open Position (Bank 1)	P12E9	Monitors the sensed AFM valve 1 position for values that are out-of-range low	AFM_Valve1State	<= ValvePstnOOR_Low)	1. Diagnostic enabled (K_b_AFM_Vlv1PstnOOR_LoEnbl) AND 2. AFM valve initialization period completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable) AND 4. AFM valve 1 position sensor circuit low diagnostic not faulted (AFM_Valve1PstnLoFP) AND 5. AFM valve 1 position sensor circuit high diagnostic not faulted (AFM_Valve1PstnHiFP)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE AND 4. <> TRUE AND 5. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Closed Position (Bank 1)	P12EA	Monitors the sensed AFM valve 1 position for values that are out-of-range high	AFM_Valve1State	>= ValvePstnOOR_High)	1. Diagnostic enabled (K_b_AFM_Vlv1PstnOOR_LoEnbl) AND 2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable) AND 4. AFM valve 1 position sensor circuit low diagnostic not faulted (AFM_Valve1PstnLoFP) AND 5. AFM valve 1 position sensor circuit high diagnostic not faulted (AFM_Valve1PstnHiFP)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE AND 4. <> TRUE AND 5. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit Low Frequency (Bank 1)	P12EB	Monitors for out-of-range high period (i.e. out-of-range low frequency) values on the AFM valve 1 diagnostic PWM feedback signal	Diagnostic PWM feedback signal_AFM_Valve1DiagFdbkSt	>= DiagFdbkPrdHigh)	1. Diagnostic enabled (K_b_AFM_Vlv1FdbkHiDiagEnbl) AND 2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit High Frequency (Bank 1)	P12EC	Monitors for out-of-range low period (i.e. out-of range high frequency) values on the AFM valve 1 diagnostic PWM feedback signal	Diagnostic PWM feedback signal_AFM_Valve1DiagFdbkSt	< = DiagFdbkPrdLow)	1. Diagnostic enabled (K_b_AFM_Vlv1FdbkLoDiagEnbl) AND 2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit Incorrect Frequency (Bank 1)	P12ED	Monitors for in-range errors that result when the sensed period of the diagnostic PWM feedback signal for AFM valve 1 is neither out-of-range low nor out-of-range high and does not fall within any of the calibrated ranges defined for diagnostic feedback data	Diagnostic PWM feedback signal_AFM_Valve1DiagFdbkSt	= DiagFdbkPrdInRngErr)	1. Diagnostic enabled (K_b_AFMV1FdbkInvldDiagEnbl) AND 2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Stuck Closed (Bank 1)	P12EF	Monitors position feedback to determine if AFM valve 1 is stuck in the closed position	Position feedback AFM_Valve1State	<> AFM_ValveCmd	1. AFM valve1 stuck diagnostics enabled (K_b_AFM_Vlv1StuckDiagEnbl) AND 2. Ignition voltage (IgnitionVoltage) AND 3. AFM Valve initialization (AFM_ValveInitDlyCmpt) AND 4. AFM valve control circuit short-to-power diagnostic fault not active (AFM_VlvCntrlPshtFA) AND 5. AFM valve control circuit short-to-ground diagnostic fault not active (AFM_VlvCntrlGshtFA) AND	1. = TRUE AND 2. >= 10.2V AND 3. = TRUE AND 4. <> TRUE AND 5. <> TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					6. AFM valve control circuit open diagnostic fault not active (AFM_VlvCntrlOpenFA) AND	6. <> TRUE AND		
					7. AFM valve1 position sensor circuit low diagnostic fault not active (AFM_Valve1PstnLoFA) AND	7. <> TRUE AND		
					8. AFM valve1 position sensor circuit high diagnostic fault not active (AFM_Valve1PstnHiFA) AND	8. <> TRUE AND		
					9. AFM valve1 position out-of-range low diagnostic fault not active (AFM_Vlv1PstnOOR_LoFA) AND	9. <> TRUE AND		
					10. AFM valve1 position out-of-range high diagnostic fault not active (AFM_Vlv1PstnOOR_HiFA) AND	10. <> TRUE AND		
					11. Diagnostic system disablement (DiagSystemDisable) AND	11. <> TRUE AND		
					12. AFM exhaust valve control not disabled for remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND	12. <> TRUE AND		
					13. AFM valve command (AFM_ValveCmd) AND	13. (= OPEN OR = CLOSED) AND		
					14. AFM valve command not changed (AFM_ValveCmd) AND	14. = AFM_ValveCmdPrev AND		
					15. AFM valve response time (AFM_Valve1ResponseTmr ≥ Ke_t_AFM_Valve1ResponseTm) AND	15. >= 1 sec AND		
					16. AFM valve position not out-of-range (AFM_Valve1State)	16. (<> ValvePstnOOR_Low AND <> ValvePstnOOR_High)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Cylinder Deactivation Exhaust Flow Valve Stuck Open (Bank 1)	P12F0	Monitors position feedback to determine if AFM valve 1 is stuck in an open position	1. (AFM valve command AND AFM_Valve1State) OR 2. (AFM valve command AND AFM_Valve1State) OR 3. (AFM valve command AND AFM_Valve1State)	1. (= Open AND =ValveInTransition) OR 2. (= Closed AND = ValvePositionOpen) OR 3. (= Closed AND =ValveInTransition)	1. The AFM valve 1 stuck diagnostics are enabled through calibration (K_b_AFM_Vlv1StuckDiagEnbl = TRUE) AND	1. = TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
					2. Ignition voltage is greater than or equal to the minimum value required to enable diagnostic execution (IgnitionVoltage ≥ K_U_AFM_Vlv1StuckMinVolt) AND	2. >= 10.2 V		
					3. Sufficient time has been allowed for initialization of the AFM valve (AFM_ValveInitDlyCmpt = TRUE) AND	3. = TRUE AND		
					4. An AFM valve control circuit short-to-power diagnostic fault is not active (AFM_VlvCntrlPshtFA = FALSE) AND	4. <> TRUE AND		
					5. An AFM valve control circuit short-to-ground diagnostic fault is not active (AFM_VlvCntrlGshtFA = FALSE) AND	5. <> TRUE AND		
					6. An AFM valve control circuit open diagnostic fault is not active (AFM_VlvCntrlOpenFA = FALSE) AND	6. <> TRUE AND		
					7. An AFM valve 1 position sensor circuit low diagnostic fault is not active (AFM_Valve1PstnLoFA = FALSE) AND	7. <> TRUE AND		
					8. An AFM valve 1 position sensor circuit high diagnostic fault is not active (AFM_Valve1PstnHiFA = FALSE) AND	8. <> TRUE AND		
					9. An AFM valve 1 position out-of-range low diagnostic fault is not active (AFM_Vlv1PstnOOR_LoFA = FALSE) AND	9. <> TRUE AND		
					10. An AFM valve 1 position out-of-range high diagnostic fault is not active (AFM_Vlv1PstnOOR_HiFA = FALSE) AND	10. <> TRUE AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					11. Diagnostic system disablement is not being requested (DiagSystemDisable = FALSE) AND	11. <> TRUE AND		
					12. Control of the AFM exhaust valve has not been disabled for the remainder of the trip due to an output driver short circuit fault (AFMV_FaultTripDsbl = FALSE) AND	12. <> TRUE AND		
					13. The AFM valve is currently being commanded to the open or closed state (AFM_ValveCmd = Open OR AFM_ValveCmd = Closed) AND	13. (= OPEN OR = CLOSED) AND		
					14. The commanded state of the AFM valve has not changed (AFM_ValveCmd = AFM_ValveCmdPrev) AND	14. <> AFM_ValveCmdPrev AND		
					15. Sufficient time has been allowed for the AFM valve to respond to a change in the commanded AFM valve state (AFM_Valve1ResponseTmr ≥ Ke_t_AFM_Valve1ResponseTm) AND	15. >= 1 sec AND		
					16. The sensed position of the AFM valve is not out-of-range (AFM_Valve1State ≠ ValvePstnOOR_Low AND AFM_Valve1State ≠ ValvePstnOOR_High)	16. (<> ValvePstnOOR_Low AND <> ValvePstnOOR_High)		
Cylinder Deactivation Exhaust Flow Valve Position Not Learned (Bank 1)	P12F1	Monitors diagnostic feedback from AFM valve 1 to determine if the valve end stops have not been learned	AFM valve diagnostic feedback status (AFM_Valve1DiagFdbkSt)	= AlignmentNotComplete	1. Diagnostic enabled (K_b_AFM_Vlv1NotLrndEnbl) AND	1. = TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
					2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND	2. = TRUE AND		
					3. Diagnostic system disablement Not requested (DiagSystemDisable) AND	3. <> TRUE AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					4. Diagnostic PWM feedback signal AFM valve1 Not out-of-range low (AFM_Valve1DiagFdbkSt) AND	4. <> DiagFdbkPrdLow AND		
					5. Diagnostic PWM feedback signal AFM valve1 Not out-of-range high (AFM_Valve1DiagFdbkSt) AND	5. <> DiagFdbkPrdHigh AND		
					6. Diagnostic PWM feedback signal Not out-of-range low, Not out-of-range high AND andNot within any calibrated feedback data range (AFM_Valve1DiagFdbkSt) AND	6. <> DiagFdbkPrdInRngErr AND		
					7. AFM valve state (AFM_Valve1DiagFdbkSt)	7. <> ActuatorFaulted		
Cylinder Deactivation Exhaust Flow Valve Actuator Performance (Bank1)	P12F2	Monitors diagnostic feedback from AFM valve 1 to determine if an internal actuator fault is present or if the AFM valve is stuck in the end stop learning mode	AFM valve command (AFM_ValveCmd) AND Position feedback (AFM_Valve1State)	(= Closed AND = ValveInTransition)	1. Diagnostic enabled (K_b_AFM_Vlv1PerfDiagEnbl) AND	1. = TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
					2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND	2. = TRUE AND		
					3. Diagnostic system disablement Not requested (DiagSystemDisable) AND	3. <> TRUE AND		
					4. AFM exhaust valve control Not disabled for remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND	4. <> TRUE AND		
					5. Diagnostic PWM feedback signal AFM valve1 not out-of-range low (AFM_Valve1DiagFdbkSt) AND	5. <> DiagFdbkPrdLow AND		
					6. Diagnostic PWM feedback signal AFM valve1 Not out-of-range high (AFM_Valve1DiagFdbkSt) AND	6. <> DiagFdbkPrdHigh AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					7. Diagnostic PWM feedback signal Not out-of-range low, Not out-of-range high AND Not in any calibrated feedback data range (AFM_Valve1DiagFdbkSt) AND 8. AFM valve fault state (AFM_Valve1DiagFdbkSt)	7. <> DiagFdbkPrdInRngErr AND 8. <> FaultStIndeterminate		
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit Low Duty Cycle (Bank 2)	P12F4	Monitors for out-of-range low duty cycle values on the AFM valve 2 diagnostic PWM feedback signal	AFM valve 2 diagnostic PWM feedback signal AFM_Valve2FdbkDC	< K_Pct_AFM_Vlv2PstnLoThrsh)	1. Diagnostic enabled (K_b_AFM_Vlv2PstnLoDiagEnbl) AND 2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit High Duty Cycle (Bank 2)	P12F5	Monitors for out-of-range high duty cycle values on the AFM valve 2 diagnostic PWM feedback signal	AFM valve 2 diagnostic PWM feedback signal AFM_Valve2FdbkDC	> K_Pct_AFM_Vlv2PstnHiThrsh)	1. Diagnostic enabled (K_b_AFM_Vlv2PstnHiDiagEnbl) AND 2. AFM valve initialization complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Open Position (Bank 2)	P12F6	Monitors the sensed AFM valve 2 position for values that are out-of-range low	AFM_Valve2State	= ValvePstnOOR_Low	1. Diagnostic enabled (K_b_AFM_Vlv2PstnOOR_LoEnbl) AND 2. AFM valve initialization complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable) AND 4. AFM valve 2 position sensor circuit low diagnostic not faulted (AFM_Valve2PstnLoFP) AND 5. AFM valve2 position sensor circuit high diagnostic unfaulted (AFM_Valve2PstnHiFP)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE AND 4. <> TRUE AND 5. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

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Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Cylinder Deactivation Exhaust Flow Valve Closed Position (Bank 2)	P12F7	Monitors the sensed AFM valve 2 position for values that are out-of-range high	AFM_Valve2State	= ValvePstnOOR_High	1. Diagnostic enabled (K_b_AFM_Vlv2PstnOOR_HiEnbl) AND 2. AFM valve initialization complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable) AND 4. AFM valve 2 position sensor circuit low diagnostic unfaulted (AFM_Valve2PstnLoFP) AND 5. AFM valve 2 position sensor circuit high diagnostic unfaulted (AFM_Valve2PstnHiFP)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE AND 4. <> TRUE AND 5. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit Low Frequency (Bank 2)	P12F8	Monitors for out-of-range high period (i.e. out-of-range low frequency) values on the AFM valve 2 diagnostic PWM feedback signal	Diagnostic PWM feedback signal AFM_Valve2DiagFdbkSt	>= DiagFdbkPrdHigh)	1. Diagnostic enabled (K_b_AFM_Vlv2FdbkHiDiagEnbl) AND 2. AFM valve initialization complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit High Frequency (Bank 2)	P12F9	Monitors for out-of-range low period (i.e. out-of-range high frequency) values on the AFM valve 2 diagnostic PWM feedback signal	Diagnostic PWM feedback signal AFM_Valve2DiagFdbkSt	< DiagFdbkPrdLow)	1. Diagnostic enabled through calibration (K_b_AFM_Vlv2FdbkLoDiagEnbl) AND 2. AFM valve initialization period has completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement is not being requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit Incorrect Frequency (Bank 2)	P12FA	Monitors for in-range errors that result when the sensed period of the diagnostic PWM feedback signal for AFM valve 2 is neither out-of-range low nor out-of-range high and does not fall within any of the calibrated ranges defined for diagnostic feedback data	Diagnostic PWM feedback signal_AFM_Valve2DiagFdbkSt	= DiagFdbkPrdInRngErr)	1. Diagnostic enabled (K_b_AFMV2FdbkInvldDiagEnbl) AND 2. AFM valve initialization period complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Stuck Closed (Bank 2)	P12FC	Monitors position feedback to determine if AFM valve 2 is stuck in the closed position	AFM valve command AND AFM Valve2 State (AFM_ValveCmd AND AFM_Valve2State)	(= Open AND = ValvePstnClosed)	1. AFM valve2 stuck diagnostics enabled (K_b_AFM_Vlv2StuckDiagEnbl) AND	1. = TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
					2. IgnitionVoltage ≥ K_U_AFM_Vlv2StuckMinVolt AND	2. V >= 10.2 V AND		
					3. AFM valve initialized (AFM_ValveInitDlyCmplt) AND	3. = TRUE AND		
					4. AFM valve control circuit short-to-power diagnostic fault (AFM_VlvCntrlPshtFA) AND	4. <> TRUE AND		
					5. AFM valve control circuit short-to-ground diagnostic fault (AFM_VlvCntrlGshtFA) AND	5. <> TRUE AND		
					6. AFM valve control circuit open diagnostic fault (AFM_VlvCntrlOpenFA) AND	6. <> TRUE AND		
					7. AFM valve2 position sensor circuit low diagnostic fault (AFM_Valve2PstnLoFA) AND	7. <> TRUE AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					8. AFM valve2 position sensor circuit high diagnostic fault (AFM_Valve2PstnHiFA) AND	8. <> TRUE AND		
					9. AFM valve2 position out-of-range low diagnostic fault (AFM_Vlv2PstnOOR_LoFA) AND	9. <> TRUE AND		
					10. AFM valve2 position out-of-range high diagnostic fault (AFM_Vlv2PstnOOR_HiFA) AND	10. <> TRUE AND		
					11. Diagnostic system disablement Not requested (DiagSystemDisable) AND	11. <> TRUE AND		
					12. AFM exhaust valve control Not disabled for remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND	12. <> TRUE AND		
					13. AFM valve command (AFM_ValveCmd) AND	13. (= Open OR = Closed) AND		
					14. AFM valve command Not changed (AFM_ValveCmd) AND	14. = AFM_ValveCmdPrev AND		
					15. AFM valve response time (AFM_Valve2ResponseTmr) AND	15. >= 1 sec AND		
					16. AFM valve position Not out-of-range (AFM_Valve2State AND AFM_Valve2State)	16. (<> ValvePstnOOR_Low AND <> ValvePstnOOR_High)		
Cylinder Deactivation Exhaust Flow Valve Stuck Open (Bank 2)	P12FD	Monitors position feedback to determine if AFM valve 2 is stuck in an open position	1. (AFM_ValveCmd AND AFM_Valve2State) OR 2. (AFM_ValveCmd AND AFM_Valve2State) OR 3. (AFM_ValveCmd AND AFM_Valve2State)	1. (= Open AND = ValveInTransition) OR 2. (= Closed AND = ValvePstnOpen) OR 3. (= Closed AND = ValveInTransition)	1. AFM valve2 stuck diagnostics enabled (K_b_AFM_Vlv2StuckDiagEnbl) AND	1. = TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
					2. Ignition voltage (IgnitionVoltage) AND	2. V >= 10.2 V AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					3. AFM valve initialization time complete (AFM_ValveInitDlyCmpt) AND	3. = TRUE AND		
					4. AFM valve control circuit short-to-power diagnostic fault (AFM_VlvCntrlPshtFA) AND	4. <> TRUE AND		
					5. AFM valve control circuit short-to-ground diagnostic fault (AFM_VlvCntrlGshtFA) AND	5. <> TRUE AND		
					6. AFM valve control circuit open diagnostic fault (AFM_VlvCntrlOpenFA) AND	6. <> TRUE AND		
					7. AFM valve2 position sensor circuit low diagnostic fault (AFM_Valve2PstnLoFA) AND	7. <> TRUE AND		
					8. AFM valve2 position sensor circuit high diagnostic fault (AFM_Valve2PstnHiFA) AND	8. <> TRUE AND		
					9. AFM valve2 position out-of-range low diagnostic fault (AFM_Vlv2PstnOOR_LoFA) AND	9. <> TRUE AND		
					10. AFM valve2 position out-of-range high diagnostic fault (AFM_Vlv2PstnOOR_HiFA) AND	10. <> TRUE AND		
					11. Diagnostic system disablement (DiagSystemDisable) AND	11. <> TRUE AND		
					12. AFM exhaust valve control not disabled for remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND	12. <> TRUE AND		
					13. AFM valve command (AFM_ValveCmd) AND	13. (= Open OR = Closed) AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					14. AFM valve command unchanged (AFM_ValveCmd) AND 15. AFM valve command response time (AFM_Valve2ResponseTmr) AND 16. AFM valve position not out-of-range (AFM_Valve2State)	14. = AFM_ValveCmdPrev AND 15. >= 1 sec AND 16. (<> ValvePstnOOR_Low AND <> ValvePstnOOR_High)		
Cylinder Deactivation Exhaust Flow Valve Position Not Learned (Bank 2)	P12FE	Monitors diagnostic feedback from AFM valve 2 to determine if the valve end stops have not been learned	AFM Valve Diagnostic Status enumeration (AFM_Valve2DiagFdbkSt)	= AlignmentNotComplete)	1. Diagnostic enabled (K_b_AFM_Vlv2NotLrndEnbl) AND 2. AFM valve initialization complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable) AND 4. AFM Valve2 diagnostic PWM feedback not out-of-range low (AFM_Valve2DiagFdbkSt) AND 5. AFM Valve2 diagnostic PWM feedback signal not out-of-range high (AFM_Valve2DiagFdbkSt) AND 6. AFM Valve2 diagnostic PWM feedback signal Not out-of-range low, Not out-of-range high AND Not in any calibrated feedback data range (AFM_Valve1DiagFdbkSt) AND 7. AFM valve diagnostic feedback state (AFM_Valve2DiagFdbkSt)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE AND 4. <> DiagFdbkPrdLow AND 5. <> DiagFdbkPrdHigh AND 6. <> DiagFdbkPrdInRngErr AND 7. <> Actuator Faulted	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Actuator Performance (Bank2)	P12FF	Monitors diagnostic feedback from AFM valve 2 to determine if an internal actuator fault is present or if the AFM valve is stuck in the end stop learning mode	1. AFM Valve2 Diagnostic Status (AFM_Valve2DiagFdbkSt) OR 2. (AFM Valve2 Diagnostic Status AND AFM Valve Command) OR 3. (AFM Valve2 Diagnostic Status AND AFM Valve Command)	1. = Faulted OR 2. (= OpenEndStopLearned AND <> OpenEndStopLearn) OR 3. (= ClosedEndStopLearned AND <> ClosedEndStopLearn)	1. Diagnostic enabled (K_b_AFM_Vlv2PerfDiagEnbl) AND	1. = TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND	2. = TRUE AND		
					3. Diagnostic system disablement (DiagSystemDisable) AND	3. <> TRUE AND		
					4. AFM exhaust valve control not disabled for remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND	4. <> TRUE AND		
					5. Diagnostic PWM feedback signal AFM Valve2 not out-of-range low (AFM_Valve2DiagFdbkSt) AND	5. <> DiagFdbkPrdLow AND		
					6. Diagnostic PWM feedback signal AFM Valve2 not out-of-range high (AFM_Valve2DiagFdbkSt) AND	6. <> DiagFdbkPrdHigh AND		
					7. Δiagnostic PWM feedback Not out-of-range low, Not out-of-range high AND not within any of the calibrated feedback data range (AFM_Valve2DiagFdbkS) AND	7. <> DiagFdbkPrdInRngErr AND		
					8. AFM valve fault state (AFM_Valve2DiagFdbkSt)	8. <> FaultStIndeterminate		
Ignition 1 Switch Circuit Low Voltage	P2534	Detects if the Ignition1 Switch circuit is shorted to low or open	Ignition 1 voltage	<= 6 V	Engine	Running	180 failures out of 200 samples 1 sample/25.0 ms	DTC Type A 1 trip
Ignition 1 Switch Circuit High Voltage	P2535	Detects if the Ignition1 Switch circuit is shorted to vehicle supply voltage	Ignition 1 voltage	> 11.7 V	Ignition Run_Crank terminal	Off	180 failures out of 200 samples 1 sample/25.0 ms	DTC Type A 1 trip
Control Module Communication Bus “A” Off	U0073	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a	Bus Status	Off	Power mode	Run/Crank	5 failures out of 5 samples (5 seconds)	DTC Type B 2 trips

16 OBDG07A Coolant Heater Control Module / CHCM LT4 CTS-V with Automatic Transmission

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Lost Communication With ECM/PCM “A”	U0100	Detects that CAN serial data communication has been lost with the ECM	Message $0C9	Undetected	1. Power mode 2. Ignition Run/Crank Voltage 3. U0073	Run/Crank 11V<voltage<32V not active	12 failures out of 12 samples (12 seconds)	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Fuel Rail Pressure (FRP) Sensor Performance (rationality)	P018B	This DTC detects a fuel pressure sensor response stuck within the normal operating range	Absolute value of fuel pressure change as sensed during intrusive test.	<= 30 kPa	1. FRP Circuit Low DTC (P018C) 2. FRP Circuit High DTC (P018D) 3. FuelPump Circuit Low DTC (P0231) 4. FuelPump Circuit High DTC (P0232) 5. FuelPump Circuit Open DTC (P023F) 6. Reference Voltage DTC (P0641) 7. Fuel Pump Control Module Driver Over-temperature DTC (P064A) 8. Control Module Internal Performance DTC (P0606) 9. Engine run time 10. Emissions fuel level low (PPEI $3FB) 11. Fuel pump control 12. Fuel pump control state 13. Engine fuel flow 14. ECM fuel control system failure (PPEI $1E7)	1. Not active 2. Not active 3. Not active 4. Not active 5. Not active 6. Not active 7. Not active 8. Not active 9. >=5 seconds 10. Not low 11. Enabled 12. Normal or FRP rationality control 13. > 0.047 g/s 14. Not failed	Frequency: Continuous; 12.5 ms loop. 60 seconds between intrusive tests that pass Intrusive test requested if fuel system is clamped for >= 5 seconds or fuel pressure error variance <= typically (0.3 to 0.6) (calculated over a 2.5sec period); otherwise report Duration of intrusive test is fueling related (5 to 12 seconds). Intrusive test is run when fuel flow is below Max allowed fuel flow rate (Typical values in the range of 11 to 50 g/s)	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Fuel Rail Pressure (FRP) Sensor Circuit Low Voltage	P018C	This DTC detects if the fuel pressure sensor circuit is shorted low	FRP sensor voltage	< 0.14 V	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type B 2 trips
Fuel Rail Pressure (FRP) Sensor Circuit High Voltage	P018D	This DTC detects if the fuel pressure sensor circuit is shorted high	FRP sensor voltage	> 4.86 V	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type B 2 trips
Fuel Pump Control Circuit Low Voltage	P0231	This DTC detects if the fuel pump control circuit is shorted to low	Fuel Pump Current	> 14.48A	Ignition switch OR Ignition switch OR Fuel Pump Control AND Ignition Run/Crank Voltage	Run or Crank Accessory enabled 9V < voltage < 32V	72 test failures in 80 test samples if Fuel Pump Current <100A 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Pump Control Circuit High Voltage	P0232	This DTC detects if the fuel pump control circuit is shorted to high	Voltage measured at fuel pump circuit	> 3.86 V	Commanded fuel pump output Fuel pump control enable Time that above conditions are met	0% duty cycle (off) False >=4.0 seconds	36 test failures in 40 test samples; 1 sample/12.5ms Pass/Fail determination made only once per trip	DTC Type B 2 trips
Fuel Pump Control Circuit (Open)	P023F	This DTC detects if the fuel pump control circuit is open	Fuel Pump Current AND Fuel Pump Duty Cycle	<=0.5A >20%	Ignition switch OR Ignition switch OR Fuel Pump Control AND Ignition Run/Crank Voltage	Run or Crank Accessory enabled 9V < voltage < 32V	72 test failures in 80 test samples; 1 sample/12.5ms	DTC Type A 1 trip
Fuel System Control Module Enable Control Circuit	P025A	This DTC detects if there is a fault in the fuel pump control enable circuit	PPEI (Powertrain Platform Electrical Interface) Fuel System Request ($1E7)	≠ Fuel Pump Control Module Enable Control Circuit	Ignition AND PPEI Fuel System Request ($1E7)	Run or Crank valid	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if any software or calibration check sum is incorrect	Calculated Checksum (CRC16)	≠ stored checksum for any of the parts (boot, software, application calibration, system calibration)	Ignition switch OR Ignition switch	Run or Crank Accessory	1 failure if it occurs during the first ROM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background	DTC Type A 1 trip
Control Module Not Programmed	P0602	Indicates that the ECU needs to be programmed	Calibration KeMEMD_b_NoStartCal	= TRUE	Ignition switch OR Ignition switch	Run or Crank Accessory	Runs once at power up	DTC Type A 1 trip
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up	≠ checksum at power-down	Ignition switch OR Ignition switch	Run or Crank Accessory	1 failure Frequency: Once at power-up	DTC Type A 1 trip
Control Module Random Access Memory (RAM)	P0604	Indicates that control module is unable to correctly write and read data to and from RAM	Data read	≠ Data written	Ignition switch OR Ignition switch	Run or Crank Accessory	1 failure if it occurs during the first RAM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background.	DTC Type A 1 trip
Control Module Internal Performance 1. Main Processor Configuration Register Test	P0606	Indicates the ECU has detected an internal processor fault or external watchdog fault (PID $2032 discriminates the source of fault)	 1. I/O configuration register faults: •Register contents	 =Incorrect value	Ignition switch OR Ignition switch 1. For all I/O configuration register faults: Calibration •KeMEMD_b_ProcFltCfgRegEnbl	(Run or Crank) OR Accessory TRUE	 1. 1 failure Frequency: Continuously (12.5ms)	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
2. Processor clock test 3. External watchdog test			2. Processor Clock Fault: • EE latch flag in EEPROM OR • RAM latch flag. 3. External Watchdog Fault: • Software control of fuel pump driver	 0x5A5A 0x5A Control Lost	2. For Processor Clock Fault: Calibration •KeMEMD_b_ProcFltCLKDiagEnbl 3. For External Watchdog Fault: Calibration •KeFRPD_b_FPExtWDogDiagEnbl AND •Control Module ROM(P0601) AND •Control Module RAM(P0604)	 TRUE TRUE Not active Not active	2. 1 failure Frequency: Continuously (12.5ms) 3. 3 failures out of 15 samples 1 sample/12.5 ms	
Control Module Long Term Memory (EEPROM) Performance	P062F	Indicates that the NVM Error flag has not been cleared	Last EEPROM write	Did not complete	Ignition switch OR Ignition switch	(Run or Crank) OR Accessory	1 test failure Once on controller power-up	DTC Type B 2 trips
5Volt Reference Circuit (Short High/Low/Out of Range)	P0641	Detects continuous short or out of range on the #1 5V sensor reference circuit	(Reference voltage AND Output) OR (Reference voltage AND Output) OR (Reference voltage AND Output) OR	(>= 0.5V inactive) (>= 5.5V active) (<= 4.5V active)	Ignition	Run or Crank	15 failures out of 20 samples 1 sample/12.5 ms	DTC Type A 1 trip
			Reference voltage	> 105% nominal OR < 95% nominal (i.e., > 5.25v OR < 4.75v)				
Fuel Pump Control Module Driver 1 Over-temperature	P064A	Detects if an internal fuel pump driver overtemperature condition exists under normal operating conditions	Pump Driver Temp	> 150C	Ignition switch OR Ignition switch	(Run or Crank) OR Accessory	3 failures out of 15 samples 1 sample/12.5 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					KeFRPD_b_FPOverTempDiagEnbl	TRUE		
					Ignition Run_Crank terminal	9V<voltage<32V		
Ignition 1 Switch Circuit Low Voltage	P2534	Detects if the Ignition1 Switch circuit is shorted to low or open	Ignition 1 voltage	<= 6 V	Engine	Running	180 failures out of 200 samples 1 sample/25.0 ms	DTC Type A 1 trip
Ignition 1 Switch Circuit High Voltage	P2535	Detects if the Ignition1 Switch circuit is shorted to vehicle supply voltage	Ignition 1 voltage	> 11.7 V	Ignition Run_Crank terminal	Off	180 failures out of 200 samples 1 sample/25.0 ms	DTC Type A 1 trip
Fuel Pump Flow Performance (rationality)	P2635	Detects degradation in the performance of the electronically regulated fuel system	Filtered fuel rail pressure error	<= Low Threshold (tabulated function of desired fuel rail pressure and fuel flow rate -- 15% of requested Target Pressure) OR >= High Threshold (tabulated function of desired fuel rail pressure and fuel flow rate -- 15% of requested Target Pressure)			Filtered fuel rail pressure error Time Constant = 12.5 seconds Frequency: Continuous 12.5 ms loop	DTC Type B 2 trips
					1. FRP Circuit Low DTC (P018C)	1. Not active		
					2. FRP Circuit High DTC (P018D)	2. Not active .		
					3. Fuel Rail Pressure Sensor Performance DTC (P018B)	3. Not active		
					4. FuelPump Circuit Low DTC (P0231)	4. Not active		
					5. FuelPump Circuit High DTC (P0232)	5. Not active		
					6. FuelPump Circuit Open DTC (P023F)	6. Not active		
					7. Reference Voltage DTC (P0641)	7. Not active		
					8. Fuel Pump Control Module Driver Over-temperature DTC's (P064A)	8. Not active		
					9. Control Module Internal Performance DTC (P0606)	9. Not active		
					10. ECM fuel control system failure (PPEI $1E7)	10. Not occurred		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					11. Barometric pressure signal (PPEI $4C1)	11. Valid (for absolute fuel pressure sensor)		
					12. Engine run time	12. >= 30 seconds		
					13. Emissions fuel level (PPEI $3FB)	13. Not low		
					14. Fuel pump control	14. Enabled		
					15. Fuel pump control state	15. Normal		
					16. Battery Voltage	16. 11V<=voltage=<32V		
					17. Fuel flow rate **(See Supporting Tables tab)**	17. > 0.047 g/s **AND** <= Max allowed fuel flow rate as a function of desired rail pressure & Vbatt (Typical values in the range of 11 to 50 g/s)		
					18. Fuel Pressure Control System	18. Is not responding to an over-pressurization due to pressure build during DFCO or a decreasing desired pressure command.		
Control Module Communication Bus “A” Off	U0073	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a	Bus Status	Off	Power mode	Run/Crank	5 failures out of 5 samples (5 seconds)	DTC Type B 2 trips
Lost Communication With ECM/PCM “A”	U0100	Detects that CAN serial data communication has been lost with the ECM	Message $0C9	Undetected	1. Power mode 2. Ignition Run/Crank Voltage 3. U0073	Run/Crank 11V<voltage<32V not active	12 failures out of 12 samples (12 seconds)	DTC Type B 2 trips

16 OBDG07A Chassis Control Module / CCM LT1 Camaro (Performance Exhaust)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Fuel Rail Pressure (FRP) Sensor Performance (rationality)	P018B	This DTC detects a fuel pressure sensor response stuck within the normal operating range	Absolute value of fuel pressure change as sensed during intrusive test.	<= 30 kPa	1. FRP Circuit Low DTC (P018C) 2. FRP Circuit High DTC (P018D) 3. FuelPump Circuit Low DTC (P0231) 4. FuelPump Circuit High DTC (P0232) 5. FuelPump Circuit Open DTC (P023F) 6. Reference Voltage DTC (P0641) 7. Fuel Pump Control Module Driver Over-temperature DTC (P064A) 8. Control Module Internal Performance DTC (P0606) 9. Engine run time 10. Emissions fuel level low (PPEI $3FB) 11. Fuel pump control 12. Fuel pump control state 13. Engine fuel flow 14. ECM fuel control system failure (PPEI $1E7)	1. Not active 2. Not active 3. Not active 4. Not active 5. Not active 6. Not active 7. Not active 8. Not active 9. >=5 seconds 10. Not low 11. Enabled 12. Normal or FRP rationality control 13. > 0.047 g/s 14. Not failed	Frequency: Continuous; 12.5 ms loop. 60 seconds between intrusive tests that pass Intrusive test requested if fuel system is clamped for >= 5 seconds or fuel pressure error variance <= typically (0.3 to 0.6) (calculated over a 2.5sec period); otherwise report pass Duration of intrusive test is fueling related (5 to 12 seconds). Intrusive test is run when fuel flow is below Max allowed fuel flow rate (Typical values in the range of 11 to 50 g/s)	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Fuel Rail Pressure (FRP) Sensor Circuit Low Voltage	P018C	This DTC detects if the fuel pressure sensor circuit is shorted low	FRP sensor voltage	< 0.14 V	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type B 2 trips
Fuel Rail Pressure (FRP) Sensor Circuit High Voltage	P018D	This DTC detects if the fuel pressure sensor circuit is shorted high	FRP sensor voltage	> 4.86 V	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type B 2 trips
Fuel Pump Control Circuit Low Voltage	P0231	This DTC detects if the fuel pump control circuit is shorted to low	Fuel Pump Current	> 14.48A	Ignition switch OR Ignition switch OR Fuel Pump Control AND Ignition Run/Crank Voltage	Run or Crank Accessory enabled 9V < voltage < 32V	72 test failures in 80 test samples if Fuel Pump Current <100A 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Pump Control Circuit High Voltage	P0232	This DTC detects if the fuel pump control circuit is shorted to high	Voltage measured at fuel pump circuit	> 3.86 V	Commanded fuel pump output Fuel pump control enable Time that above conditions are met	0% duty cycle (off) False >=4.0 seconds	36 test failures in 40 test samples; 1 sample/12.5ms Pass/Fail determination made only once per trip	DTC Type B 2 trips
Fuel Pump Control Circuit (Open)	P023F	This DTC detects if the fuel pump control circuit is open	Fuel Pump Current AND Fuel Pump Duty Cycle	<=0.5A >20%	Ignition switch OR Ignition switch OR Fuel Pump Control AND Ignition Run/Crank Voltage	Run or Crank Accessory enabled 9V < voltage < 32V	72 test failures in 80 test samples; 1 sample/12.5ms	DTC Type A 1 trip
Fuel System Control Module Enable Control Circuit	P025A	This DTC detects if there is a fault in the fuel pump control enable circuit	PPEI (Powertrain Platform Electrical Interface) Fuel System Request ($1E7)	≠ Fuel Pump Control Module Enable Control Circuit	Ignition AND PPEI Fuel System Request ($1E7)	Run or Crank valid	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if any software or calibration check sum is incorrect	Calculated Checksum (CRC16)	≠ stored checksum for any of the parts (boot, software, application calibration, system calibration)	Ignition switch OR Ignition switch	Run or Crank Accessory	1 failure if it occurs during the first ROM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background	DTC Type A 1 trip
Control Module Not Programmed	P0602	Indicates that the ECU needs to be programmed	Calibration KeMEMD_b_NoStartCal	= TRUE	Ignition switch OR Ignition switch	Run or Crank Accessory	Runs once at power up	DTC Type A 1 trip
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up	≠ checksum at power-down	Ignition switch OR Ignition switch	Run or Crank Accessory	1 failure Frequency: Once at power-up	DTC Type A 1 trip
Control Module Random Access Memory (RAM)	P0604	Indicates that control module is unable to correctly write and read data to and from RAM	Data read	≠ Data written	Ignition switch OR Ignition switch	Run or Crank Accessory	1 failure if it occurs during the first RAM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background.	DTC Type A 1 trip
Control Module Internal Performance	P0606	Indicates the ECU has detected an internal processor fault or external watchdog fault (PID $2032 discriminates the source of fault)			Ignition switch OR Ignition switch	(Run or Crank) OR Accessory		DTC Type A 1 trip
1. Main Processor Configuration Register Test			1. I/O configuration register faults: •Register contents	 =Incorrect value	1. For all I/O configuration register faults: Calibration •KeMEMD_b_ProcFltCfgRegEnbl	 TRUE	1. 1 failure Frequency: Continuously (12.5ms)	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
2. Processor clock test 3. External watchdog test			2. Processor Clock Fault: • EE latch flag in EEPROM OR • RAM latch flag. 3. External Watchdog Fault: • Software control of fuel pump driver	 0x5A5A 0x5A Control Lost	2. For Processor Clock Fault: Calibration •KeMEMD_b_ProcFltCLKDiagEnbl 3. For External Watchdog Fault: Calibration •KeFRPD_b_FPExtWDogDiagEnbl AND •Control Module ROM(P0601) AND •Control Module RAM(P0604)	 TRUE TRUE Not active Not active	2. 1 failure Frequency: Continuously (12.5ms) 3. 3 failures out of 15 samples 1 sample/12.5 ms	
Control Module Long Term Memory (EEPROM) Performance	P062F	Indicates that the NVM Error flag has not been cleared	Last EEPROM write	Did not complete	Ignition switch OR Ignition switch	(Run or Crank) OR Accessory	1 test failure Once on controller power-up	DTC Type B 2 trips
5Volt Reference Circuit (Short High/Low/Out of Range)	P0641	Detects continuous short or out of range on the #1 5V sensor reference circuit	(Reference voltage AND Output) OR (Reference voltage AND Output) OR (Reference voltage AND Output) OR	(>= 0.5V inactive) (>= 5.5V active) (<= 4.5V active)	Ignition	Run or Crank	15 failures out of 20 samples 1 sample/12.5 ms	DTC Type A 1 trip
			Reference voltage	> 105% nominal OR < 95% nominal (i.e., > 5.25v OR < 4.75v)				
Fuel Pump Control Module Driver 1 Over-temperature	P064A	Detects if an internal fuel pump driver overtemperature condition exists under normal operating conditions	Pump Driver Temp	> 150C	Ignition switch OR Ignition switch	(Run or Crank) OR Accessory	3 failures out of 15 samples 1 sample/12.5 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					KeFRPD_b_FPOverTempDiagEnbl	TRUE		
					Ignition Run_Crank terminal	9V<voltage<32V		
Cylinder Deactivation Exhaust Flow Valve Control Circuit/Open	P12E3	Monitors for open circuit faults in the AFM valve PWM control circuit	Open circuit fault status AFM_VlvCntrlCktOpenFlt	== Faulted	1. Diagnostic enabled (K_b_AFM_VlvCntrlOpenEnbl) AND 2. Diagnostic system disablement not requested (DiagSystemDisable) AND 3. AFM Valve Initialization complete (AFM_ValveInitDlyCmpt) AND 4. AFM exhaust valve control not disabled remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND 5. AFM control circuit Open circuit fault status (AFM_VlvCntrlCktOpenFlt)	1. = TRUE AND 2. <> TRUE AND 3. = TRUE AND 4. <> TRUE AND 5. <> INDETERMINATE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Control Circuit Low	P12E4	Monitors for short-to-ground faults in the AFM valve PWM control circuit	Short-to-ground fault status AFM_VlvCntrlCktGshtFlt	== Faulted	1. Diagnostic enabled (K_b_AFM_VlvCntrlGshtEnbl) AND 2. Diagnostic system disablement not requested (DiagSystemDisable) AND 3. AFM Valve Initialization complete (AFM_ValveInitDlyCmpt) AND 4. AFM exhaust valve control not disabled for remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND 5. AFM control circuit Short-to-ground fault status not indeterminate (AFM_VlvCntrlCktGshtFlt)	1. = TRUE AND 2. <> TRUE AND 3. = TRUE AND 4. <> TRUE AND 5. <> INDETERMINATE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Cylinder Deactivation Exhaust Flow Valve Control Circuit High	P12E5	Monitors for short-to-power faults in the AFM valve PWM control circuit	Short-to-power fault status AFM_VlvCntrlCktPshtFlt	== Faulted	1. Diagnostic enabled (K_b_AFM_VlvCntrlPshtEnbl) AND 2. Diagnostic system disablement not requested (DiagSystemDisable) AND 3. AFM Valve Initialization complete (AFM_ValveInitDlyCmpt) AND 4. AFM exhaust valve control not disabled remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND 5. AFM control circuit Short-to-power fault status not indeterminate (AFM_VlvCntrlCktPshtFlt)	1. = TRUE AND 2. <> TRUE AND 3. = TRUE AND 4. <> TRUE AND 5. <> INDETERMINATE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feeback Circuit Low Duty Cycle (Bank 1)	P12E7	Monitors for out-of-range low duty cycle values on the AFM valve 1 diagnostic PWM feedback signal	AFM valve 1 diagnostic PWM feedback signal AFM_Valve1FdbkDC	< K_Pct_AFM_Vlv1PstnLoThrsh)	1. Diagnostic enabled (K_b_AFM_Vlv1PstnLoDiagEnbl) AND 2. AFM valve initialization complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit High Duty Cycle (Bank 1)	P12E8	Monitors for out-of-range high duty cycle values on the AFM valve 1 diagnostic PWM feedback signal	AFM valve 1 diagnostic PWM feedback signal AFM_Valve1FdbkDC	> K_Pct_AFM_Vlv1PstnHiThrsh	1. Diagnostic enabled (K_b_AFM_Vlv1PstnHiDiagEnbl) AND 2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Cylinder Deactivation Exhaust Flow Valve Open Position (Bank 1)	P12E9	Monitors the sensed AFM valve 1 position for values that are out-of-range low	AFM_Valve1State	<= ValvePstnOOR_Low)	1. Diagnostic enabled (K_b_AFM_Vlv1PstnOOR_LoEnbl) AND 2. AFM valve initialization period completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable) AND 4. AFM valve 1 position sensor circuit low diagnostic not faulted (AFM_Valve1PstnLoFP) AND 5. AFM valve 1 position sensor circuit high diagnostic not faulted (AFM_Valve1PstnHiFP)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE AND 4. <> TRUE AND 5. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Closed Position (Bank 1)	P12EA	Monitors the sensed AFM valve 1 position for values that are out-of-range high	AFM_Valve1State	>= ValvePstnOOR_High)	1. Diagnostic enabled (K_b_AFM_Vlv1PstnOOR_LoEnbl) AND 2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable) AND 4. AFM valve 1 position sensor circuit low diagnostic not faulted (AFM_Valve1PstnLoFP) AND 5. AFM valve 1 position sensor circuit high diagnostic not faulted (AFM_Valve1PstnHiFP)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE AND 4. <> TRUE AND 5. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit Low Frequency (Bank 1)	P12EB	Monitors for out-of-range high period (i.e. out-of-range low frequency) values on the AFM valve 1 diagnostic PWM feedback signal	Diagnostic PWM feedback signal_AFM_Valve1DiagFdbkSt	>= DiagFdbkPrdHigh)	1. Diagnostic enabled (K_b_AFM_Vlv1FdbkHiDiagEnbl) AND 2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit High Frequency (Bank 1)	P12EC	Monitors for out-of-range low period (i.e. out-of range high frequency) values on the AFM valve 1 diagnostic PWM feedback signal	Diagnostic PWM feedback signal_AFM_Valve1DiagFdbkSt	< = DiagFdbkPrdLow)	1. Diagnostic enabled (K_b_AFM_Vlv1FdbkLoDiagEnbl) AND 2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit Incorrect Frequency (Bank 1)	P12ED	Monitors for in-range errors that result when the sensed period of the diagnostic PWM feedback signal for AFM valve 1 is neither out-of-range low nor out-of-range high and does not fall within any of the calibrated ranges defined for diagnostic feedback data	Diagnostic PWM feedback signal_AFM_Valve1DiagFdbkSt	= DiagFdbkPrdInRngErr)	1. Diagnostic enabled (K_b_AFMV1FdbkInvldDiagEnbl) AND 2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Stuck Closed (Bank 1)	P12EF	Monitors position feedback to determine if AFM valve 1 is stuck in the closed position	Position feedback AFM_Valve1State	<> AFM_ValveCmd	1. AFM valve1 stuck diagnostics enabled (K_b_AFM_Vlv1StuckDiagEnbl) AND 2. Ignition voltage (IgnitionVoltage) AND 3. AFM Valve initialization (AFM_ValveInitDlyCmpt) AND 4. AFM valve control circuit short-to-power diagnostic fault not active (AFM_VlvCntrlPshtFA) AND 5. AFM valve control circuit short-to-ground diagnostic fault not active (AFM_VlvCntrlGshtFA) AND	1. = TRUE AND 2. >= 10.2V AND 3. = TRUE AND 4. <> TRUE AND 5. <> TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					6. AFM valve control circuit open diagnostic fault not active (AFM_VlvCntrlOpenFA) AND	6. <> TRUE AND		
					7. AFM valve1 position sensor circuit low diagnostic fault not active (AFM_Valve1PstnLoFA) AND	7. <> TRUE AND		
					8. AFM valve1 position sensor circuit high diagnostic fault not active (AFM_Valve1PstnHiFA) AND	8. <> TRUE AND		
					9. AFM valve1 position out-of-range low diagnostic fault not active (AFM_Vlv1PstnOOR_LoFA) AND	9. <> TRUE AND		
					10. AFM valve1 position out-of-range high diagnostic fault not active (AFM_Vlv1PstnOOR_HiFA) AND	10. <> TRUE AND		
					11. Diagnostic system disablement (DiagSystemDisable) AND	11. <> TRUE AND		
					12. AFM exhaust valve control not disabled for remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND	12. <> TRUE AND		
					13. AFM valve command (AFM_ValveCmd) AND	13. (= OPEN OR = CLOSED) AND		
					14. AFM valve command not changed (AFM_ValveCmd) AND	14. = AFM_ValveCmdPrev AND		
					15. AFM valve response time (AFM_Valve1ResponseTmr ≥ Ke_t_AFM_Valve1ResponseTm) AND	15. >= 1 sec AND		
					16. AFM valve position not out-of-range (AFM_Valve1State)	16. (<> ValvePstnOOR_Low AND <> ValvePstnOOR_High)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Cylinder Deactivation Exhaust Flow Valve Stuck Open (Bank 1)	P12F0	Monitors position feedback to determine if AFM valve 1 is stuck in an open position	1. (AFM valve command AND AFM_Valve1State) OR 2. (AFM valve command AND AFM_Valve1State) OR 3. (AFM valve command AND AFM_Valve1State)	1. (= Open AND =ValveInTransition) OR 2. (= Closed AND = ValvePositionOpen) OR 3. (= Closed AND =ValveInTransition)	1. The AFM valve 1 stuck diagnostics are enabled through calibration (K_b_AFM_Vlv1StuckDiagEnbl = TRUE) AND	1. = TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
					2. Ignition voltage is greater than or equal to the minimum value required to enable diagnostic execution (IgnitionVoltage ≥ K_U_AFM_Vlv1StuckMinVolt) AND	2. >= 10.2 V		
					3. Sufficient time has been allowed for initialization of the AFM valve (AFM_ValveInitDlyCmpt = TRUE) AND	3. = TRUE AND		
					4. An AFM valve control circuit short-to-power diagnostic fault is not active (AFM_VlvCntrlPshtFA = FALSE) AND	4. <> TRUE AND		
					5. An AFM valve control circuit short-to-ground diagnostic fault is not active (AFM_VlvCntrlGshtFA = FALSE) AND	5. <> TRUE AND		
					6. An AFM valve control circuit open diagnostic fault is not active (AFM_VlvCntrlOpenFA = FALSE) AND	6. <> TRUE AND		
					7. An AFM valve 1 position sensor circuit low diagnostic fault is not active (AFM_Valve1PstnLoFA = FALSE) AND	7. <> TRUE AND		
					8. An AFM valve 1 position sensor circuit high diagnostic fault is not active (AFM_Valve1PstnHiFA = FALSE) AND	8. <> TRUE AND		
					9. An AFM valve 1 position out-of-range low diagnostic fault is not active (AFM_Vlv1PstnOOR_LoFA = FALSE) AND	9. <> TRUE AND		
					10. An AFM valve 1 position out-of-range high diagnostic fault is not active (AFM_Vlv1PstnOOR_HiFA = FALSE) AND	10. <> TRUE AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					11. Diagnostic system disablement is not being requested (DiagSystemDisable = FALSE) AND	11. <> TRUE AND		
					12. Control of the AFM exhaust valve has not been disabled for the remainder of the trip due to an output driver short circuit fault (AFMV_FaultTripDsbl = FALSE) AND	12. <> TRUE AND		
					13. The AFM valve is currently being commanded to the open or closed state (AFM_ValveCmd = Open OR AFM_ValveCmd = Closed) AND	13. (= OPEN OR = CLOSED) AND		
					14. The commanded state of the AFM valve has not changed (AFM_ValveCmd = AFM_ValveCmdPrev) AND	14. <> AFM_ValveCmdPrev AND		
					15. Sufficient time has been allowed for the AFM valve to respond to a change in the commanded AFM valve state (AFM_Valve1ResponseTmr ≥ Ke_t_AFM_Valve1ResponseTm) AND	15. >= 1 sec AND		
					16. The sensed position of the AFM valve is not out-of-range (AFM_Valve1State ≠ ValvePstnOOR_Low AND AFM_Valve1State ≠ ValvePstnOOR_High)	16. (<> ValvePstnOOR_Low AND <> ValvePstnOOR_High)		
Cylinder Deactivation Exhaust Flow Valve Position Not Learned (Bank 1)	P12F1	Monitors diagnostic feedback from AFM valve 1 to determine if the valve end stops have not been learned	AFM valve diagnostic feedback status (AFM_Valve1DiagFdbkSt)	= AlignmentNotComplete	1. Diagnostic enabled (K_b_AFM_Vlv1NotLrndEnbl) AND	1. = TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
					2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND	2. = TRUE AND		
					3. Diagnostic system disablement Not requested (DiagSystemDisable) AND	3. <> TRUE AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					4. Diagnostic PWM feedback signal AFM valve1 Not out-of-range low (AFM_Valve1DiagFdbkSt) AND	4. <> DiagFdbkPrdLow AND		
					5. Diagnostic PWM feedback signal AFM valve1 Not out-of-range high (AFM_Valve1DiagFdbkSt) AND	5. <> DiagFdbkPrdHigh AND		
					6. Diagnostic PWM feedback signal Not out-of-range low, Not out-of-range high AND andNot within any calibrated feedback data range (AFM_Valve1DiagFdbkSt) AND	6. <> DiagFdbkPrdInRngErr AND		
					7. AFM valve state (AFM_Valve1DiagFdbkSt)	7. <> ActuatorFaulted		
Cylinder Deactivation Exhaust Flow Valve Actuator Performance (Bank1)	P12F2	Monitors diagnostic feedback from AFM valve 1 to determine if an internal actuator fault is present or if the AFM valve is stuck in the end stop learning mode	AFM valve command (AFM_ValveCmd) AND Position feedback (AFM_Valve1State)	(= Closed AND = ValveInTransition)	1. Diagnostic enabled (K_b_AFM_Vlv1PerfDiagEnbl) AND	1. = TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
					2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND	2. = TRUE AND		
					3. Diagnostic system disablement Not requested (DiagSystemDisable) AND	3. <> TRUE AND		
					4. AFM exhaust valve control Not disabled for remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND	4. <> TRUE AND		
					5. Diagnostic PWM feedback signal AFM valve1 not out-of-range low (AFM_Valve1DiagFdbkSt) AND	5. <> DiagFdbkPrdLow AND		
					6. Diagnostic PWM feedback signal AFM valve1 Not out-of-range high (AFM_Valve1DiagFdbkSt) AND	6. <> DiagFdbkPrdHigh AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					7. Diagnostic PWM feedback signal Not out-of-range low, Not out-of-range high AND Not in any calibrated feedback data range (AFM_Valve1DiagFdbkSt) AND 8. AFM valve fault state (AFM_Valve1DiagFdbkSt)	7. <> DiagFdbkPrdInRngErr AND 8. <> FaultStIndeterminate		
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit Low Duty Cycle (Bank 2)	P12F4	Monitors for out-of-range low duty cycle values on the AFM valve 2 diagnostic PWM feedback signal	AFM valve 2 diagnostic PWM feedback signal AFM_Valve2FdbkDC	< K_Pct_AFM_Vlv2PstnLoThrsh)	1. Diagnostic enabled (K_b_AFM_Vlv2PstnLoDiagEnbl) AND 2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit High Duty Cycle (Bank 2)	P12F5	Monitors for out-of-range high duty cycle values on the AFM valve 2 diagnostic PWM feedback signal	AFM valve 2 diagnostic PWM feedback signal AFM_Valve2FdbkDC	> K_Pct_AFM_Vlv2PstnHiThrsh)	1. Diagnostic enabled (K_b_AFM_Vlv2PstnHiDiagEnbl) AND 2. AFM valve initialization complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Open Position (Bank 2)	P12F6	Monitors the sensed AFM valve 2 position for values that are out-of-range low	AFM_Valve2State	= ValvePstnOOR_Low	1. Diagnostic enabled (K_b_AFM_Vlv2PstnOOR_LoEnbl) AND 2. AFM valve initialization complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable) AND 4. AFM valve 2 position sensor circuit low diagnostic not faulted (AFM_Valve2PstnLoFP) AND 5. AFM valve2 position sensor circuit high diagnostic unfaulted (AFM_Valve2PstnHiFP)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE AND 4. <> TRUE AND 5. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Cylinder Deactivation Exhaust Flow Valve Closed Position (Bank 2)	P12F7	Monitors the sensed AFM valve 2 position for values that are out-of-range high	AFM_Valve2State	= ValvePstnOOR_High	1. Diagnostic enabled (K_b_AFM_Vlv2PstnOOR_HiEnbl) AND 2. AFM valve initialization complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable) AND 4. AFM valve 2 position sensor circuit low diagnostic unfaulted (AFM_Valve2PstnLoFP) AND 5. AFM valve 2 position sensor circuit high diagnostic unfaulted (AFM_Valve2PstnHiFP)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE AND 4. <> TRUE AND 5. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit Low Frequency (Bank 2)	P12F8	Monitors for out-of-range high period (i.e. out-of-range low frequency) values on the AFM valve 2 diagnostic PWM feedback signal	Diagnostic PWM feedback signal AFM_Valve2DiagFdbkSt	>= DiagFdbkPrdHigh)	1. Diagnostic enabled (K_b_AFM_Vlv2FdbkHiDiagEnbl) AND 2. AFM valve initialization complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit High Frequency (Bank 2)	P12F9	Monitors for out-of-range low period (i.e. out-of-range high frequency) values on the AFM valve 2 diagnostic PWM feedback signal	Diagnostic PWM feedback signal AFM_Valve2DiagFdbkSt	< DiagFdbkPrdLow)	1. Diagnostic enabled through calibration (K_b_AFM_Vlv2FdbkLoDiagEnbl) AND 2. AFM valve initialization period has completed (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement is not being requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Cylinder Deactivation Exhaust Flow Valve Feedback Circuit Incorrect Frequency (Bank 2)	P12FA	Monitors for in-range errors that result when the sensed period of the diagnostic PWM feedback signal for AFM valve 2 is neither out-of-range low nor out-of-range high and does not fall within any of the calibrated ranges defined for diagnostic feedback data	Diagnostic PWM feedback signal_AFM_Valve2DiagFdbkSt	= DiagFdbkPrdInRngErr)	1. Diagnostic enabled (K_b_AFMV2FdbkInvldDiagEnbl) AND 2. AFM valve initialization period complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Stuck Closed (Bank 2)	P12FC	Monitors position feedback to determine if AFM valve 2 is stuck in the closed position	AFM valve command AND AFM Valve2 State (AFM_ValveCmd AND AFM_Valve2State)	(= Open AND = ValvePstnClosed)	1. AFM valve2 stuck diagnostics enabled (K_b_AFM_Vlv2StuckDiagEnbl) AND	1. = TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
					2. IgnitionVoltage ≥ K_U_AFM_Vlv2StuckMinVolt AND	2. V >= 10.2 V AND		
					3. AFM valve initialized (AFM_ValveInitDlyCmplt) AND	3. = TRUE AND		
					4. AFM valve control circuit short-to-power diagnostic fault (AFM_VlvCntrlPshtFA) AND	4. <> TRUE AND		
					5. AFM valve control circuit short-to-ground diagnostic fault (AFM_VlvCntrlGshtFA) AND	5. <> TRUE AND		
					6. AFM valve control circuit open diagnostic fault (AFM_VlvCntrlOpenFA) AND	6. <> TRUE AND		
					7. AFM valve2 position sensor circuit low diagnostic fault (AFM_Valve2PstnLoFA) AND	7. <> TRUE AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					8. AFM valve2 position sensor circuit high diagnostic fault (AFM_Valve2PstnHiFA) AND	8. <> TRUE AND		
					9. AFM valve2 position out-of-range low diagnostic fault (AFM_Vlv2PstnOOR_LoFA) AND	9. <> TRUE AND		
					10. AFM valve2 position out-of-range high diagnostic fault (AFM_Vlv2PstnOOR_HiFA) AND	10. <> TRUE AND		
					11. Diagnostic system disablement Not requested (DiagSystemDisable) AND	11. <> TRUE AND		
					12. AFM exhaust valve control Not disabled for remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND	12. <> TRUE AND		
					13. AFM valve command (AFM_ValveCmd) AND	13. (= Open OR = Closed) AND		
					14. AFM valve command Not changed (AFM_ValveCmd) AND	14. = AFM_ValveCmdPrev AND		
					15. AFM valve response time (AFM_Valve2ResponseTmr) AND	15. >= 1 sec AND		
					16. AFM valve position Not out-of-range (AFM_Valve2State AND AFM_Valve2State)	16. (<> ValvePstnOOR_Low AND <> ValvePstnOOR_High)		
Cylinder Deactivation Exhaust Flow Valve Stuck Open (Bank 2)	P12FD	Monitors position feedback to determine if AFM valve 2 is stuck in an open position	1. (AFM_ValveCmd AND AFM_Valve2State) OR 2. (AFM_ValveCmd AND AFM_Valve2State) OR 3. (AFM_ValveCmd AND AFM_Valve2State)	1. (= Open AND = ValveInTransition) OR 2. (= Closed AND = ValvePstnOpen) OR 3. (= Closed AND = ValveInTransition)	1. AFM valve2 stuck diagnostics enabled (K_b_AFM_Vlv2StuckDiagEnbl) AND	1. = TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
					2. Ignition voltage (IgnitionVoltage) AND	2. V >= 10.2 V AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					3. AFM valve initialization time complete (AFM_ValveInitDlyCmpt) AND	3. = TRUE AND		
					4. AFM valve control circuit short-to-power diagnostic fault (AFM_VlvCntrlPshtFA) AND	4. <> TRUE AND		
					5. AFM valve control circuit short-to-ground diagnostic fault (AFM_VlvCntrlGshtFA) AND	5. <> TRUE AND		
					6. AFM valve control circuit open diagnostic fault (AFM_VlvCntrlOpenFA) AND	6. <> TRUE AND		
					7. AFM valve2 position sensor circuit low diagnostic fault (AFM_Valve2PstnLoFA) AND	7. <> TRUE AND		
					8. AFM valve2 position sensor circuit high diagnostic fault (AFM_Valve2PstnHiFA) AND	8. <> TRUE AND		
					9. AFM valve2 position out-of-range low diagnostic fault (AFM_Vlv2PstnOOR_LoFA) AND	9. <> TRUE AND		
					10. AFM valve2 position out-of-range high diagnostic fault (AFM_Vlv2PstnOOR_HiFA) AND	10. <> TRUE AND		
					11. Diagnostic system disablement (DiagSystemDisable) AND	11. <> TRUE AND		
					12. AFM exhaust valve control not disabled for remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND	12. <> TRUE AND		
					13. AFM valve command (AFM_ValveCmd) AND	13. (= Open OR = Closed) AND		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					14. AFM valve command unchanged (AFM_ValveCmd) AND 15. AFM valve command response time (AFM_Valve2ResponseTmr) AND 16. AFM valve position not out-of-range (AFM_Valve2State)	14. = AFM_ValveCmdPrev AND 15. >= 1 sec AND 16. (<> ValvePstnOOR_Low AND <> ValvePstnOOR_High)		
Cylinder Deactivation Exhaust Flow Valve Position Not Learned (Bank 2)	P12FE	Monitors diagnostic feedback from AFM valve 2 to determine if the valve end stops have not been learned	AFM Valve Diagnostic Status enumeration (AFM_Valve2DiagFdbkSt)	= AlignmentNotComplete)	1. Diagnostic enabled (K_b_AFM_Vlv2NotLrndEnbl) AND 2. AFM valve initialization complete (AFM_ValveInitDlyCmpt) AND 3. Diagnostic system disablement not requested (DiagSystemDisable) AND 4. AFM Valve2 diagnostic PWM feedback not out-of-range low (AFM_Valve2DiagFdbkSt) AND 5. AFM Valve2 diagnostic PWM feedback signal not out-of-range high (AFM_Valve2DiagFdbkSt) AND 6. AFM Valve2 diagnostic PWM feedback signal Not out-of-range low, Not out-of-range high AND Not in any calibrated feedback data range (AFM_Valve1DiagFdbkSt) AND 7. AFM valve diagnostic feedback state (AFM_Valve2DiagFdbkSt)	1. = TRUE AND 2. = TRUE AND 3. <> TRUE AND 4. <> DiagFdbkPrdLow AND 5. <> DiagFdbkPrdHigh AND 6. <> DiagFdbkPrdInRngErr AND 7. <> Actuator Faulted	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips
Cylinder Deactivation Exhaust Flow Valve Actuator Performance (Bank2)	P12FF	Monitors diagnostic feedback from AFM valve 2 to determine if an internal actuator fault is present or if the AFM valve is stuck in the end stop learning mode	1. AFM Valve2 Diagnostic Status (AFM_Valve2DiagFdbkSt) OR 2. (AFM Valve2 Diagnostic Status AND AFM Valve Command) OR 3. (AFM Valve2 Diagnostic Status AND AFM Valve Command)	1. = Faulted OR 2. (= OpenEndStopLearned AND <> OpenEndStopLearn) OR 3. (= ClosedEndStopLearned AND <> ClosedEndStopLearn)	1. Diagnostic enabled (K_b_AFM_Vlv2PerfDiagEnbl) AND	1. = TRUE AND	20 failures out of 40 samples 1 sample/25 ms	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					2. AFM valve initialization completed (AFM_ValveInitDlyCmpt) AND	2. = TRUE AND		
					3. Diagnostic system disablement (DiagSystemDisable) AND	3. <> TRUE AND		
					4. AFM exhaust valve control not disabled for remainder of trip due to output driver short circuit fault (AFMV_FaultTripDsbl) AND	4. <> TRUE AND		
					5. Diagnostic PWM feedback signal AFM Valve2 not out-of-range low (AFM_Valve2DiagFdbkSt) AND	5. <> DiagFdbkPrdLow AND		
					6. Diagnostic PWM feedback signal AFM Valve2 not out-of-range high (AFM_Valve2DiagFdbkSt) AND	6. <> DiagFdbkPrdHigh AND		
					7. Δiagnostic PWM feedback Not out-of-range low, Not out-of-range high AND not within any of the calibrated feedback data range (AFM_Valve2DiagFdbkS) AND	7. <> DiagFdbkPrdInRngErr AND		
					8. AFM valve fault state (AFM_Valve2DiagFdbkSt)	8. <> FaultStIndeterminate		
Ignition 1 Switch Circuit Low Voltage	P2534	Detects if the Ignition1 Switch circuit is shorted to low or open	Ignition 1 voltage	<= 6 V	Engine	Running	180 failures out of 200 samples 1 sample/25.0 ms	DTC Type A 1 trip
Ignition 1 Switch Circuit High Voltage	P2535	Detects if the Ignition1 Switch circuit is shorted to vehicle supply voltage	Ignition 1 voltage	> 11.7 V	Ignition Run_Crank terminal	Off	180 failures out of 200 samples 1 sample/25.0 ms	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Fuel Pump Flow Performance (rationality)	P2635	Detects degradation in the performance of the electronically regulated fuel system	Filtered fuel rail pressure error	<= Low Threshold (tabulated function of desired fuel rail pressure and fuel flow rate -- 15% of requested Target Pressure) OR >= High Threshold (tabulated function of desired fuel rail pressure and fuel flow rate -- 15% of requested Target Pressure)			Filtered fuel rail pressure error Time Constant = 12.5 seconds Frequency: Continuous 12.5 ms loop	DTC Type B 2 trips
					1. FRP Circuit Low DTC (P018C)	1. Not active		
					2. FRP Circuit High DTC (P018D)	2. Not active .		
					3. Fuel Rail Pressure Sensor Performance DTC (P018B)	3. Not active		
					4. FuelPump Circuit Low DTC (P0231)	4. Not active		
					5. FuelPump Circuit High DTC (P0232)	5. Not active		
					6. FuelPump Circuit Open DTC (P023F)	6. Not active		
					7. Reference Voltage DTC (P0641)	7. Not active		
					8. Fuel Pump Control Module Driver Over-temperature DTC's (P064A)	8. Not active		
					9. Control Module Internal Performance DTC (P0606)	9. Not active		
					10. ECM fuel control system failure (PPEI $1E7)	10. Not occurred		
					11. Barometric pressure signal (PPEI $4C1)	11. Valid (for absolute fuel pressure sensor)		
					12. Engine run time	12. >= 30 seconds		
					13. Emissions fuel level (PPEI $3FB)	13. Not low		
					14. Fuel pump control	14. Enabled		
					15. Fuel pump control state	15. Normal		
					16. Battery Voltage	16. 11V<=voltage=<32V		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					17. Fuel flow rate **(See Supporting Tables tab)**	17. > 0.047 g/s **AND** <= Max allowed fuel flow rate as a function of desired rail pressure & Vbatt (Typical values in the range of 11 to 50 g/s)		
					18. Fuel Pressure Control System	18. Is not responding to an over-pressurization due to pressure build during DFCO or a decreasing desired pressure command.		
Control Module Communication Bus “A” Off	U0073	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a	Bus Status	Off	Power mode	Run/Crank	5 failures out of 5 samples (5 seconds)	DTC Type B 2 trips
Lost Communication With ECM/PCM “A”	U0100	Detects that CAN serial data communication has been lost with the ECM	Message $0C9	Undetected	1. Power mode 2. Ignition Run/Crank Voltage 3. U0073	Run/Crank 11V<voltage<32V not active	12 failures out of 12 samples (12 seconds)	DTC Type B 2 trips

P2635 Fuel Pump Performance Maximum Fuel Flow map (grams / s)

X-axis= Desired Fuel Pressure (kiloPascals)

Y-axis= Battery voltage (volts)

	200	250	300	350	400	450	500	550	600
4.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
6	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
7.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
9	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
10.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
12	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
13.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
15	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
16.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
18	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
19.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
21	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
22.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
24	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
25.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
27	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
28.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5

P2635 Fuel Pump Performance Filtered Pressure Error Fault Threshold High map (kiloPascals)

X-axis= Target Fuel Pressure (kiloPascals)

Y-axis= Fuel Flow (grams / s)

	200	250	300	350	400	450	500	550	600
0	30	37.5	45	52.5	60	67.5	75	82.5	90
1.5	30	37.5	45	52.5	60	67.5	75	82.5	90
3	30	37.5	45	52.5	60	67.5	75	82.5	90
4.5	30	37.5	45	52.5	60	67.5	75	82.5	90
6	30	37.5	45	52.5	60	67.5	75	82.5	90
7.5	30	37.5	45	52.5	60	67.5	75	82.5	90
9	30	37.5	45	52.5	60	67.5	75	82.5	90
10.5	30	37.5	45	52.5	60	67.5	75	82.5	90
12	30	37.5	45	52.5	60	67.5	75	82.5	90
13.5	30	37.5	45	52.5	60	67.5	75	82.5	90
15	30	37.5	45	52.5	60	67.5	75	82.5	90
16.5	30	37.5	45	52.5	60	67.5	75	82.5	90
18	30	37.5	45	52.5	60	67.5	75	82.5	90
19.5	30	37.5	45	52.5	60	67.5	75	82.5	90
21	30	37.5	45	52.5	60	67.5	75	82.5	90
22.5	30	37.5	45	52.5	60	67.5	75	82.5	90
24	30	37.5	45	52.5	60	67.5	75	82.5	90
25.5	30	37.5	45	52.5	60	67.5	75	82.5	90
27	30	37.5	45	52.5	60	67.5	75	82.5	90
28.5	30	37.5	45	52.5	60	67.5	75	82.5	90
30	30	37.5	45	52.5	60	67.5	75	82.5	90
31.5	30	37.5	45	52.5	60	67.5	75	82.5	90

P2635 Fuel Pump Performance Filtered Pressure Error Fault Threshold High map (kiloPascals) Continued…

X-axis= Target Fuel Pressure (kiloPascals)

Y-axis= Fuel Flow (grams / s)

	200	250	300	350	400	450	500	550	600
33	30	37.5	45	52.5	60	67.5	75	82.5	90
34.5	30	37.5	45	52.5	60	67.5	75	82.5	90
36	30	37.5	45	52.5	60	67.5	75	82.5	90
37.5	30	37.5	45	52.5	60	67.5	75	82.5	90
39	30	37.5	45	52.5	60	67.5	75	82.5	90
40.5	30	37.5	45	52.5	60	67.5	75	82.5	90
42	30	37.5	45	52.5	60	67.5	75	82.5	90
43.5	30	37.5	45	52.5	60	67.5	75	82.5	90
45	30	37.5	45	52.5	60	67.5	75	82.5	90
46.5	30	37.5	45	52.5	60	67.5	75	82.5	90
48	30	37.5	45	52.5	60	67.5	75	82.5	90

P2635 Fuel Pump Performance Filtered Pressure Error Fault RePass Threshold High map (kiloPascals)

X-axis= Target Fuel Pressure (kiloPascals)

Y-axis= Fuel Flow (grams / s)

	200	250	300	350	400	450	500	550	600
0	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
1.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
3	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
4.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
6	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5

P2635 Fuel Pump Performance Filtered Pressure Error Fault RePass Threshold High map (kiloPascals) Continued….

X-axis= Target Fuel Pressure (kiloPascals)

Y-axis= Fuel Flow (grams / s)

	200	250	300	350	400	450	500	550	600
7.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
9	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
10.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
12	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
13.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
15	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
16.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
18	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
19.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
21	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
22.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
24	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
25.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
27	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
28.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
30	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
31.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
33	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
34.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
36	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
37.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
39	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5

P2635 Fuel Pump Performance Filtered Pressure Error Fault RePass Threshold High map (kiloPascals) Continued….

X-axis= Target Fuel Pressure (kiloPascals)

Y-axis= Fuel Flow (grams / s)

	200	250	300	350	400	450	500	550	600
40.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
42	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
43.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
45	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
46.5	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5
48	25.5	31.875	38.25	44.625	51	57.375	63.75	70.125	76.5

P2635 Fuel Pump Performance Filtered Pressure Error Fault Threshold Low map (kiloPascals)

X-axis= Target Fuel Pressure (kiloPascals)

Y-axis= Fuel Flow (grams / s)

	200	250	300	350	400	450	500	550	600
0	-260	-210	-160	-110	-60	-67.5	-75	-82.5	-90
1.5	-145	-125	-102.5	-81.25	-60	-67.5	-75	-82.5	-90
3	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
4.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
6	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
7.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
9	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
10.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
12	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
13.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90

P2635 Fuel Pump Performance Filtered Pressure Error Fault Threshold Low map (kiloPascals) Continued…

X-axis= Target Fuel Pressure (kiloPascals)

Y-axis= Fuel Flow (grams / s)

	200	250	300	350	400	450	500	550	600
15	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
16.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
18	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
19.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
21	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
22.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
24	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
25.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
27	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
28.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
30	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
31.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
33	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
34.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
36	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
37.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
39	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
40.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
42	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
43.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
45	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
46.5	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90
48	-30	-37.5	-45	-52.5	-60	-67.5	-75	-82.5	-90

P2635 Fuel Pump Performance Filtered Pressure Error Fault RePass Threshold Low map (kiloPascals)

X-axis= Target Fuel Pressure (kiloPascals)

Y-axis= Fuel Flow (grams / s)

	200	250	300	350	400	450	500	550	600
0	-221	-178.5	-136	-93.5	-51	-57.375	-63.75	-70.125	-76.5
1.5	-123.25	-106.25	-87.125	-69.0625	-51	-57.375	-63.75	-70.125	-76.5
3	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
4.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
6	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
7.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
9	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
10.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
12	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
13.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
15	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
16.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
18	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
19.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
21	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
22.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
24	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
25.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
27	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
28.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
30	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
31.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5

P2635 Fuel Pump Performance Filtered Pressure Error Fault RePass Threshold Low map (kiloPascals) Continued….

X-axis= Target Fuel Pressure (kiloPascals)

Y-axis= Fuel Flow (grams / s)

	200	250	300	350	400	450	500	550	600
33	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
34.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
36	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
37.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
39	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
40.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
42	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
43.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
45	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
46.5	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5
48	-25.5	-31.875	-38.25	-44.625	-51	-57.375	-63.75	-70.125	-76.5