14 OBDG05 ECM Summary Tables (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 is within limits Output driver is commanded on, Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 25 samples250 ms / sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft System Performance – Bank 1	P0011	Detects a VVT system error by comparing the desired and actual cam positions when VVT is activated	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive	(Intake cam Bank 1) Cam Position Error > 6.00 deg. (**CamPosErrorLimIc1**)	DTC's are NOT active: P0010, IntakeCamSensorTFTKO CrankSensorTFTKO CrankIntakeCamCorrelationFA.	System Voltage > 11.00 Volts, Engine is running VVT is enabled Desired cam position > 0 Power Take Off (PTO) not active Both Desired & Measured cam positions cannot be < 6.00 (**CamPosErrorLimIc1**) or have both > 29.00 deg. (**PerfMaxIc1**). Desired cam position cannot vary more than 3.00 Cam Deg for at least 3.00 sec. (**StablePositionTimeIc1**)	135.00 failures out of 150.00 samples100 ms / sample	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Camshaft Actuator Solenoid Circuit Open – Bank 1	P0013	Diagnoses the VVT system high side driver circuit for circuit faults.	The ECM detects that voltage is high during driver off state (indicates short to power or open circuit)	Short to power: ≤ 0.5 Ω impedance between signal and controller power Open Circuit: ≥ 200 K Ω impedance between signal and controller ground	System supply voltage is within limitsOutput driver is commanded on, Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 25 samples250 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.
Exhaust Camshaft System Performance – Bank 1	P0014	Detects a VVT system error by comparing the desired and actual cam positions when VVT is activated	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive	(Exhaust cam Bank 1) Cam Position Error > 5.00 deg. (**CamPosErrorLimEc1**)	DTC's are NOT active: P0013, ExhaustCamSensorTFTKO CrankSensorTFTKO CrankExhaustCamCorrelationFA	System Voltage > 11.00 Volts, Engine is running VVT is enabled Desired cam position > 0 Power Take Off (PTO) not active Both Desired & Measured cam positions cannot be < 5.00 deg. (**CamPosErrorLimEc1**) or have both > (27.50) (**PerfMaxEc1**). Desired cam position cannot vary more than 3.00 Cam Deg for at least 3.00 sec. (**StablePositionTimeEc1**)	135.00 failures out of 150.00 samples100 ms / sample	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)- 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	4 cam sensor pulses more than -7.9 crank degrees before or 12.1 crank degrees after nominal position in one cam revolution.		Crankshaft and camshaft position signals are synchronized Engine is Spinning Cam phaser is in "parked" position No Active DTCs: Time since last execution of diagnostic	 P0335, P0336 P0340,P0341 5VoltReferenceA_FA 5VoltReferenceB_FA < 1.0 seconds	2 failures out of 3 tests. A failed test is 4 failures out of 5 samples. There is a delay after the first failed test to allow the camshaft position to return to the park position. This time is defined by the table "Cam Correlation Oil Temperature Threshold". One sample per cam rotation	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)- Camshaft Position (CMP) Correlation Bank 1 Sensor B	P0017	Detects cam to crank misalignment by monitoring if cam sensor pulse for bank 1 sensor B occurs during the incorrect crank position	4 cam sensor pulses more than -7.9 crank degrees before or 12.1 crank degrees after nominal position in one cam revolution.		Crankshaft and camshaft position signals are synchronized Engine is Spinning Cam phaser is in "parked" position No Active DTCs: Time since last execution of diagnostic	 P0335, P0336 P0365,P0366 5VoltReferenceA_FA 5VoltReferenceB_FA < 1.0 seconds	2 failures out of 3 tests. A failed test is 4 failures out of 5 samples. There is a delay after the first failed test to allow the camshaft position to return to the park position. This time is defined by the table "Cam Correlation Oil Temperature Threshold". One sample per cam rotation	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank 1 Sensor 1	P0030	Diagnoses the Heater Output low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit)	Open Circuit: ≥ 200 K Ω impedance between signal and controller ground.	Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controllers P0031 may also set

14 OBDG05 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank1 Sensor1	P0031	Diagnoses the Heater Output low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground).	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground.	Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controllers P0030 may also set

14 OBDG05 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank1 Sensor1	P0032	Diagnoses the Heater Output low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power).	Short to power: ≤ 0.5 Ω impedance between signal and controller power.	Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank 1 Sensor 2	P0036	Diagnoses the Heater Output low side driver circuit for circuit faults.	Voltage low during driver off state (indicates open circuit).	Open Circuit: ≥ 200 K Ω impedance between signal and controller ground.	Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controllers P0037 may also set

14 OBDG05 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank1 Sensor2	P0037	Diagnoses the Heater Output low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground).	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground.	Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips Note: In certain controllers P0036 may also set

14 OBDG05 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank1 Sensor2	P0038	Diagnoses the Heater Output low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power).	Short to power: ≤ 0.5 Ω impedance between signal and controller power.	Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips

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	3.6 < Ω < 10.3	No Active DTC's Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P2610 IAT_SensorFA < 8.0 ºC > 28,800 seconds -30.0 < ºC < 45.0 < 32.0 volts < 0.05 seconds	Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
HO2S Heater Resistance Bank 1 Sensor 2) (For Single Bank Exhaust Only	P0054	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Heater Resistance outside of the expected range of	4.0 < Ω < 10.7	No Active DTC's Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P2610 IAT_SensorFA < 8.0 ºC > 28,800 seconds -30.0 < ºC < 45.0 < 32.0 volts < 0.15 seconds	Once per valid cold start	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	>= 100 ° 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 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	>= 11 Volts > 0.250 MPa >= 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 >= -20.0 degC -20 <= Temp degC <= 90	Windup High - 750 failures out of 938 samples Windup Low - 750 failures out of 938 Samples	Type B, 2 Trips

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

14 OBDG05 ECM Summary Tables (Initial 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

14 OBDG05 ECM Summary Tables (Initial 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

14 OBDG05 ECM Summary Tables (Initial 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.
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)	> 30 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 >= 11.00 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

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:	>= 11.00 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 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:	>= 11.00 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)	> 80.00 DegC 10 consecutive IAT 2 samples	Powertrain Relay Voltage for a time No Active DTCs:	>= 11.00 Volts >= 0.9 seconds PowertrainRelayFault	4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (Initial 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)	< 42 Ohms	Engine run time OR IAT min	> 10.0 seconds ≤ 70.3 °C	5 failures out of 10 samples 1 sec/ sample Continuous	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (Initial 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)	> 320,000 Ohms	Engine run time OR IAT min	> 60.0 seconds ≥ -7.0 °C	5 failures out of 10 samples 1 sec/ sample Continuous	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Flow Insufficient	P00B7	This DTC detects a Insufficient Flow Condition (i.e.. Stuck Closed Thermostat)	Engine Coolant Temp (ECT) is greater than 117 Deg C and Difference between ECT and RCT is greater than 30 Deg C. When above is present for more than 5 seconds, fail counts start.		No Active DTC's Engine run time AND Engine Coolant Temp	THMR_RCT_Sensor_Ckt _FA THMR_ECT_Sensor_Ckt _FA > 300 seconds > 99.5 Deg C	30 failures out of 60 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.
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 Fall Test: High Side Fuel Rail Pressure <= Supporting Table KtFHPD_p_HPS_PressFallLoThrsh Pressure Rise Test: High Side Fuel Pressure < Supporting Table KtFHPC_p_HighPressStart	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.	>= 0 KPA < = 0 sec > 8 Volts -100 <= °C <= 80 All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP or TFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) and Cam or Crank Sensor Not FA and IAT, IAT2 and ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and Device control commanded pressure is false and Device control pump ckt enabled on is false and Engine movement detected is true and Manufacturers enable	Pressure Fall Test: Injected cylinder events >= Supporting Table KtFHPD_Cnt_HPS_PressFallLoThrsh Pressure Rise Test: Time >= Supporting Table KtFHPC_t_HighPressStartTmout	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active		
					Barometric Pressure Inlet Air Temp	>= 70.0 KPA >= -20.0 DegC		

14 OBDG05 ECM Summary Tables (Initial 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

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

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

14 OBDG05 ECM Summary Tables (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:	>= 11.00 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (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:	>= 11.00 Volts >= 0.9 seconds PowertrainRelayFault	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (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:	>= 11.00 Volts >= 0.9 seconds PowertrainRelayFault	4 failures out of 5 samples Each sample takes 1.00 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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) > 17 grams/sec > 25.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) No Active DTCs: No Pending DTCs:	>= 575 RPM <= 6,600 RPM >= -7 Deg C <= 129 Deg C >= -20 Deg C <= 125 Deg C >= 0.50 Filtered Throttle Model Error multiplied by **TPS Residual Weight Factor based on RPM** Modeled Air Flow Error multiplied by **MAF Residual Weight Factor based on RPM** and **MAF Residual Weight Factor based on MAF Est** MAP Model 2 Error multiplied by **MAP2 Residual Weight Factor based on RPM** See Residual Weight Factor tables. MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (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	<= 500 Hertz (~ 0.25 gm/sec)	Engine Run Time Engine Speed Ignition Voltage Above criteria present for a period of time	> 1.0 seconds >= 300 RPM >= 11.0 Volts >= 1.0 seconds	200 failures out of 250 samples 1 sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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	>= 11,000 Hertz (~ 328.0 gm/sec)	Engine Run Time Engine Speed Ignition Voltage Above criteria present for a period of time	> 1.0 seconds >= 300 RPM >= 11.0 Volts >= 1.0 seconds	200 failures out of 250 samples 1 sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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) > 25.0 kPa > 25.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) No Active DTCs: No Pending DTCs:	>= 575 RPM <= 6,600 RPM >= -7 Deg C <= 129 Deg C >= -20 Deg C <= 125 Deg C >= 0.50 Filtered Throttle Model Error multiplied by **TPS Residual Weight Factor based on RPM** MAP Model 1 Error multiplied by **MAP1 Residual Weight Factor based on RPM** MAP Model 2 Error multiplied by **MAP2 Residual Weight Factor based on RPM** See Residual Weight Factor tables. MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP	Continuous Calculations are performed every 12.5 msec	Type B, 2 Trips
			Manifold Pressure OR	< 50.0 kPa	Time between current ignition cycle and the last		999 failures out of 5 samples	

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

14 OBDG05 ECM Summary Tables (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	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

14 OBDG05 ECM Summary Tables (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	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 115.0 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.
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)	> 30 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 >= 11.00 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

14 OBDG05 ECM Summary Tables (Initial DTCs)

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

14 OBDG05 ECM Summary Tables (Initial DTCs)

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

14 OBDG05 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Intermittent In-Range	P0114	Detects a noisy or erratic IAT signal circuit or IAT sensor	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current IAT reading - IAT reading from 100 milliseconds previous)	> 80.00 DegC 10 consecutive IAT samples	Continuous		4 failures out of 5 samples Each sample takes 1.0 seconds	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (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)	< 42 Ohms			5 failures out of 6 samples 1 sec/ sample Continuous	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (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)	> 320,000 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.	 10.0 seconds -80.0 Deg C 200.0 Deg C	No Active DTC's	ECT_Sensor_Ckt_FP	3 failures out of 4 samples 1 sec/ sample Continuous	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (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) > 17 grams/sec <= 25.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) No Active DTCs: No Pending DTCs:	>= 575 RPM <= 6,600 RPM > -7 Deg C < 129 Deg C > -20 Deg C < 125 Deg C >= 0.50 Filtered Throttle Model Error multiplied by **TPS Residual Weight Factor based on RPM** Modeled Air Flow Error multiplied by **MAF Residual Weight Factor based on RPM** and **MAF Residual Weight Factor based on MAF Est** See Residual Weight Factor tables. MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
TPS1 Circuit Low	P0122	Detects a continuous or intermittent short or open in TPS1 circuit	TPS1 Voltage <	0.3250		Run/Crank voltage > 6.41 No 5V reference error or fault for # 4 5V reference circuit (P06A3)	79 / 159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
TPS1 Circuit High	P0123	Detects a continuous or intermittent short or open in TPS1 circuit	TPS1 Voltage >	4.750		Run/Crank voltage > 6.41 No 5V reference error or fault for # 4 5V reference circuit (P06A3)	79 / 159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature Below Stat Regulating Temperature) (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) = 1 If the type cal is equal to one, the application has an electrically heated t-stat, if equal to zero the the application has an non heated t-stat. See appropiate section below. ********** Type cal above = 1 (Electrically heated t-stat) == == == == Range #1 (Primary) ECT reaches Commanded temperature minus 19 °C when Ambient min is ≤ 52 °C and > 10 °C. Note: Warm up target for range #1 will be at least 79 °C == == == == Range #2 (Alternate) ECT reaches Commanded temperature minus 50 °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 ≥ 1,800 seconds 30 ≤ Eng Run Tme ≤ 1,800 seconds Ethanol ≤ 87 % ≥ 0.80 km ********** 9,999 rpm 5.0 seconds ********** ********** > 20.0 % duty cycle > 5.0 seconds	1 failure to set DTC 1 sec/ sample Once per ignition key cycle	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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 86 °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	 ********** -40 ≤ ECT ≤ 81 °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 All of the above met for	TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA = Not active = Not active = Not active = Not active 10.0 < Volts < 32.0 = Not active = Not active = Not active = Not active = False 0.9912 < ratio < 1.0137 120 < mgram < 500 = Closed Loop = TRUE Enabled (On) Ethanol ≤ 87 % DFCO not active > 5.0 seconds	380 failures out of 475 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit High Voltage Bank 1 Sensor 1	P0132	This DTC determines if the O2 sensor circuit is shorted to high.	Oxygen Sensor Signal	> 1,050 mvolts	== Open Test Criteria == No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Fuel Condition ========== No Active DTC's Low Fuel Condition Diag Fuel Condition Initial delay after Open Test Criteria met (cold start condition) Initial delay after Open Test Criteria met (not cold start condition) Equivalence Ratio Air Per Cylinder Fuel Control State	========== TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA 10.0 < Volts < 32.0 = All Cylinders active = Complete > 5 seconds > 150 seconds ≤ 87 % Ethanol ========== MAP_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA = False ≤ 87 % Ethanol > 45.0 seconds when engine soak time > 28,800 seconds > 45.0 seconds when engine soak time ≤ 28,800 seconds 0.9912 ≤ ratio ≤ 1.0137 50 ≤ mgram ≤ 500 not = Power Enrichment	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (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	> 5.0 seconds		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Slow Response Bank 1 Sensor 1) (For use with ESPD	P0133	This DTC determines if the O2 sensor response time is degraded.	Fault condition present when the average response time is caluclated over the test time, and compared to the threshold. OR Slope Time L/R Switches OR Slope Time R/L Switches	Refer to **P0133_O2S Slow Response Bank 1 Sensor 1 "Pass/Fail Threshold table"** in the Supporting Tables tab < 5 < 5 The test averages the signal response time over 60.0 seconds when the signal is transitioning between 325 mvolts and 600 mvolts. An average rich to lean time and lean to rich time are each calculated separately.	No Active DTC's Bank 1 Sensor 1 DTC's not active System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Diag Green O2S Condition	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131, P0132, P0134 10.0 < Volts < 32.0 = Not active = Not active = Not active = Not active = False = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S1, B2S1 (if applicable)	Sample time is 60 seconds Frequency: Once per trip	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						in Supporting Tables tab. ≥ 40 seconds = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") > 70 ºC > -40 ºC > 120 seconds > 2.0 seconds > 0.0 seconds > 1.5 seconds 10 ≤ grams/second ≤ 40 1,000 <= RPM <= 3,500 < 87 % Ethanol > 70 kpa ≥ 200 mGrams = Closed Loop = TRUE = Enabled ≤ 100.0 mgrams = Not Defaulted not = Power Enrichment DFCO not active ≥ 0.0 % ========== > 3.0 seconds		
					O2 Heater on for Learned Htr resistance Engine Coolant IAT Engine run Accum Time since any AFM status change Time since Purge On to Off change Time since Purge Off to On change Engine airflow Engine speed Fuel Condition Baro Air Per Cylinder Fuel Control State Closed Loop Active LTM fuel cell Transient Fuel Mass Baro Fuel Control State Fuel State Commanded Proportional Gain ========== All of the above met for			

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Insufficient Activity Bank 1 Sensor 1	P0134	This DTC determines if the O2 sensor circuit is open.	Oxygen Sensor Signal	> 1,700 mvolts	No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Fuel Condition	TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA 10.0 < Volts < 32.0 = All Cylinders active = Complete > 5 seconds > 150 seconds ≤ 87 % Ethanol	200 failures out of 250 samples. Frequency: Continuous 100 msec loop	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Performance Bank 1 Sensor 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 < 2.5	No Active DTC's System Voltage Heater Warm-up delay O2S Heater device control B1S1 O2S Heater Duty Cycle All of the above met for	ECT_Sensor_FA 10.0 < Volts < 32.0 = Complete = Not active > zero > 120 seconds	8 failures out of 10 samples Frequency: 2 tests per trip 30 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 Single Bank Exhaust Only	P0137	This DTC determines if the O2 sensor circuit is shorted to low.	Oxygen Sensor Signal	< 40 mvolts	No Active DTC's AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Diag Equivalence Ratio Air Per Cylinder Fuel Control State Closed Loop Active All Fuel Injectors for active Cylinders Fuel Condition Fuel State All of the above met for	TPS_ThrottleAuthority DefaultedMAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA = Not active = Not active = Not active = Not active 10.0 < Volts < 32.0 = Not active = Not active = Not active = Not active = False 0.9912 ≤ ratio ≤ 1.0137 120 ≤ mgrams ≤ 500 = Closed Loop = TRUE Enabled (On) Ethanol <= 87 %DFCO not active > 5.0 seconds	430 failures out of 540 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit High Voltage Bank 1 Sensor 2) (For Single Bank Exhaust Only	P0138	This DTC determines if the O2 sensor circuit is shorted to high.	Oxygen Sensor Signal	> 1,050 mvolts	== Open Test Criteria == No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Fuel Condition ========== No Active DTC's Low Fuel Condition Diag Fuel Condition Initial delay after Open Test Criteria met (cold start condition) Initial delay after Open Test Criteria met (not cold start condition) Equivalence Ratio Air Per Cylinder Fuel Control State	========== TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA 10.0 < Volts = All Cylinders active = Complete > 5 seconds ≤ 87 %Ethanol ========== MAP_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA = False ≤ 87 % Ethanol > 105.0 seconds when engine soak time > 28,800 seconds > 105.0 seconds when engine soak time ≤ 28,800 seconds 0.9912 ≤ ratio ≤ 1.0137 50 ≤ mgrams ≤ 500 not = Power Enrichment	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					All of the above met for	> 5.0 seconds		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Slow Response Rich to Lean Bank 1 Sensor 2	P013A	This DTC determines if the post catalyst O2 sensor has Slow Response in a predefined Rich to Lean voltages range during Rich to Lean transition. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	The EWMA of the Post O2 sensor normalized integral value OR The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 8.0 units > 75.0 grams (upper voltage threshold is 450 mvolts and lower voltage threshold is 150 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 Post fuel cell (Decel) Crankshaft Torque	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013B, P013E, P013F, P2270 or P2271 10.0 < Volts < 32.0 = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab. = False = enabled < 100.0 Nm	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.
					DTC's Passed ========== After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).	P2270 (and P2272 if applicable) P013E (and P014A if applicable) ==========		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Slow Response Lean to Rich Bank 1 Sensor 2	P013B	This DTC determines if the post catalyst O2 sensor has Slow Response in a predefined Lean to Rich voltages range during Lean to Rich transition. The diagnostic is an intrusive test which increases the delivered A/F ratio to achieve the required rich threshold.	The EWMA of the Post O2 sensor normalized integral value OR The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 8.0 units > 190 grams (lower voltage threshold is 300 mvolts and upper voltage threshold is 600 mvolts)	No Active DTC's B1S2 DTC's Not Active this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Green Cat System Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013E, P013F, P2270 or P2271 10.0 < Volts < 32.0 = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab. = Not Valid, System is not valid until accumulated airflow is greater than	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						360,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C. (Note: This feature is only enabled when the vehicle is new and cannot be enabled in service).		
					Low Fuel Condition Diag Post fuel cell	= False = enabled		
					DTC's Passed	P2270 (and P2272 if applicable) P013E (and P014A if applicable) P013A (and P013C if applicable) P2271 (and P2273 if applicable) P013F (and P014B if applicable)		
					========== After above conditions are met: Fuel Enrich mode continued. ========== During this test the following must stay TRUE or the test will abort: 0.96 ≤ Fuel EQR ≤ 1.01	==========		

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	> 450 mvolts > 39 grams > 1 secs > 6 grams	No Active DTC's B1S2 DTC's Not Active this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Post fuel cell (Decel)	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013B, P013F, P2270 or P2271 10.0 < Volts < 32.0 = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab. = False = enabled	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Crankshaft Torque DTC's Passed Number of fueled cylinders ========== After above conditions are met: DFCO mode entered (wo driver initiated pedal input).	< 100.0 Nm P2270 (and P2272 if applicable) ≤ 3 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	< 300 mvolts > 190 grams	No Active DTC's B1S2 DTC's Not Active this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Green Cat System Condition	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013B, P013E, P2270 or P2271 10.0 < Volts < 32.0 = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab. = Not Valid, System is not valid until accumulated airflow is greater than	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						360,000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C. (Note: This feature is only enabled when the vehicle is new and cannot be enabled in service).		
					Low Fuel Condition Diag Post fuel cell	= False = enabled		
					DTC's Passed	P2270 (and P2272 if applicable) P013E (and P014A if applicable) P013A (and P013C if applicable) P2271 (and P2273 if applicable)		
					Number of fueled cylinders ========== After above conditions are met: Fuel Enrich mode entered. ========== During this test the following must stay TRUE or the test will abort: 0.96 ≤ Fuel EQR ≤ 1.01	≥ 1 cylinders ==========		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Insufficient Activity Bank 1 Sensor 2) (For Single Bank Exhaust Only	P0140	This DTC determines if the O2 sensor circuit is open.	Oxygen Sensor Signal	> 1,700 mvolts	No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Fuel Condition	TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA 10.0 < Volts < 32.0 = All Cylinders active = Complete > 5 seconds > 150 seconds ≤ 87 % Ethanol	200 failures out of 250 samples. Frequency: Continuous 100 msec loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Performance Bank 1 Sensor 2) (For Single Bank Exhaust Only	P0141	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	Heater Current outside of the expected range of	0.3 > amps > 2.5	No Active DTC's System Voltage Heater Warm-up delay O2S Heater device control B1S1 O2S Heater Duty Cycle All of the above met for	ECT_Sensor_FA 10.0 < Volts < 32.0 = Complete = Not active > zero > 120 seconds	8 failures out of 10 samples Frequency: 2 tests per trip 30 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 1 Sensor 1	P015A	This DTC determines if the pre catalyst O2 sensor has an initial delayed response to an A/F change from Rich to Lean. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	The EWMA of the Pre O2 sensor normalized R2L time delay value OR [The Accumulated time monitored during the R2L Delayed Response Test (Gross failure). AND Pre O2 sensor voltage is	> 0.4 EWMA (sec) ≥ 1.5 Seconds > 550 mvolts	No Active DTC's System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Diag Green O2S Condition	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131, P0132, P0134 10.0 < Volts < 32.0 = Not active = Not active = Not active = Not active = False = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for	Frequency: Once per trip Note: if NaESPD_b_FastInitRespIsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponseIsActive = TRUE, multiple tests per trip are allowed	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						the following locations: B1S1, B2S1 (if applicable) in Supporting Tables tab.		
					O2 Heater (pre sensor) on for	≥ 40 seconds		
					Learned Htr resistance	= Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's")		
					Engine Coolant	> 70 ºC		
					IAT	> -40 ºC		
					Engine run Accum	> 120 seconds		
					Engine Speed to initially enable test	1,250 ≤ RPM ≤ 2,300		
					Engine Speed range to keep test enabled (after initially enabled)	1,100 ≤ RPM ≤ 2,450		
					Engine Airflow	3 ≤ gps ≤ 11		
					Vehicle Speed to initially enable test	34.2 ≤ MPH ≤ 74.6		
					Vehicle Speed range to keep test enabled (after initially enabled)	31.7 ≤ MPH ≤ 82.0		
					Closed loop integral	0.85 ≤ C/L Int ≤ 1.07		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater (post sensor) on Time	≥ 175.0 sec		
					Predicted Catalyst temp	600 ≤ ºC ≤ 850		
					Fuel State	= DFCO possible		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					========== All of the above met for at least 1.0 seconds, and then the Force Cat Rich intrusive stage is requested. ========== Pre O2S voltage B1S1 at end of Cat Rich stage Fuel State Number of fueled cylinders ========== After above conditions are met: DFCO Mode is entered (wo driver initiated pedal input).	========== ========== ≥ 690 mvolts = DFCO active ≤ 3 cylinders ==========		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Delayed Response Lean to Rich Bank 1 Sensor 1	P015B	This DTC determines if the pre catalyst O2 sensor has an initial delayed response to an A/F change from Lean to Rich. The diagnostic is an intrusive test which runs in an enriched fuel mode to achieve the required response.	The EWMA of the Pre O2 sensor normalized L2R time delay value OR [The Accumulated time monitored during the L2R Delayed Response Test (Gross failure). AND Pre O2 sensor voltage is OR At end of Cat Rich stage the Pre O2 sensor output is	> 0.5 EWMA (sec) ≥ 1.5 Seconds < 350 mvolts < 690 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131, P0132, P0134	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
					System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Diag	10.0 < Volts < 32.0 = Not active = Not active = Not active = Not active = False		
					Green O2S Condition	= Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						the following locations: B1S1, B2S1 (if applicable) in Supporting Tables tab.		
					O2 Heater (pre sensor) on for	≥ 40 seconds		
					Learned Htr resistance	= Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's")		
					Engine Coolant	> 70 ºC		
					IAT	> -40 ºC		
					Engine run Accum	> 120 seconds		
					Engine Speed to initially enable test	1,250 ≤ RPM ≤ 2,300		
					Engine Speed range to keep test enabled (after initially enabled)	1,100 ≤ RPM ≤ 2,450		
					Engine Airflow	3 ≤ gps ≤ 11		
					Vehicle Speed to initially enable test	34.2 ≤ MPH ≤ 74.6		
					Vehicle Speed range to keep test enabled (after initially enabled)	31.7 ≤ MPH ≤ 82.0		
					Closed loop integral	0.85 ≤ C/L Int ≤ 1.07		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater (post sensor) on Time	≥ 175.0 sec		
					Predicted Catalyst temp	600 ≤ ºC ≤ 850		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Fuel State Number of fueled cylinders ========== When above conditions are met: Fuel Enrich mode is entered. ========== During this test: Engine Airflow must stay between: and the delta Engine Airflow over 12.5msec must be :	= DFCO inhibit ≥ 1 cylinders ========== ========== 0 ≤ gps ≤ 10 ≤ 1.0 gps		

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)	>= 1.385 >= 0.100	Engine speed BARO Coolant Temp MAP Inlet Air Temp MAF Fuel Level Long Term Fuel Trim data accumulation: Sometimes, certain Long-Term Fuel Trim Cells are not utilized for control and/or diagnosis Closed Loop Long Term FT EGR Diag. Catalyst Diag. Post O2 Diag.	400 <rpm< 6,600 > 70 kPa -20 <°C< 130 15 <kPa< 255 -20 <°C< 150 1.0 <g/s< 512.0 > 10 % or if fuel sender is faulty the diagnostic will bypass the fuel level criteria. > 80.0 seconds of data must accumulate on each trip, with at least 50.0 seconds of data in the current fuel trim cell before a pass or fail decision can be made. (Please see "**Long-Term Fuel Trim Cell Usage**" in Supporting Tables for a list of cells utilized for diagnosis) Enabled Enabled (Please see "**Closed Loop Enable Criteria**" and "**Long Term FT Enable Criteria**" in Supporting Tables.) Intrusive Test Not Active Intrusive Test Not Active Intrusive Test Not Active	Frequency: 100 ms Continuous Loop	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel System Too Rich Bank 1	P0172	Determines if the fuel control system is in a rich condition, based on the filtered long-term fuel trim metric. There are two methods to determine a Rich fault. They are Passive and Intrusive. A Passive Test decision can be made up until the time that purge is first enabled. From that point forward, rich faults can only be detected by turning purge off intrusively. Intrusive Test: If the filtered Purge Long Term Fuel Trim metric > 0.800 , 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 <= 0.800 , 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 2 out of 3 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 35 seconds and are separated by the lesser of 30 seconds of purge-on time or enough time to	<= 0.790 <= 2.000 <= 0.800 <= 0.790 <= 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 18 grams of vapor. A maximum of 3 completed segments or 30 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 > 0.800 for at least 60 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.
SIDI High Pressure Sensor Performance - Single Sensor	P0191	The DTC Diagnoses a skewed fuel rail sensor via a comparison of measured pressure and commanded/ modeled pressure	Idle test (Low Side Fuel Pressure - High Side Fuel Pressure)	SIDI High Pressure Sensor Performance Idle Test Enabled <= -1.000 MPa OR >= 1.000 MPa	Vehicle Speed Pedal Position = 0 for Battery Voltage Low Pressure Fuel Pump Pressure Engine Run Time Delay counts after pump is turned off	Enabled when a code clear is not active or not exiting device control Engine is not cranking <= 0.62 MPH 200 Counts (12.5ms per count) >= 11 Volts >= 0.250 MPa >= KtFHPD_t_PumpCntrlEngRunThrsh(see supporting tables) Enabled when a code clear is not active or not exiting device control Engine is not cranking >= KtFHPD_Cnt_SnsPrfIdlePumpOffDly(see supporting tables)	Idle Test > = 240 counts (12.5ms per count)	Type A, 1 Trips
			---	---	---	---	---	
			High Drive Test (Relief Pressure - Measured high Pressure)	SIDI High Pressure Sensor Performance High Drive Test Enabled <= -1.60 MPa	Engine Speed Desired High Side Pressure Vehicle Speed Accelerator Pedal	1,000 <= RPM <= 3,000 4 <= MPa <= 6 >= 22 MPH >= 10 %	KtFHPD_Cnt_SnsPrfIdlePumpOffDly runs in 12.5 ms loopHigh Drive Test >= 160 counts (12.5ms per count)	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Battery Voltage Low Pressure Fuel Pump Pressure Engine Run Time	>= 11 Volts >= 0.250 MPa >= KtFHPD_t_PumpCntrlEngRunThrsh(see supporting tables) Enabled when a code clear is not active or not exiting device control Engine is not cranking		
			----------	----------	----------	----------	----------	
			Low Drive Test (Commanded high Pressure - Measured high Pressure) AND Modeled Injection Pressure	SIDI High Pressure Sensor Performance Low Drive Test Enabled >= 3.000 MPa >= 1.60 MPa	Engine Speed Desired High Side Pressure Vehicle Speed Accelerator Pedal Battery Voltage Low Pressure Fuel Pump Pressure Engine Run Time	1,000 <= RPM <= 3,000 4.00 <= MPa <= 6.00 >= 22 MPH >= 10 % >= 11 Volts >= 0.250 MPa >= KtFHPD_t_PumpCntrlEngRunThrsh(see supporting tables) Enabled when a code clear is not active or not exiting device control Engine is not cranking	LoDrive Test >= 240 counts (12.5ms per count)	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			----------	----------	----------	----------	----------	
			Sensor Stuck Test Measured High Pressure (max - min)	SIDI High Pressure Sensor Performance Stuck Test Enabled <= 0.100 MPa	Engine Speed Vehicle Speed	>= 2,000 RPM >= 18.64 MPH Enabled when a code clear is not active or not exiting device control Engine is not cranking Additional Enable Conditions: All must be true (High Pressure Pump is enabled and High Fuel pressure sensor ckt is Not (FA,FP or TFTKO) and High Pressure fuel pump ckt is Not (FA,FP or TFTKO) and Cam or Crank Sensor Not FA and IAT,IAT2,ECT Not FA and Low side Fuel Pump Relay ckt Not FA and Estimate fuel rail pressure is valid and Green Engine (In assembly plant) is not enabled and Not if low fuel condition and Low side Fuel Pump is on and Injector Flow Test is not active and Device control commanded pressure is false and Device control pump ckt enabled on is false and 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 Fuel InjCkt Not (FA or TFTKO) EST Driver Not(FA) Misfire detected	Stuck Test Engine Run Time >= KtFHPD_t_PumpCntrlEngRunThrsh(See Supporting Tables) or Accumulating engine crank time >= KtFHPD_t_SnsPrfStuckCrankTmout(See Supporting Tables)	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Barometric Pressure Inlet Air Temp Fuel Temp	Not(FA) MAFR sensor Not (FA) MAPR sensor Not (FA) APSR Pedal sensor Not(FA) TPSR sensor Not (FA) VSPR speed sensor Not(FA) SystemRPM Not (FA) Manual Clutch not engaged or vehicle has automatic transmission All cylinder are fuel enabled and >= 70.0 KPA >= -20.0 DegC -20 <= Temp degC <= 90		

14 OBDG05 ECM Summary Tables (Initial 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	<= 4 % of 5Vref	Battery Voltage	>= 11 Volts Engine Running	Both Run Continuously Engine Synchronous Mode 800 failures out of 1,000 samples Time Based Mode 400 failures out of 500 samples 6.25 ms Sample Continuous	Type A, 1 Trips

14 OBDG05 ECM Summary Tables (Initial 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	>= 96 % of 5Vref	Battery Voltage	>= 11 Volts Engine Running	Both Run Continuously Engine Synchronous Mode 800 failures out of 1,000 samples Time Based Mode 400 failures out of 500 samples 6.25 ms Sample Continuous	Type A, 1 Trips

14 OBDG05 ECM Summary Tables (Initial 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 >= 5 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

14 OBDG05 ECM Summary Tables (Initial 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 >= 5 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

14 OBDG05 ECM Summary Tables (Initial 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 >= 5 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

14 OBDG05 ECM Summary Tables (Initial 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 >= 5 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.
TPS2 Circuit Low	P0222	Detects a continuous or intermittent short or open in TPS2 circuit	TPS2 Voltage <	0.250		Run/Crank voltage > 6.41 No 5V reference error or fault for # 4 5V reference circuit (P06A3)	79 / 159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
TPS2 Circuit High	P0223	Detects a continuous or intermittent short or open in TPS2 circuit	TPS2 Voltage >	4.590		Run/Crank voltage > 6.41 No 5V reference error or fault for # 4 5V reference circuit (P06A3)	79 / 159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Type A, 1 Trips

14 OBDG05 ECM Summary Tables (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 (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 >= 5 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 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 >= 5 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 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 >= 5 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 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 >= 5 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 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 >= 5 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 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 >= 5 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 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 >= 5 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

14 OBDG05 ECM Summary Tables (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 (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 >= 5 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.
Random Misfire Detected Cylinder 1 Misfire Detected Cylinder 2 Misfire Detected Cylinder 3 Misfire Detected Cylinder 4 Misfire Detected	P0300 P0301 P0302 P0303 P0304	These DTC's will determine if a random or a cylinder specific misfire is occurring by monitoring various terms derived from crankshaft velocity. The rate of misfire over an interval is compared to both emissions and catalyst damaging thresholds. The pattern of crankshaft acceleration after the misfire is checked to differentiate between real misfire and other sources of crank shaft noise.	Deceleration Value vs. Engine Speed and Engine load The equation used to calculate deceleration value is tailored to specific vehicle operating conditions. The selection of the equation used is based on the 1st tables encountered that are not max of range. If all tables are max of range at a given speed/load, that speed load region is an ***Undetectable region*** see Algorithm Description Document for additional details. Misfire Percent Emission Failure Threshold Misfire Percent Catalyst Damage	[(>**IdleSCD_Decel** AND > **IdleSCD_Jerk**) OR (>**SCD_Decel** AND > **SCD_Jerk**) OR (>**IdleCylModeDecel** AND > **IdleCylModeJerk)** OR (>**CylMode_Decel** AND > **CylMode_Jerk**) OR (>**RevMode_Decel**) OR WHILE in Cylinder Deactivation mode: (> **AFM_Decel**)] - see details on Supporting Tables Tab (P0300 Section) ≥ 0.63 % P0300 > **Catalyst_Damage_ Misfire_Percentage** in Supporting Tables	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.) (at low speed/loads, one cylinder may not cause cat damage)	> 2 crankshaft revolution -7 ºC < ECT < 129 ºC < -7 ºC 21 ºC < ECT < 129 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. Failure reported with (1 or 3) Exceedences in FTP, or (1) Exceedence outside FTP.	Type B, 2 Trips (Mil Flashes with Catalyst damage level of Misfire)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				whenever secondary conditions are met.	Engine Speed Engine Load Misfire counts	> 1,400 rpm AND > 22 % load AND < 180 counts on one cylinder	Continuous	
			When engine speed and load are less than the FTP cals (3) catalyst damage exceedences are allowed.	≤ 0 FTP rpm AND ≤ 0 FTP % load				
				disable conditions:	Engine Speed	450 < rpm < ((Engine Over Speed Limit) - 400 Engine speed limit is a function of inputs like Gear and temperature see **EngineOverSpeedLimit** in supporting tables	4 cycle delay	
					No active DTCs:	TPS_FA EnginePowerLimited MAF_SensorTFTKO MAP_SensorTFTKO IAT_SensorTFTKO ECT_Sensor_Ckt_TFTKO 5VoltReferenceB_FA CrankSensorTFTKO CrankSensorFA CamLctnIntFA CamLctnExhFA CamSensorAnyLctnTFTKO AnyCamPhaser_FA AnyCamPhaser_TFTKO AmbPresDfltdStatus	4 cycle delay	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					P0315 & engine speed	> 1,000 rpm	4 cycle delay	
					Fuel Level Low	LowFuelConditionDiagnostic	500 cycle delay	
					Cam and Crank Sensors	in sync with each other	4 cycle delay	
					Misfire requests TCC unlock	Not honored because Transmission in hot mode or POPD intrusive diagnostic running	4 cycle delay	
					Fuel System Status	≠ Fuel Cut	4 cycle delay	
					Active FuelManagement	Transition in progress	0 cycle delay	
					Undetectable engine speed and engine load region	***Undetectable region*** from Malfunction Criteria	4 cycle delay	
					Abusive Engine Over Speed	> 8,192 rpm	0 cycle delay	
					Below zero torque (except CARB approved 3000 rpm to redline triangle.)	< **ZeroTorqueEngLoad** in Supporting Tables	4 cycle delay	
					Below zero torque: TPS Vehicle Speed	 ≤ 1 % > 19 mph	4 cycle delay	
					EGR Intrusive test	Active	12 cycle delay	
					Manual Trans	Clutch shift	4 cycle delay	
					Accel Pedal Position AND Automatic transmission shift	> 100.00 %	7 cycle delay	
					Driveline Ring Filter active			

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early. Filter Driveline ring: Stop filter early: Abnormal engine speed oscillations: (Rough road etc) Off Idle, number of consecutive decelerating cylinders after "misfire": (Number of decels can vary with misfire detection equation) TPS Engine Speed Veh Speed Consecutive decels while in SCD Mode Cyl Mode Rev Mode Misfire Crankshaft Pattern Recognition checks each "misfire" candidate in 100 engine Cycle test to see if it looks like real misfire, or some disturbance like rough road. The check is	> "**Ring Filter**" # of engine cycles after misfire in Supporting Tables > "**Number of Normals**" # of engine cycles after misfire in Supporting Tables tab > 3 % > 1,000 rpm > 3 mph > **Abnormal SCD Mode** > **Abnormal Cyl Mode** > **Abnormal Rev Mode** in Supporting Tables		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					based on a multiplier times the ddt_jerk value used to detect misfire at that speed and load. At the end of 100 engine cycle test, the ratio of unrecog/recognized is checked to confirm if real misfire is present.			
					Pattern Recog Enabled:	Disabled		
					Engine Speed	700 < rpm < 3,000		
					Veh Speed	> 0.6 mph		
					"misfire" unrecognized if:			
					Crankshaft snap after:			
					isolated "misfire"	> **Min_PatternMultiplier**		
					repetative "misfire"	> **Max_PatternMultiplier** in Supporting Tables		
					Ratio of Unrecog/Recog	> 1.00	discard test	
					Rough Road:			
					Non-Crankshaft based:	Disabled		
					Rough Road Source	Wheel Speed in ECM		
					IF Rough Road Source = WheelSpeedInECM			
					ABS/TCS	active	discard test	
					Wheel speed noise	> WSSRoughRoadThres		
					VSES	active		
					IF Rough Road Source = "FromABS"			
					ABS/TCS	active	discard test	
					RoughRoad	detected		
					VSES	active		
					IF Rough Road Source = "TOSS"			

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position System Variation Not Learned	P0315	Monitor for valid crankshaft error compensation factors	Sum of Compensation factors. Each Cylinder pair shares one compensation factor. A perfect factor would be 1.0000. Unlearned factors are defaulted out of range so the sum of factors would be out of range.	≥ 2.0040 OR ≤ 1.9960	OBD Manufacturer Enable Counter	MEC = 0	0.50 seconds Frequency Continuous100 msec	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Knock Sensor (KS) Performance Per Cylinder	P0324	This diagnostic checks for knock sensor performance out of the normal expected range on a per cylinder basis due to: 1. Excessive knock or 2. Abnormal engine noise or 3. Flat signal	Common Enable Criteria (Applies to all 3 parts of the performance diag)		Diagnostic Enabled? Engine Run Time Engine Speed Engine Air Flow ECT IAT	Yes ≥ 2.0 seconds ≤ 8,500 RPM ≥ 0 mg/cylinder and ≤ 2,000 mg/cylinder ≥ -40 deg's C ≥ -40 deg's C		Type B, 2 Trips
			Specific Enable Criteria and Thresholds for 3 individual parts of the performance diag:				First Order Lag Filters with Weight Coefficients	
			1. Excessive Knock Diag: Filtered Knock Intensity VaKNKD_k_PerfCylKnockIntFilt (where 'Knock Intensity' = 0 with no knock; and > 0 & proportional to knock magnitude with knock)	> 2.10 (no units)	Engine Speed Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle)	≥ 550 RPM ≥ 300 Revs	Excessive Knk Weight Coefficient = 0.0100 Updated each engine event	
			2. Abnormal Noise Diag: Filtered FFT Intensity (where 'FFT Intensity' = Non-knocking, background noise)	< **AbnormalNoise_Threshold** (see Supporting Tables)	Individual Cylinders enabled for Abnormal Noise Engine Speed Cumlative Number of Engine Revs Above Min Eng Speed (per key	See **AbnormalNoise_CylsEnabled** (Supporting Tables) ≥ 8,500 RPM ≥ 400 Revs	Abn Noise Weight Coefficient = 0.0150 Updated each engine event	

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Knock Sensor (KS) Circuit Bank 1	P0325	This diagnostic checks for an open in the knock sensor circuit There are two possible methods used: 1. 20 kHz 2. Normal Noise See **Supporting Tables** for method definition: **P0325_P0330_OpenMethod** Typical implementations: A. Use 20 kHz method at all RPM (used when acceptable separation achieved at all RPM) or B. Use 20 kHz method at low/medium RPM and Normal Noise at high RPM	Filtered FFT Output	> **OpenCktThrshMin** and < **OpenCktThrshMax** **See Supporting Tables** Thresholds for OpenMethod = 20 kHz: **OpenCktThrshMin (20 kHz)** & **OpenCktThrshMax (20 kHz)** Thresholds for OpenMethod = NormalNoise: **OpenCktThrshMin (Normal Noise)** & **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 ≥ 550 RPM and ≤ 8,500 RPM ≥ 200 revs ≥ 20 mg/cylinder and ≤ 2,000 mg/cylinder ≥ -40 deg's C ≥ -40 deg's C	First Order Lag Filter with Weight Coefficient Weight Coefficient = 0.0120 Updated each engine event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Knock Sensor (KS) Performance Bank 1	P0326	This diagnostic checks for knock sensor performance out of the normal expected range, on a per sensor basis, due to 1. Excessive knock or 2. Abnormal engine noise or 3. Flat signal	Common Enable Criteria (Applies to all 3 parts of the performance diag)		Diagnostic Enabled? Engine Run Time Engine Speed Engine Air Flow ECT IAT	Yes ≥ 2.0 seconds ≤ 8,500 RPM ≥ 20 mg/cylinder and ≤ 2,000 mg/cylinder ≥ -40 deg's C ≥ -40 deg's C		Type B, 2 Trips
			Specific Enable Criteria and Thresholds for 3 individual parts of the performance diag:				First Order Lag Filters with Weight Coefficients	
			1. Excessive Knock Diag: Filtered Knock Intensity (where 'Knock Intensity' = 0 with no knock; and > 0 & proportional to knock magnitude with knock)	> 2.10 (no units)	Engine Speed Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle)	≥ 550 RPM ≥ 200 Revs	Excessive Knk Weight Coefficient = 0.0100 Updated each engine event	
			2. Abnormal Noise Diag: Filtered FFT Intensity: (where 'FFT Intensity' = Non-knocking, background noise)	< **AbnormalNoise_ Threshold** (see Supporting Tables)	Individual Cylinders enabled for Abnormal Noise Engine Speed Cumlative Number of Engine Revs Above Min Eng Speed (per key	See **AbnormalNoise_ CylsEnabled** (Supporting Tables) ≥ 2,000 RPM ≥ 200 Revs	Abnormal Noise Weight Coefficient = 0.0050 Updated each engine event	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			- 3. Flat Signal Diag: Filtered Signal Delta (Current FFT Intensity - Ave_Intensity_No-Knock)	- < 0.008 (no units)	cycle) - Engine Speed Cumlative Number of Engine Revs Above Min Eng Speed (per keycycle)	- ≥ 8,500 RPM ≥ 200 Revs	- - - - - - - - - - - - - Flat Signal Weight Coefficient = 0.010 Updated each engine event	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Knock Sensor (KS) Circuit Low Bank 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

14 OBDG05 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Knock Sensor (KS) Circuit 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	Filtered FFT Output	> OpenCktThrshMin and < OpenCktThrshMax **See Supporting Tables** Thresholds for OpenMethod = 20 kHz: **OpenCktThrshMin (20 kHz)** & **OpenCktThrshMax (20 kHz)** Thresholds for OpenMethod = NormalNoise: **OpenCktThrshMin (Normal Noise)** & **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 ≥ 550 RPM and ≤ 8,500 RPM 200 revs ≥ 20 mg/cylinder and ≤ 2,000 mg/cylinder ≥ -40 deg's C ≥ -40 deg's C	First Order Lag Filter with Weight Coefficient Weight Coefficient = 0.0120 Updated each engine event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Knock Sensor (KS) Performance Bank 2	P0331	This diagnostic checks for knock sensor performance out of the normal expected range, on a per sensor basis, due to 1. Excessive knock or 2. Abnormal engine noise on a per bank basis or 3. Flat signal	Common Enable Criteria (Applies to all 3 parts of the performance diag)		Diagnostic Enabled? Engine Run Time Engine Speed Engine Air Flow ECT IAT	Yes ≥ 2.0 seconds ≤ 8,500 RPM ≥ 20 mg/cylinder and ≤ 2,000 mg/cylinder ≥ -40 deg's C ≥ -40 deg's C		Type B, 2 Trips
			Specific Enable Criteriaand Thresholds for 3 individual parts of the performance diag:				First Order Lag Filters with Weight Coefficients	
			1. Excessive Knock Diag: Filtered Knock Intensity (where 'Knock Intensity' = 0 with no knock; and > 0 & proportional to knock magnitude with knock)	> 2.10 (no units)	Engine Speed Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle)	≥ 550 RPM ≥ 200 Revs	Excessive knk Weight Coefficient = 0.0100 Updated each engine event	
			2. Abnormal Noise Diag: Filtered FFT Intensity: (where 'FFT Intensity' = Non-knocking, background noise)	< **AbnormalNoise_Threshold** (see Supporting Tables)	Individual Cylinders enabled for Abnormal Noise Engine Speed Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle)	See **AbnormalNoise_CylsEnabled**(Supporting Tables) ≥ 2,000 RPM ≥ 200 Revs	Abnormal Noise Weight Coefficient = 0.0050 Updated each engine event	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			3. Flat Signal Diag: Filtered Signal Delta (Current FFT Intensity - Ave_Intensity_No-Knock)	< 0.008 (no units)	Engine Speed Cumlative Number of Engine Revs Above Min Eng Speed (per keycycle)	≥ 8,500 RPM ≥ 200 Revs	Flat Signal Weight Coefficient = 0.010 Updated each engine event	

14 OBDG05 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Knock Sensor (KS) Circuit Low Bank 2	P0332	This diagnostic checks for an out of range low knock sensor signal	Sensor Input or Return Signal Line	< 8.0 Percent (of 5 Volt Reference)	Diagnostic Enabled? Engine Speed	Yes > 0 RPM and < 8,500 RPM	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Knock Sensor (KS) Circuit High Bank 2	P0333	This diagnostic checks for an out of range high knock sensor signal	Sensor Input or Return Signal Line	> 39.00 Percent (of 5 Volt Reference)	Diagnostic Enabled? Engine Speed	Yes > 0 RPM and < 8,500 RPM	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP) Sensor A Circuit	P0335	Determines if a fault exists with the crank position sensor signal	Time since last crankshaft position sensor pulse received	>= 4.0 seconds	Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow	 = FALSE = FALSE = FALSE > 3.0 grams/second))	Continuous every 100 msec	Type B, 2 Trips
			No crankshaft pulses received	>= 1.0 seconds	Engine is Running Starter is not engaged No DTC Active:	 5VoltReferenceB_FA	Continuous every 12.5 msec	
			No crankshaft pulses received		Engine is Running OR Starter is engaged No DTC Active:	 5VoltReferenceA_FA 5VoltReferenceB_FA P0365 P0366	2 failures out of 10 samples One sample per engine revolution	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP) Sensor A Performance	P0336	Determines if a performance fault exists with the crank position sensor signal	Time in which 10 or more crank re-synchronizations occur	< 10.0 seconds	Engine Air Flow Cam-based engine speed No DTC Active:	>= 3.0 grams/second > 450 RPM 5VoltReferenceB_FA P0335	Continuous every 250 msec	Type B, 2 Trips
			No crankshaft synchronization gap found	>= 0.4 seconds	Engine is Running Starter is not engaged No DTC Active:	 5VoltReferenceB_FA	Continuous every 12.5 msec	
			Time since starter engaged without detecting crankshaft synchronization gap	>= 1.5 seconds	Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow	 = FALSE = FALSE = FALSE > 3.0 grams/second))	Continuous every 100 msec	
			Crank pulses received in one engine revolution OR Crank pulses received in one engine revolution	< 51 > 65	Engine is Running OR Starter is engaged No DTC Active:	 5VoltReferenceA_FA 5VoltReferenceB_FA P0365 P0366	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 (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow	 = FALSE = FALSE = FALSE > 3.0 grams/second))	Continuous every 100 msec	Type B, 2 Trips
			Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Engine is running Starter is not engaged No DTC Active:	 5VoltReferenceA_FA	Continuous every 100 msec	
			No camshaft pulses received during first 12 MEDRES events (There are 12 MEDRES events per engine cycle		Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	 5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Continuous every MEDRES event	
			The number of camshaft pulses received during 100 engine cycles	= 0	Crankshaft is synchronized No DTC Active:	 5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor A	P0341	Determines if a performance fault exists with the cam position bank 1 sensor A signal	The number of camshaft pulses received during first 12 MEDRES events is OR (There are 12 MEDRES events per engine cycle)	< 4 > 10	Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensorFA	Continuous every MEDRES event	Type B, 2 Trips
			The number of camshaft pulses received during 100 engine cycles OR	< 398 > 402	Crankshaft is synchronized No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensorFA	8 failures out of 10 samples Continuous every engine cycle	

14 OBDG05 ECM Summary Tables (Initial DTCs)

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

14 OBDG05 ECM Summary Tables (Initial DTCs)

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

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

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor B	P0365	Determines if a fault exists with the cam position bank 1 sensor B 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 (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow	= FALSE = FALSE = FALSE > 3.0 grams/second))	Continuous every 100 msec	Type B, 2 Trips
			Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Engine is running Starter is not engaged No DTC Active:	5VoltReferenceA_FA	Continuous every 100 msec	
			No camshaft pulses received during first 12 MEDRES events (There are 12 MEDRES events per engine cycle		Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Continuous every MEDRES event	
			The number of camshaft pulses received during 100 engine cycles	= 0	Crankshaft is synchronized No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor B	P0366	Determines if a performance fault exists with the cam position bank 1 sensor B signal	The number of camshaft pulses received during first 12 MEDRES events is OR (There are 12 MEDRES events per engine cycle)	< 4 > 10	Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensorFA	Continuous every MEDRES event	Type B, 2 Trips
			The number of camshaft pulses received during 100 engine cycles OR	< 398 > 402	Crankshaft is synchronized No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensorFA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Secondary AIR Incorrect Airflow	P0411	Detects an insufficient flow condition.This test is run during Phase 1 (AIR pump commanded On, Valve commanded Open).Leaks downstream of the valve are detected via an evaluation of average pressure error and average “String Length”(SL) – a term that represents the absolute pressure delta accumulated every 6.25ms, then averaged over the duration of the test. Low SL values are indicative of downstream leaks or blockages.	Average Pressure Error or or or OR the following String Length (SL) Test: Average Pressure Error or or or and the Average String Length or NOTE: Average Pressure Error is the average difference between the predicted pressure and the measured pressure	> 4.5 kPa Bank 1 > 4.5 kPa Bank 2 < -7.5 kPa Bank 1 < -7.5 kPa Bank 2 > 5.0 kPa Bank 1 > 5.0 kPa Bank 2 < -1.0 kPa Bank 1 < -1.0 kPa Bank 2 < **SL Threshold Bank 1 Table** < **SL Threshold Bank 2 Table**	BARO Inlet Air Temp Coolant Temp Engine off time System Voltage MAP not Engine Speed MAF not SL Stability time SL RPM range No active DTCs:	> 60 kPa > -11.0 deg C > -11.0 deg C < 56.0 > 1,800.0 seconds > 10.0 Volts < 32.0 < 20 kPa for 2.0 sec < 5,000 RPM > 50 gm/s for 3.0 sec > 4.0 seconds Bank 1 > 4.0 seconds Bank 2 < 4,700 RPM or > 4,900 AIRSystemPressureSensor FA AIRValveControlCircuit FA AIRPumpControlCircuit FA MAF_SensorFA AmbientAirDefault_NA IAT_SensorFA ECT_Sensor_FA EngineMisfireDetected_FA CatalystSysEfficiencyLoB1_FA CatalystSysEfficiencyLoB2_FA ControllerProcessorPerf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA IgnitionOutputDriver_FA FuelInjectorCircuit_FA	Phase 1 Conditional test weight > 7.0 seconds Total 'String Length' accumulation time: > 10.0 sec Bank1 > 10.0 sec Bank2 Frequency: Once per trip when AIR pump commanded On Conditional test weight is calculated by multiplying the following Factors: **Phase 1 Baro Test Weight Factor, Phase 1 MAF Test Weight Factor, Phase 1 System Volt Test Weight Factor, Phase 1 Ambient Temp Test Weight Factor** (see Supporting Tables)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Secondary AIR Solenoid Control Circuit Open - For 3 DTC implementation only	P0412	Diagnoses the Secondary AIR Solenoid Control Low Side Driver circuit for circuit faults	Voltage low during driver off state (indicates open circuit)	Open Circuit: >= 200K Ohms impedance between signal and controller ground	Powertrain Relay Voltage	>= 11.00 volts	100 failures out of 120 samples 250ms / sample	Type B, 2 Trips Note: In certain controllers P041F may also set (Secondary AIR solenoid control circuit low voltage)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Secondary AIR Pump Control Circuit Open- For 3 DTC implementation only	P0418	Diagnoses the Secondary AIR Pump Control Low Side Driver circuit for circuit faults	Voltage low during driver off state (indicates open circuit)	Open Circuit: >= 200K Ohms impedance between signal and controller ground	Powertrain relay Voltage	>= 11.00 volts	100 failures out of 120 samples 250ms / sample	Type B, 2 Trips Note: In certain controllers P2257 may also set (Secondary AIR Pump Control Circuit Low Voltage)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Secondary AIR Solenoid Control Circuit Low Voltage	P041F	Diagnoses the Secondary AIR Solenoid Control 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	Powertrain relay Voltage	>= 11.00 volts	100 failures out of 120 samples 250ms / sample	Type B, 2 Trips Note: In certain controllers P0412 may also set (Secondary AIR solenoid control circuit open)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Catalyst System Low Efficiency Bank 1	P0420	NOTE: The information below applies to applications that use the Decel Catalyst Monitor Algorithm Oxygen StorageThe catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and O2 during lean A/F excursions to store the excess oxygen (I.e. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H2 to release this stored oxygen (I.e. Cerium Reduction). This is referred to as the Oxygen Storage Capacity, or OSC. CatMon's strategy is to "measure" the OSC of the catalyst through forced Rich (intrusive rich) and Lean (decel fuel cutoff) A/F excursions Normalized Ratio OSC Value Calculation Information and Definitions = 1. Raw OSC Calculation = (post cat O2 Resp time - pre cat O2 Resp time) 2. BestFailing OSC value from a calibration	Normalized Ratio OSC Value (EWMA filtered)	< 0.35	All enable criteria associated with P0420 can be found under P2270 - (O2 Sensor Signal Stuck Lean Bank 1 Sensor 2) Rapid Step Response (RSR) feature will initiate multiple tests: If the difference between current EWMA value and the current OSC Normalized Ratio value is and the current OSC Normalized Ratio value is Maximum number of RSR tests to detect failure when RSR is enabled. General Enable Criteria In addition to the p-codes listed under P2270, the following DTC's shall also not be set:	> 0.40 < 0.10 6 O2S_Bank_1_Sensor_1_FA O2S_Bank_1_Sensor_2_FA O2S_Bank_2_Sensor_1_FA O2S_Bank_2_Sensor_2_FA	1 test attempted per valid decel period Minimum of 1 test per trip Maximum of 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** for details in the Supporting Tables tab The Catalyst Monitoring Test is completed during a decel fuel cutoff event. This fuel cutoff event occurs following a rich instrusive fueling event initiated by the O2 Sensor Signal Stuck Lean Bank 1 Sensor 2 test (P2270). Several conditions must be met in order to execute this test. These conditions and their related values are listed in the "Secondary						

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission (EVAP) System Small Leak Detected (No ELCP - Conventional EVAP Diagnostic)	P0442	This DTC will detect a small leak (≥ 0.020") in the EVAP system between the fuel fill cap and the purge solenoid. On some applications a small leak is defined as ≥ 0.025", 0.030", or 0.150". The engine off natural vacuum method (EONV) is used. EONV is an evaporative system leak detection diagnostic that runs when the vehicle is shut off when enable conditions are met. Prior to sealing the system and performing the diagnostic, the fuel volatility is analyzed. In an open system (Canister Vent Solenoid [CVS] open) high volatility fuel creates enough flow to generate a measurable pressure differential relative to atmospheric.After the volatility check, the vent solenoid will close. After the vent is closed, typically a build up of pressure from the hot soak begins (phase-1). The pressure typically will peak and then begin to decrease as the fuel cools. When	The total delta from peak pressure to peak vacuum during the test is normalized against a calibration pressure threshold table that is based upon fuel level and ambient temperature. (Please see **P0442: EONV Pressure Threshold (Pascals) Table** in Supporting Tables). The normalized value is calculated by the following equation: 1 - (peak pressure - peak vacuum) / pressure threshold. The normalized value is entered into EWMA (with 0= perfect pass and 1= perfect fail). When EWMA is the DTC light is illuminated. The DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 3 additional consecutive trips.	> 0.57 (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 ≥ 3.1 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 (-62.27) Pa from peak pressure, the vent is then opened for 60 seconds to normalize the system pressure. The vent is again closed to begin the vacuum portion of the test (phase-2). As the fuel temperature continues to fall, a vacuum will begin forming. The vacuum will continue until it reaches a vacuum peak. When the pressure rises 62.27 Pa from vacuum peak, the test then completes. If the key is turned on while the diagnostic test is in progress, the test will abort.			Startup delta deg C (ECT-IAT) OR 2. Short Soak and Previous EAT Valid Previous time since engine off OR 3. Less than a short soak and Previous EAT Not Valid Previous time since engine off AND Vehicle Speed AND Mass Air Flow Must expire Estimate of Ambient Temperature Valid Conditioning Time. **P0442: Estimate of Ambient Temperature Valid Conditioning Time Table** in Supporting Tables. OR 4. Not a Cold Start and greater than a Short Soak Previous time since engine off AND Vehicle Speed AND Mass Air Flow	≤ 8 °C ≤ 7,200 seconds ≤ 7,200 seconds ≥ 40 mph ≥ 6 g/sec > 7,200 seconds ≥ 40 mph ≥ 6 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** 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 3. Fuel Level Refueling	********** < -5		

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

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

14 OBDG05 ECM Summary Tables (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 ≥ 6 liters	Fuel Level System Voltage Startup IAT Startup ECT BARO No active DTCs:	10 % ≤ Percent ≤ 90 % 11 volts ≤ Voltage ≤ 32 volts 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C ≥ 70 kPa MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454	Once per Cold Start Time is dependent on driving conditions Maximum time before test abort is 1,000 seconds	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (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)

14 OBDG05 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Secondary AIR Solenoid Control Circuit High Voltage	P044F	Diagnoses the Secondary AIR Solenoid Control 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	Powertrain relay Voltage	>= 11.00 volts	100 failures out of 120 samples 250ms / 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 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

14 OBDG05 ECM Summary Tables (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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Tank Pressure (FTP) Sensor Circuit High Voltage (No ELCP - Conventional EVAP Diagnostic)	P0453	This DTC will detect a Fuel Tank Pressure (FTP) sensor signal that is too high out of range.	FTP sensor signal The normal operating range of the FTP sensor is 0.5 volts (~1245 Pa) to 4.5 volts (~ -3736 Pa).	> 4.85 volts (97 % of Vref or ~ -4,172 Pa)	Time delay after sensor power up for sensor warm-up is	0.10 seconds	640 failures out of 800 samples 12.5 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Tank Pressure (FTP) Sensor Circuit Intermittent (No ELCP - Conventional EVAP Diagnostic)	P0454	This DTC will detect intermittent tank vacuum sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event.	If an abrupt change in tank vacuum is detected the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that a refueling event occurred. If a refueling is confirmed, then the test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem. An abrupt change is defined as a change in vacuum: in the span of 1.0 seconds. But in 12.5 msec. A refueling event is confirmed if the fuel level has a persistent change of for 30 seconds during a 600 second refueling rationality test.	> 112 Pa < 249 Pa > 10 %	This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes and the canister vent solenoid is closed		This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period.The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete.The test will report a failure if 2 out of 3 samples are failures. 12.5 ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission (EVAP) System Large Leak Detected (No ELCP - Conventional EVAP Diagnostic)	P0455	This DTC will detect a weak vacuum condition (large leak or purge blockage) in the EVAP system. Purge valve is controlled (to allow purge flow) and vent valve is commanded closed.	Purge volume while Tank vacuum After setting the DTC for the first time, 2 liters of fuel must be consumed before setting the DTC for the second time. Weak Vacuum Follow-up Test (fuel cap replacement test) Weak Vacuum Test failed. Passes if tank vacuum Note: Weak Vacuum Follow-up Test can only report a pass.	> 15 liters ≤ 2,740 Pa ≥ 2,740 Pa	Fuel Level System Voltage BARO Purge Flow No active DTCs: Cold Start Test If ECT > IAT, Startup temperature delta (ECT-IAT): Cold Test Timer Startup IAT Startup ECT Weak Vacuum Follow-up Test This test can run following a weak vacuum failure or on a hot restart.	10 % ≤ Percent ≤ 90 % 11 volts ≤ Voltage ≤ 32 volts ≥ 70 kPa ≥ 2.10 % MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454 ≤ 8 °C ≤ 1,000 seconds 4 °C≤Temperature≤ 30 °C ≤ 35 °C	Once per cold start Time is dependent on driving conditions Maximum time before test abort is 1,000 seconds Weak Vacuum Follow-up Test With large leak detected, the follow-up test is limited to 1,300 seconds. Once the MIL is on, the follow-up test runs indefinitely.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Purge Control Valve Circuit Low (No ELCP - Conventional EVAP Diagnostic)	P0458	Diagnoses the canister purge solenoid low side driver circuit for circuit faults	Voltage low during driver off state (indicates short to ground)	Short to ground: ≤ 0.5 Ω impedence between signal and controller ground	PT Relay Voltage	Voltage ≥ 11.0 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)

14 OBDG05 ECM Summary Tables (Initial DTCs)

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

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 18.4 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 an accumulated 114 miles.	≥ 28.7 liters < 2.8 liters 149 miles. < 3 liters	Engine Running No active DTCs: The shutdown primary tank volume + 3.0 liters must be	VehicleSpeedSensor_FA < 28.7 liters	250 ms / sample	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (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 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

14 OBDG05 ECM Summary Tables (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.
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).

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission (EVAP) System Flow During Non-Purge (No ELCP - Conventional EVAP Diagnostic)	P0496	This DTC will determine if the purge solenoid is leaking to engine manifold vacuum. This test will run with the purge valve closed and the vent valve closed.	Tank Vacuum for Test time	> 2,491 Pa 5 seconds ≥ refer to **P0496: Purge Valve Leak Test Engine Vacuum Test Time (Cold Start) as a Function of Fuel Level Table** in Supporting Tables.	Fuel Level System Voltage BARO Startup IAT Startup ECT Engine Off Time No active DTCs:	10 % ≤ Percent ≤ 90 % 11 volts ≤ Voltage ≤ 32 volts ≥ 70 kPa 4 °C≤Temperature≤ 30 °C ≤ 35 °C ≥ 28,800.0 seconds MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454	Once per cold start Cold start: max time is 1,000 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Vent Solenoid Control Circuit Low (No ELCP - Conventional EVAP Diagnostic)	P0498	Diagnoses the vent solenoid low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short to ground)	Short to ground: ≤ 0.5 Ω impedence between signal and controller ground			20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips Note: In certain controllers P0449 may also set (Vent Solenoid Open Circuit)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Vent Solenoid Control Circuit High (No ELCP - Conventional EVAP Diagnostic)	P0499	Diagnoses the vent solenoid low side driver circuit for circuit faults. If the P0499 is active, an intrusive test is performed with the vent solenoid commanded closed for 15 seconds.	Voltage low during driver on state (indicates short to power)	Short to power: ≤ 0.5 Ω impedence between signal and controller power			20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Low Engine Speed Idle System	P0506	This DTC will determine if a low idle exists	Filtered Engine Speed Error	> 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_EngCoolHotHi Thresh (128 °C) Must verify KfECTI_T_EngCoolHotLo Thresh (126) is less than KfECTI_T_EngCoolHotHi Thresh (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	> 5 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.
						TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA FuelLevelDataFault LowFuelConditionDiagnostic Clutch Sensor FA AmbPresDfltdStatus P2771		
					All of the above met for Idle time	> 5 sec		

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_EngCoolHotHi Thresh (128 °C) Must verify KfECTI_T_EngCoolHotLo Thresh (126) is less than KfECTI_T_EngCoolHotHi Thresh (128)	Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	
					Engine run time	≥ 60 sec		
					Ignition voltage	32 ≥ volts ≥ 11		
					Time since gear change	≥ 3 sec		
					Time since a TCC mode change	> 3 sec		
					IAT	> -20 °C		
					Vehicle speed	≤ 1.24 kph		
					Commanded RPM delta	≤ 25 rpm		
					For manual transmissions: Clutch Pedal Position or Clutch Pedal Position	> 12.00 pct < 75.00 pct		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						PTO not active Transfer Case not in 4WD LowState Off-vehicle device control (service bay control) must not be active. following conditions not TRUE: (VeTESR_e_EngSpdReqIntvType = CeTESR_e_EngSpdMinLimit AND VeTESR_e_EngSpdReqRespType = CeTESR_e_NoSuggestion) Clutch is not depressed		
					No active DTCs	TC_BoostPresSnsrFA ECT_Sensor_FA EnginePowerLimited EGRValveCircuit_FA EGRValvePerformance_FA IAT_SensorCircuitFA EvapFlowDuringNonPurge_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA FuelInjectorCircuit_FA MAF_SensorFA EngineMisfireDetected_FA IgnitionOutputDriver_FA TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						FuelLevelDataFaultLow FuelConditionDiagnostic Clutch SensorFA AmbPresDfltdStatus P2771		
					All of the above met for Idle time	> 5 sec		

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 < 500.00 degC > -12.00 degC <= 56.00 degC >= 75.00 KPa >= 250.00 RPM <= 3,000.00 RPM <= 1.00 Pct < 20 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 >= 17.50 seconds		
					OR			
					Engine Run Time	> **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	> 3,200.00 RPM		
					Accel Position	> 2.00 Pct		
					Engine Run Time	>= 20 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		
					Piston Protection	Not Active		
					Hot Coolant Enrichment	Not Active		
					Injector Flow Test	Not Active		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					General Enable DTC's Not Set:	AcceleratorPedalFailure ECT_Sensor_FA IAT_SensorCircuitFA MnfdTempSensorCktFA CrankSensorFaultActive FuelInjectorCircuit_FA MAF_SensorFA MAP_SensorFA AnyCamPhaser_TFTKO Clutch Sensor 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 EngineTorqueInaccurate 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 Engine Oil Pressure below high threshold minus an offset	 Filtered Oil Pressure ≤ **LowMinOilPresFail** (Details on Supporting Tables Tab) OR Filtered Oil Pressure ≥ **(OP_HiStatePressure** * 1.10 + 114.0 kPa) (Details on Supporting Tables Tab) Filtered Oil Pressure ≥ 10.0 kPa+ **LowMinOilPresFail** (Details on Supporting Tables Tab) OR Filtered Oil Pressure ≤ (**OP_HiStatePressure**	Two Stage Oil Pump is Present = TRUE Engine Running Diagnostic enabled/ disabled Engine Off Rationality Test Diagnostic Reporting Status Oil Pressure Sensor In Use Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 5,000 RPM for longer than 30.0 seconds) Filtered Engine Speed within range Modelled Oil Temperature within range No active DTC's	TRUE Enabled Test not report a fail state Present ≥ 20.0 seconds ≥ 70.0 kPa FALSE 1,500 RPM ≤ Filtered Engine Speed ≤ 4,500 RPM 40.0 deg C ≤ Oil Temp ≤ 120.0 deg C Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA CrankSensorFA EngOilPressureSensorCkt FA AmbientAirDefault EngOilTempFA	≥ 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.
				* 1.10 + 114.0 kPa) - 10.0 kPa (Details on Supporting Tables Tab)				
			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 enabled/ disabled Engine Running Rationality Test Diagnostic Reporting Status Modelled Oil Temperature No Engine Movement No active DTC's	TRUE Enabled Test not report a fail state ≥ 70.0 deg C > 4.0 seconds EngineModeNotRunTimer_FA EngOilTempFA EngOilPressureSensorCktFA CrankSensorFA	≥ 20 errors out of 40 samples. Run once per trip	

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	< 5.00 percent	Engine Speed Enable Engine Speed Disable Sensor Present Diagnostic enabled/ disabled	> 400 rpm < 350 rpm Present Enabled	800 failures out of 1,000 samples Performed every 6.25 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Oil Pressure (EOP) Sensor Circuit High Voltage	P0523	Determines if the Engine Oil Pressure (EOP) Sensor circuit voltage is too high	(Engine Oil Pressure Sensor Circuit Voltage) / 5 Volts	> 95.00 percent	Sensor Present Diagnostic enabled/ disabled	Present Enabled	800 failures out of 1,000 samples Performed every 6.25 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Air Conditioning High Side Pressure Sensor (HSPS) Circuit Low Voltage	P0532	Determines if the Air Conditioning High Side Pressure Sensor circuit voltage is too low	(AC High Side Pressure Sensor Circuit Voltage) / 5 Volts	< 3 percent	Sensor Present Diagnostic enabled/ disabled	Enabled Enabled	80 failures out of 100 samples Performed every 25 msec	Type C, No MIL

14 OBDG05 ECM Summary Tables (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	> 95 percent	Sensor Present Diagnostic enabled/ disabled	Enabled Enabled	80 failures out of 100 samples Performed every 25 msec	Type C, No MIL

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Mutil-Functon Switch Circuit	P0564	Detect when cruise control multi-function switch circuit (analog) voltage is in an illegal range	Cruise Control analog circuit voltage must be in an "illegal range" or "between ranges" for greater than a calibratable period of time for cruise switch states that are received over serial data		CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 0.500 seconds	MIL: Type C, No MIL

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Resume Circuit	P0567	Detects a failure of the cruise resume switch in a continously applied state	Cruise Control Resume switch remains applied for greater than a calibratable period of time for architecture where cruise switch states are received over serial data		CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 89.000 seconds	MIL: Type C, No MIL

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Set Circuit	P0568	Detects a failure of the cruise set switch in a continously applied state	Cruise Control Set switch remains applied for greater than a calibratable period of time for architecture where cruise switch states are received over serial data		CAN cruise switch diagnostic enable in ECM	1.00	fail continuously for greater than 89.000 seconds	MIL: Type C, No MIL

14 OBDG05 ECM Summary Tables (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 MIL

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 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_CmpltTestPointWeight 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	

14 OBDG05 ECM Summary Tables (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

14 OBDG05 ECM Summary Tables (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

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 MIL

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 MIL

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	MIL: Type C, No MIL

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control 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	MIL: Type C, No MIL

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control 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	MIL: Type C, No MIL

14 OBDG05 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Thermostat Heater Control Open Circuit	P0597	Diagnoses the T-stat Heater 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 Ignition in Range Engine not cranking Run Crank active == Above is true and == Last Open Circuit Test	 = True = True = True ========== = not Indeterminate	15 failures out of 30 samples 1 sec/ sample Continuous	Type B, 2 Trips Note: In certian controllers P0598 may also set

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Thermostat Heater Control Circuit Low	P0598	Diagnoses the T-stat Heater 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 Ignition in Range Engine not cranking Run Crank active == Above is true and == Last Ground Short Circuit Test	 = True = True = True ========== = not Indeterminate	15 failures out of 30 samples 1 sec/ sample Continuous	Type B, 2 Trips Note: In certian controllers P0597 may also set

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Thermostat Heater Control Circuit High	P0599	Diagnoses the T-stat Heater 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 Ignition in Range Engine not cranking Run Crank active == Above is true and == Last Power Short Circuit Test	 = True = True = True ========== = not Indeterminate	15 failures out of 30 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.
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				

14 OBDG05 ECM Summary Tables (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 PCM is a service PCM that has not been programmed.	Output state invalid		PCM State	= crank or run PCM is identified through calibration as a Service PCM	Diagnostic runs at powerup and once per second continuously after that	Type A, 1 Trips

14 OBDG05 ECM Summary Tables (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

14 OBDG05 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EC A ailure	P0 04	Indicates that the EC has detected a A fault	Indicates that the primary processor is unable to correctly read data from or write data to system A . Detects data read does not match data written	254 counts			ill finish first memory scan within 0 seconds at all engine conditions - diagnostic runs continuously (bac ground loop)	Type A, Trips
			Indicates that the primary processor is unable to correctly read data from or write data to cached A . Detects data read does not match data written	254 counts			ill finish first memory scan within 0 seconds at all engine conditions - diagnostic runs continuously (bac ground loop)	
			Indicates that the primary processor is unable to correctly read data from or write data to TP A . Detects data read does not match data written	5 counts			ill finish first memory scan within 0 seconds at all engine conditions - diagnostic runs continuously (bac ground loop)	
			Indicates that the primary processor detects a mismatch between the data and dual data is found during A updates. Detects a mismatch in data and dual data updates	0.45200 s			hen 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 A . Number of illegal writes are	5,5 4 counts			Diagnostic runs continuously (bac ground loop)	
			Indicates that the secondary processor is unable to correctly read data from or write data to system A . Detects data read does not match data written	5 counts			ill finish first memory scan within 0 seconds at all engine conditions - diagnostic runs continuously (bac ground loop)	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal ECM Processor Integrity Fault	P0606	Indicates that the ECM has detected an internal processor integrity fault	Loss or invalid message of SPI communication from the Secondary Processor at initialization detected by the Primary Processor or loss or invalid message of SPI communication from the Secondary Processor after a valid message was received by the Primary Processor	Loss or invalid message at initialization detected or loss or invalid message after a valid message was recieved		Run/Crank voltage >= 6.41 or Run/Crank voltage >= 11.00 , else the failure will be reported for all conditions	In the primary processor, 159 / 399 counts intermittent or 39 counts continuous; 39 counts continuous @ initialization. 12.5 ms /count in the ECM main processor	Type A, 1 Trips
			Loss or invalid message of SPI communication from the Primary Processor at initialization detected by the Secondary Processor or loss or invalid message of SPI communication from the Primary Processor after a valid message was received by the Secondary Processor	Loss or invalid message at initialization detected or loss or invalid message after a valid message was recieved			In the secondary processor, 20 / 200 counts intermittent or 0.1875 s continuous; 0.4750 s continuous @ initialization. 12.5 ms /count in the ECM secondary processor	
			Checks for stack over or underflow in secondary processor by looking for corruption of known pattern at stack boundaries. Checks number of stack over/ under flow since last powerup reset >=	5		KeMEMD_b_StackLimitTestEnbl == 1 Value of KeMEMD_b_StackLimitTestEnbl is: 1 . (If 0, this test is disabled)	variable, depends on length of time to corrupt stack	
			MAIN processor is verified by responding to a seed sent from the secondary with a key response to secondary. Checks number of incorrect keys	2 incorrect seeds within 8 messages, 0.2000 seconds		ignition in Run or Crank	150 ms for one seed continually failing	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			received > or Secondary processor has not received a new within time limit					
			Time new seed not received exceeded			always running	0.450 seconds	
			MAIN processor receives seed in wrong order			always running	3 / 17 counts intermittent. 50 ms/count in the ECM main processor	
			2 fails in a row in the Secondary processor's ALU check			KePISD_b_ALU_TestEnbld == 1 Value of KePISD_b_ALU_TestEnbld is: 1 . (If 0, this test is disabled)	25 ms	
			2 fails in a row in the Secondary processor's configuration register masks versus known good data			KePISD_b_ConfigRegTestEnbld == 1 Value of KePISD_b_ConfigRegTestEnbld is: 1 . (If 0, this test is disabled)	12.5 to 25 ms	
			Secondary processor detects an error in the toggling of a hardware discrete line controlled by the MAIN processor: number of discrete changes > = or < = over time window(50ms)	7 17		KePISD_b_MainCPU_SOH_FltEnbld == 1 Value of KePISD_b_ConfigRegTestEnbld is: 1 . (If 0, this test is disabled) time from initialization >= 0.4875 seconds	50 ms	
			memory and complement memory do not agree				0.19 seconds	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Software background task first pass time to complete exceeds			Run/Crank voltage > 6.41	360.000 seconds	
			2 fails in a row in the MAIN processor's ALU check			KePISD_b_ALU_TestEnbld == 1 Value of KePISD_b_ALU_TestEnbld is: 1 . (If 0, this test is disabled)	25 ms	
			2 fails in a row in the MAIN processor's configuration register masks versus known good data			KePISD_b_ConfigRegTestEnbld == 1 Value of KePISD_b_ConfigRegTestEnbld is: 1 . (If 0, this test is disabled)	12.5 to 25 ms	
			Checks number of stack over/under flow since last powerup reset >=	3		KeMEMD_b_StackLimitTestEnbl == 1 Value of KeMEMD_b_StackLimitTestEnbl is: 1 . . (If 0, this test is disabled)	variable, depends on length of time to corrupt stack	
			Voltage deviation >	0.4950		KePISD_b_A2D_CnvrtrTestEnbld == 1 Value of KePISD_b_A2D_CnvrtrTestEnbld is: 1 . (If 0, this test is disabled)	5 / 10 counts or 0.150 seconds continuous; 50 ms/count in the ECM main processor	
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error occured since last	3 (results in MIL), 5 (results in MIL and remedial action)		KeMEMD_b_FlashECC_CktTestEnbl == 1 Value of KeMEMD_b_FlashECC_CktTestEnbl is: 1 . (If 0, this test is disabled)	variable, depends on length of time to access flash with corrupted memory	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			controller initialization. Counter >=					
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		KeMEMD_b_RAM_ECC_CktTestEnbl == 1 Value of KeMEMD_b_RAM_ECC_CktTestEnbl is: 1 . (If 0, this test is disabled)	variable, depends on length of time to write flash to RAMvariable, depends on length of time to write flash to RAM	
			MAIN processor DMA transfer from Flash to RAM has 1 failure			KePISD_b_DMA_XferTestEnbld == 1 Value of KePISD_b_DMA_XferTestEnbld is: 0 . (If 0, this test is disabled)	variable, depends on length of time to write flash to RAM	
			Safety critical software is not executed in proper order.	>= 1 incorrect sequence.		Table, f(Loop Time). See supporting tables: **Program Sequence Watch Enable f(Loop Time)** (If 0, this Loop Time test is disabled)	Fail Table, f(Loop Time). See supporting tables: **PSW Sequence Fail f (Loop Time)** / Sample Table, f (Loop Time)See supporting tables: **PSW Sequence Sample f(Loop Time)** counts 50 ms/count in	

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

14 OBDG05 ECM Summary Tables (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 volts ≥ 0 RPM	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips

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

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

14 OBDG05 ECM Summary Tables (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

14 OBDG05 ECM Summary Tables (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

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 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)

14 OBDG05 ECM Summary Tables (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

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 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).

14 OBDG05 ECM Summary Tables (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 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).

14 OBDG05 ECM Summary Tables (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 volts	8 failures out of 10 samples 250 ms / sample	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (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

14 OBDG05 ECM Summary Tables (Initial 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).

14 OBDG05 ECM Summary Tables (Initial 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

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

14 OBDG05 ECM Summary Tables (Initial 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

14 OBDG05 ECM Summary Tables (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

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	> OpenTestCktThrshMin and < 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 > 500 RPM and < 8,000 RPM ≥ 200 Revs ≥ 0 mg/cylinder and ≤ 2,000 mg/cylinder	First Order Lag Filter with Weight Coefficient Weight Coefficient = 0.0120 Updated each engine event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Knock Sensor Processor 2 Performance	P06B7	This diagnostic checks for a fault with the internal test circuit used only for the '20 kHz' method of the Open Circuit Diagnostic	FFT Diagnostic Output	> OpenTestCktThrshMin and < 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 > 500 RPM and < 8,000 RPM ≥ 200 Revs ≥ 0 mg/cylinder and ≤ 2,000 mg/cylinder	First Order Lag Filter with Weight Coefficient Weight Coefficient = 0.0120 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.
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 enabled/ disabled 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 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 enabled/ disabled 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

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 Circuit ≤ 0.5 Ω impedance between signal and controller power	Diagnostic enabled/ disabled 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	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 1.5 seconds] Oil Pressure delta ≤ **OP_StateChangeMin** (P06DD Performance Test Details on Supporting Tables Tab) AND Filtered Oil Pressure ≥ (**OP_HiStatePressure** - **OP_LoStatePressure**) / 2	<u>Common Criteria:</u> Two Stage Oil Pump is Present Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 5,000 RPM for longer than 30.0 seconds) No active DTC's for diagnsotic enable: No active DTC's for control enable if set to **Enabled**: <u>Active Criteria:</u> Oil Pump in Low State Modelled Oil Temperature within range	TRUE ≥ 20.0 seconds ≥ 70.0 kPa FALSE Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA CrankSensorFA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA OilPmpTFTKO Enabled Fault bundles for control disable : OilPmpTFTKO EngineTorqueEstInaccurate EngOilPressureSensorFA PowertrainRelayFault CrankSensorFaultActive > 1.5 seconds 70.0 deg C ≤ Oil Temp ≤ 115.0 deg C	≥ 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.
					Filtered Engine Speed within range	1,500 RPM ≤ Filtered Engine Speed ≤ 2,500 RPM		
					Engine Torque within range	**MinEnableTorque_OP** ≤ Indicated Requested Engine Torque ≤ **MaxEnableTorque_OP** (P06DD Performance Test Details on Supporting Tables Tab)		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.5 seconds] ≤ 150 RPM		
					<u>Passive Criteria:</u>			
					Active Test Passed	TRUE		
					Filtered Engine Speed within range	1,500 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 1.5 seconds] ≤ 450 RPM		
					Oil Pressure Delta < **OP_StateChangeMin**	= TRUE		

14 OBDG05 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(P06DD Performance Test Details on Supporting Tables Tab)			

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Two Stage Oil Pump Control Circuit StuckOn	P06DE	Diagnoses the two stage oil pump is stuck in the low pressure state	Fail from a passing state: Oil Pressure delta is less than a minimum delta pressure on a state change and the measured filtered oil pressure is below a threshold	Oil Pressure delta = ABS [Filtered Oil Pressure at beginning of state change - filtered oil pressure after 1.5 seconds] Oil Pressure delta ≤ **OP_StateChangeMin** (P06DD Performance Test Details on Supporting Tables Tab) Filtered Oil Pressure ≤ (**OP_HiStatePressure** - **OP_LoStatePressure**) / 2 (P06DD Performance Test Details on Supporting Tables Tab)	Common Criteria: Two Stage Oil Pump is Present Engine Running Ambient Air Pressure Oil Aeration (= TRUE if engine speed > 5,000 RPM for longer than 30.0 seconds) No active DTC's for diagnsotic enable: No active DTC's for control enable if set to Enabled: Active Criteria: Oil Pump in Low State	TRUE ≥ 20.0 seconds ≥ 70.0 kPa FALSE Fault bundles: MAF_SensorFA ECT_Sensor_FA IAT_SensorFA CrankSensorFA EngOilPressureSensorCktFA AmbientAirDefault EngOilTempFA Enabled Fault bundles for control disable : OilPmpTFTKO EngineTorqueEstInaccurate EngOilPressureSensorFA PowertrainRelayFault CrankSensorFaultActive > 1.5 seconds	≥ 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.
					Modelled Oil Temperature within range	70.0 deg C ≤ Oil Temp ≤ 115.0 deg C		
					Filtered Engine Speed within range	1,500 RPM ≤ Filtered Engine Speed ≤ 2,500 RPM		
					Engine Torque within range	**MinEnableTorque_OP** ≤ Indicated Requested Engine Torque ≤ **MaxEnableTorque_OP** (P06DD Performance Test Details on Supporting Tables Tab)		
					Delta Filtered Engine Speed within a range	ABS [Filtered RPM at beginning of State change - Filtered RPM after 1.5 seconds] ≤ 150 RPM		
					<u>Passive Criteria:</u>			
					Active Test Passed	TRUE		
					Filtered Engine Speed within range	1,500 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 1.5 seconds]		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						≤ 450 RPM		
					Oil Pressure Delta < **OP_StateChangeMin** (P06DD Performance Test Details on Supporting Tables Tab)	TRUE		

14 OBDG05 ECM Summary Tables (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 - ($140 for PPEI2 or $1C9 for PPEI3, $1CA/$1C6 for Hybrid))	Message <> 2's complement of message	Serial communication to EBTCM (U0108) Power Mode Engine Running Status of traction in GMLAN message ($4E9)	No loss of communication = Run = True = Traction Present	Count of 2's complement values not equal >= 10 Performed on every received message	Type C, No MIL Special Type C
			OR Serial Communication message ($140 for PPEI2 or $1C9 for PPEI3, $1CA/ $1C6 for Hybrid)) rolling count value	Message rolling count value <> previous message rolling count value plus one			6 rolling count failures out of 10 samples Performed on every received message	
			OR Too many minimum limit torque request transitions occur from TRUE to FALSE to TRUE within a time period	Requested torque intervention type toggles from not increasing request to increasing request			>= 3 multi-transitions out of 5 samples. Performed every 200 ms	
			OR Torque request greater than torque request diagnostic maximum threshold	> 250 Nm for engine based traction torque system, OR > 4,000 Nm for axle based traction torque system			>= 4 out of 10 samples Performed on every received message	

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) > 17 grams/sec > 25.0 kPa) > 25.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) No Active DTCs:	>= 575 RPM <= 6,600 RPM > -7 Deg C < 129 Deg C > -20 Deg C < 125 Deg C >= 0.50 Filtered Throttle Model Error multiplied by **TPS Residual Weight Factor based on RPM** Modeled Air Flow Error multiplied by **MAF Residual Weight Factor based on RPM** and **MAF Residual Weight Factor Based on MAF Est** MAP Model 1 Error multiplied by **MAP1 Residual Weight Factor based on RPM** MAP Model 2 Error multiplied by **MAP2 Residual Weight Factor based on RPM** See Residual Weight Factor tables. MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine 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	≥ 60.0 ºC ≥ 15.8 and < 60.0 ºC ≤ 15.8 Deg ºC	No Active DTC's Engine Off Soak Time Propulsion Off Soak Time Non-volatile memory initization Test complete this trip Test aborted this trip Test disabled this trip Ambient LowFuelCondition Diag ================== Block Heater detection is **enabled** when either of the following occurs: 1) Sensor1 power up temp is greater than Sensor2 and Sensor3 in this range: 2) Cranking time ================== Block Heater is **detected** and diagnostic is aborted	VehicleSpeedSensor_FA IAT_SensorCircuitFA THMR_RCT_Sensor_Ckt_FA ECT_Sensor_Ckt_FA EngModeNotRunTmErr EngineModeNotRunTimer_FA OAT_PtEstFiltFA OAT_PtEstRawFA PSAR_PropSysInactveCrs_FA DRER_DiagSystemDsbl > 25,200 seconds > 0 seconds = Not occurred = False = False = False ≥ -7 ºC = False ================== ≥ 15.8 ºC and < 60.0 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 15.8 ºC and the time spent cranking the engine without starting is ≥ 10.0 seconds with the LowFuelConditionDiag	= False	when 1) or 2) occurs. 1a) IAT monitoring is enabled after the following Vehicle drive constraints 1b) Drive time 1c) Vehicle speed 1d) Additional Vehicle drive time is provided to 1b when Vehicle speed is below 1c as follows: 1e) IAT drops from power up IAT 2a) ECT monitoring is enabled after engine start in the following engine run time window 2b) Sensor1 temp derivative during the test is: 2c) Consectutive samples of 2b) being true are: ========== Diagnostic is **aborted** when 3) or 4) occurs: 3) Engine run time with vehicle speed below 1b 4) Engine off time (i.e. auto stop) during Block heater detection	 > 400 Seconds with > 14.9 MPH and 0.50 times the seconds with vehicle speed below 1b ≥ 5.0 ºC 5.0 <= seconds <= 60.0 < -0.10 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:	 ≥ 15.8 ºC ≥ 15.8 ºC	No Active DTC's Engine Off Soak Time Propulsion Off Soak Time Non-volatile memory initization Test complete this trip Test aborted this trip Test disabled this trip Ambient LowFuelCondition Diag	VehicleSpeedSensor_FA IAT_SensorCircuitFA THMR_RCT_Sensor_Ckt_FA ECT_Sensor_Ckt_FA EngineModeNotRunTimerError EngineModeNotRunTimer_FA OAT_PtEstFiltFA OAT_PtEstRawFA PSAR_PropSysInactveCrs_FA DRER_DiagSystemDsbl > 25,200 seconds > 0 seconds = Not occurred = False = False = False ≥ -7 ºC = False	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.
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 >= 5 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 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 >= 5 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 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 >= 5 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 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 >= 5 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.
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: 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	> 11.0 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.
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) > 7.00 KJ/s (low RPM failure mode)	To enable the diagnostic, the Cold Start Emission Reduction Strategy must be Active per the following: Catalyst Temperature AND Engine Coolant AND Engine Coolant AND Barometric Pressure The Cold Start Emission Reduction strategy must not be exiting. The strategy will exit per the following: Catalyst Temperature AND Engine Run Time OR Engine Run Time OR Barometric Pressure	< 500.00 degC > -12.00 degC <= 56.00 degC >= 75.00 KPa >= 1,000.00 degC >= 17.50 seconds > **CatalystLightOffExtendedEngineRunTimeExit** This Extended Engine run time exit is a function of percent ethanol and Catmons NormRatioEWMA. Refer to "Supporting Tables" for details. < 75.00 KPa	Runs once per trip when the cold start emission reduction strategy is active Frequency: 100ms Loop Test completes after 8 seconds of accumulated qualified data.	EWMA Based - Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Other Enable Criteria:			
					OBD Manufacturer Enable Counter	0		
					Vehicle Speed	< 1.86 MPH		
					Allow diagnostic to calculate residual in an off-idle state. If the value of the OffIdleEnable is equal to 1 then the "DriverOffAccelPedal" will not be checked. However, if the value of OffIdleEnable is 0 then driver must be off the accel pedal	0 (A value of 1 allows diagnostic to run and calculate the residual while off idle. A value of 0 requires calculation of the residual at idle)		
					A change in throttle position (tip-in/tip-out) will initiate a delay in the calculation of the average qualified residual value. Therefore when the:			
					Pedal Close Delay Timer	> 2.00 seconds		
					the diagnostic will continue the calculation.			
					For Manual Transmission vehicles:	> 12.00 %		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Clutch Pedal Position Clutch Pedal Position The diagnostic will delay calculation of the residual value and potentially weight the residual calculation differently based on engine run time. This is to ensure the diagnostic is operating in idle speed control as well as during the peak catalyst light off period. The time weighting factor must be : General Enable: DTC's Not Set:	< 75.00 % > 0 These are scalar values that are a function of engine run time. Refer to **ColdStartDiagnosticDelayBasedOnEngineRunTime** and the cal axis, **ColdStartDiagnosticDelayBasedOnEngineRunTimeCalAxis** in the "Supporting Tables" for details. AcceleratorPedalFailure ECT_Sensor_FA IAT_SensorCircuitFA MnfdTempSensorCktFP CrankSensorFaultActive FuelInjectorCircuit_FA		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						MAF_SensorFA MAP_SensorFA EngineMisfireDetected_FA Clutch Sensor FA IAC_SystemRPM_FA IgnitionOutputDriver_FA TPS_FA VehicleSpeedSensor_FA 5VoltReferenceMAP_OOR_Flt TransmissionEngagedState_FA EngineTorqueInaccurate		

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

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Switch State 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 15.5 seconds	MIL: Type C, No MIL

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

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Analog Mode Switch Circuit Low Voltage	P159F	This DTC will detect a fuel saver 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:	< 29.0 % < 66.8 % ≥ 29.0 % < 88.8 % ≥ 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 Circuit High Voltage	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:	≥ 88.8 % < 66.8 % ≥ 29.0 % < 88.8 % ≥ 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.	Analog Mode Switch % of 5V is in an indeterminate range: The normal operating range of the analog mode switch is: Switch depressed % of 5V range: Switch released % of 5V range:	66.8 % ≤ % of 5 volts < 72.8 % < 66.8 % ≥ 29.0 % < 88.8 % ≥ 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 > 0.250 MPa >= 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	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 >= -20.0 degC -20 <= Temp degC <= 90		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Ignition Voltage Correlation	P1682	Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage & the Powertrain Relay Ignition Voltage	|Run/Crank – PT Relay Ignition| >	3.00 Volts		Powertrain commanded on AND (Run/Crank voltage > Table, f(IAT). See supporting tables: **PT Relay Pull-in Run/Crank Voltage f(IAT)** OR PT Relay Ignition voltage > 5.50) AND Run/Crank voltage > 5.50 .	240 / 480 counts or 0.1750 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

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

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

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.	Desired Throttle Area calculated does not equal its redundant calculation	N/A	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	Type A, 1 Trips
			Equivance Ratio torque compensation exceeds threshold	-70.08 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Absolute difference between Equivance Ratio torque compensation and its dual store out of bounds given by threshold	70.08 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	70.08 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	73.68 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	11.34 degrees		Engine speed >0rpm	Up/down timer 140 ms continuous, 0.5 down time multipier	
			Torque Learn offset is out of bounds given by threshold range	High Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				Low Threshold 0.00 Nm			multipier	
			One step ahead calculation of air-per-cylinder and two step ahead is greater than threshold	80.00 mg		Engine speed > 625 rpm	Up/down timer 440 ms continuous, 0.5 down time multipier	
			Difference between Unmanaged Spark and PACS Spark is greater than threshold	11.34 degrees	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded Predicted Engine Torque and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							multipier	
			Zero pedal axle torque is out of bounds given by threshold range	High Threshold 981.60 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 981.60 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	70.08 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							multipier	
			Arbitrated Air-Per-Cylinder filter coefficient is out of bounds given by threshold range	High Threshold 1.000 Low Threshold 0.074	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Launch spark is active but the launch spark redundant path indicates it should not be active	N/A		Engine speed < 7,000.00 or 7,200.00 rpm (hysteresis pair)	Up/down timer 140 ms continuous, 0.5 down time multipier	
			Rate limited vehicle speed and its dual store do not equal	N/A		Time since first CAN message with vehicle speed >= 0.500 sec	10 / 20 counts; 25.0msec/count	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Preload Throttle Area and its dual store do not equal	N/A	Ignition State	Accessory, run or crank AFM apps only	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Commanded engine torque due to fast actuators and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded engine torque due to slow actuators and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			TOS to wheel speed conversion factor is out of bounds given by threshold	High Threshold: 1.10	Ignition State	Accessory, run or crank	255 / 6 counts; 25.0msec/count	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			range	T/C Range Hi 0.10 T/C Range Lo Low Threshold: 1.10 T/C Range Hi 0.10 T/C Range Lo				
			TOS to wheel speed conversion factor and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	255 / 6 counts; 25.0msec/count	
			Cylinders active greater than commanded	2 cylinders		Engine run flag = TRUE > 2.00 s Number of cylinder events since engine run > 24 No fuel injector faults	Up/down timer 140 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						active		
			Transfer case neutral request from four wheel drive logic does not match with operating conditions	N/A	Ignition State	Accessory, run or crank Transfer case range valid and not over-ridden FWD Apps only	32 / 0 counts; 25.0msec/count	
			Transfer case neutral and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	255 / 6 counts; 25.0msec/count	
			Driver progression mode and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Predicted torque for uncorrected zero pedal determination is greater than calculated limit.	Table, f(Engine, Oil Temp). See supporting tables + 70.08 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Engine Predicted Request Without Motor is greater than its redundant calculation plus threshold	69.08 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	69.08 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Positive Torque Offset is greater than its redundant calculation plus threshold OR Positive Torque Offset is less than its redundant calculation minus threshold	70.08 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	70.08 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				0.00 Nm			0.5 down time multipier	
			Cylinder Spark Delta Correction exceeds the absolute difference as compared to Unadjusted Cylinder Spark Delta	11.34 degrees	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			1. Cylinder Torque Offset exceeds step size threshold OR 2. Sum of Cylinder Torque Offset exceeds sum threshold	1. 70.08 Nm 2. 70.08 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Engine Capacity Minimum Immediate Without Motor is greater than its dual store plus threshold	100.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Engine Capacity Minimum Engine Off is greater than threshold	0 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Engine Capacity Minimum Engine Immediate Without Motor is greater than threshold	0 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Commanded Immediate Engine Request is greater than its redundant calculation plus threshold	70.08 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 140 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing timing (event	N/A		Engine speed greater than 0rpm	Up/down timer 140	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			based) calculation does not equal its redundant calculation				ms continuous, 0.5 down time multipier	
			Idle speed control calculated predicted minimum torque request exceeds calculated torque limit	Table, f(Oil Temp, RPM). See supporting tables: **Speed Control External Load f(Oil Temp, RPM)** + 70.08 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Idle speed control calculated predicted minimum torque without reserves exceeds calculated torque limit	Table, f(Oil Temp, RPM). See supporting tables: **Speed Control External Load f(Oil Temp, RPM)** + 70.08 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Difference between Driver Requested Immediate	981.60 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Torque primary path and its secondary exceeds threshold				ms continuous, 0.5 down time multipier	
			Driver Immediate Request is less than its redundant calculation minus threshold	981.60 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded Immediate Request is greater than its redundant calculation plus threshold OR Commanded Immediate Request is less than its redundant calculation minus threshold	981.60 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Commanded Immediate Response Type is set to Inactive	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Difference between Cruise Axle Torque Arbitrated Request and Cruise Axle Torque Request exceeds threshold	122.70 Nm		Cruise has been engaged for more than 4.00 seconds	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Desired engine torque request greater than redundant calculation plus threshold	69.08 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Engine min capacity above threshold	70.08 Nm	Ignition State	Accessory, run or crank	Up/down timer 132 ms continuous, 0.5 down time multipier	
			No fast unmanaged retarded spark above the applied spark plus the threshold	Table, f(RPM,APC). See supporting tables: **Delta Spark Threshold f (RPM,APC)**		Engine speed greater than 0rpm	Up/down timer 140 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 180 ms continuous, 0.5 down time multipier	
			1. Absolute difference of redundant calculated engine speed above threshold	500 RPM		Engine speed greater than 0 RPM	Up/down timer 140 ms continuous, 0.5	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							down time multipier	
			After throttle blade pressure and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Speed Control's Preditcted Torque Request and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Engine oil temperature and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 420 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Desired throttle position greater than redundant calculation plus threshold	7.91 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	70.08 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Desired filtered throttle torque exceeds the threshold plus the higher of desired throttle torque or modeled throttle torque	70.08 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							multipier	
			Torque feedback proportional term is out of allowable range or its dual store copy does not match	High Threshold 35.04 Nm Low Threshold -35.04 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Torque feedback integral term magnitude or rate of change is out of allowable range or its dual store copy do not match	High Threshold 65.70 Nm Low Threshold -70.08 Nm Rate of change threshold	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				4.38 Nm/loop				
			Difference of Final Torque feedback proportional plus integral term and its redundant calculation is out of bounds given by threshold range	High Threshold 70.08 Nm Low Threshold - 70.08 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of torque desired throttle area and its redundant calculation is out of bounds given by threshold range	High Threshold 0.50 % Low Threshold - 0.50 %	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Difference of torque model coefficients and its redundant calculation is out of bounds given by threshold range	High Threshold 0.0001278 Low Threshold - 0.0001278	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 70.08 Nm Low Threshold - 70.08 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Accessory drive friction torque is out of bounds given by threshold range	High Threshold 70.08 Nm Low Threshold	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				0.00 Nm				
			AC friction torque is greater than commanded by AC control software or less than threshold limit	High Threshold 35.00 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Difference of Oil temperature delta friction torque and its redundant calculation is out of bounds given by threshold range	High Threshold 70.08 Nm Low Threshold - 70.08 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Generator friction torque is out of bounds given by threshold range	High Threshold 70.08 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Supercharger friction torque is out of bounds given by threshold range	High Threshold 70.08 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				Low Threshold 0.00 Nm				
			Filtered Torque error magnitude or its increase rate of change is out of allowable range or its dual store copy do not match	High Threshold 70.08 Nm Low Threshold -70.08 Nm Rate of change threshold 4.38 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 70.08 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				Low Threshold 0.00 Nm			multipier	
			Delta Torque Baro compensation is out of bounds given by threshold range	High Threshold 6.45 Nm Low Threshold -6.12 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			1. Difference of reserve torque value and its redundant calculation exceed threshold OR 2. Reserve request does not agree with operating conditions or Difference of final predicted torque and its redundant calculation	1. 69.08 Nm 2. N/A 3. 69.08 Nm 4. 69.08		1. & 2.: Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 70.08 Nm	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			exeed threshold OR 3. Rate of change of reserve torque exceeds threshold, increasing direction only OR 4. Reserve engine torque above allowable capacity threshold	Nm	3. & 4.: Ignition State	3. & 4.: Accessory, run or crank		
			Engine Vacuum and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of the calculated Intake Manifold Pressure during engine event versus during time event is greater than threshold	Table, f(Desired Engine Torque). See supporting tables: **Delta MAP Threshold f(Desired Engine Torque)**		Engine speed >0rpm	Up/down timer 140 ms continuous, 0.5 down time multipier	
			Min. Axle Torque Capacity is greater than threshold	0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							ms continuous, 0.5 down time multipier	
			Driver Predicted Request is greater than its redundant calculation plus threshold OR Driver Predicted Request is less than its redundant calculation minus threshold	981.60 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Cold Delta Friction Torque and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Predicted torque for zero pedal determination is greater than calculated limit.	Table, f(Oil Temp, RPM). See supporting tables: **Speed Control External Load f(Oil Temp, RPM)** + 70.08 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Commanded Predicted Axle Torque and its dual store do not match	1 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Steady State Estimated Engine Torque and its dual store are not equal	N/A		AFM not changing from Active to Inactive and preload torque not changing and one loop after React command Engine speed >0rpm	Up/down timer 1,988 ms continuous, 0.5 down time multipier	
			Difference of Weighting factor for number of cylinders fueled and its	0.26		Engine run flag = TRUE > 10.00 s	Up/down timer 175 ms continuous,	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			redundant calculation is above threshold				0.5 down time multipier	
			Difference of minimum spark advance limit and its redundant calculation is out of bounds given by threshold range	11.34 degrees	Ignition State	Accessory, run or crank	Up/down timer 140 ms continuous, 0.5 down time multipier	
			Difference of commanded spark advance and adjusted delivered is out of bounds given by threshold range	11.34 degrees		Engine speed >0rpm	Up/down timer 140 ms continuous, 0.5 down time multipier	
			Absolute difference between Estimated Engine Torque and its dual store are above a threshold	70.08 Nm		Engine speed >0rpm	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Absolute difference between Estimated Engine Torque without reductions due to torque control and its dual store are above a threshold	70.08 Nm		Engine speed >0rpm	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of desired spark advance for managed torque and its redundant calculation is out of bounds given by threshold range	11.34 degrees		Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 70.08 Nm	Up/down timer 440 ms continuous, 0.5 down time multipier	
			Absolute difference of Engine Capacity Minimum Running Immediate Brake Torque Excluding Cylinder Sensitivity and its redundant calculation is out of bounds given by threshold range	70.08 Nm		Engine speed >0rpm	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			One step ahead calculation of air-per-cylinder greater than two step ahead calculation by threshold for time	Threshold: Dynamically calculated based on current engine conditions Fault Pending Threshold: 100 ms		Engine speed > 625 rpm	Up/down timer 440 ms continuous, 0.5 down time multipier	
			Rate limited cruise axle torque request and its dual store do not match within a threshold	122.70 Nm	Ignition State	Accessory, run or crank	Up/down timer 163 ms continuous, 0.5 down time multipier	
			1. Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions and its redundant calculation is out of bounds given by threshold range	1. 5.00 % 2. N/A 3. N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			OR 2. Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions and its dual store do not equal OR 3. Absolute difference of Calculated accelerator pedal position and its dual store do not equal					
			Commanded axle torque is greater than its redundant calculation by threshold	981.60 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded axle torque is less than its redundant calculation by threshold	1,472.40 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous,	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							0.5 down time multipier	
			Preload timer and its redundant calculation do not equal	N/A	Ignition State	Accessory, run or crank AFM apps only	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			AC friction torque is greater than commanded by AC control software	35.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing (time based) calculation does not equal its redundant calculation	N/A		Engine speed >0rpm	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of the calculated spark offset for	11.34 degrees		Engine speed >0rpm	Up/down timer 140	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			equivalence ratio and its redundant cacluation is greater than a threshold				ms continuous, 0.5 down time multipier	
			Transmission Torque Request cacluations do not equal their dual stores	N/A		Run or Crank = TRUE > 0.50 s	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 a threshold	15 mm2			Up/down timer 180 ms continuous, 0.5 down time multipier	
			Absolute difference of Desired TIAP and its redundant cacluation is greater than a threshold	5.00 kPa			Up/down timer 475 ms continuous, 0.5 down time multipier	

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 OR ********** Fuel Level is in a Readable Range for both Primary and Secondary Tanks too Long ********** This subtest is not 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 ********** If the vehicle is driven a	≥ 28.7 liters < 2.8 liters 149 miles < 29 liters > 3 liters 2,430 seconds	Engine Running No active DTCs: Volume in secondary tank	VehicleSpeedSensor_FA ≥ 2.8 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.
			distance of 81 miles without the secondary fuel level changing by 3 liters, then the sender must be stuck.					

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

14 OBDG05 ECM Summary Tables (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 is within limits. Output driver is commanded on, Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 25 samples250 ms / sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Actuator Solenoid Circuit High – Bank 1	P2089	Diagnoses the VVT system high side driver circuit for circuit faults.	The ECM detects that voltage is high during driver off state (indicates short to power or open circuit)	Short to power: ≤ 0.5 Ω impedance between signal and controller power Open Circuit: ≥ 200 K Ω impedance between signal and controller ground	System supply voltage is within limits. Output driver is commanded on, Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 25 samples250 ms / sample, continuous	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Exhaust Camshaft Actuator Solenoid Circuit Low – Bank 1	P2090	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 is within limits. Output driver is commanded on, Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 25 samples250 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.
Exhaust Camshaft Actuator Solenoid Circuit High – Bank 1	P2091	Diagnoses the VVT system high side driver circuit for circuit faults.	The ECM detects that voltage is high during driver off state (indicates short to power or open circuit)	Short to power: ≤ 0.5 Ω impedance between signal and controller power Open Circuit: ≥ 200 K Ω impedance between signal and controller ground	System supply voltage is within limits. Output driver is commanded on, Ignition switch is in crank or run position	> 11.00 Volts	20 failures out of 25 samples250 ms / sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Post Catalyst Fuel Trim System Low Limit Bank 1 (Too Rich)	P2096	Determines if the post catalyst O2 sensor based fuel control system has utilized all or most of it's low limit authority, indicating a rich emissions/exhaust gas condition. Note: If the post catalyst O2 voltage is too rich, the post catalyst O2 integral offset control is decreased. This results in lean bias fuel control in an attempt to correct the rich condition. A perfectly balanced control system (no rich or lean bias required) is represented by an integral offset value of “0” and a post catalyst O2 sensor that is within it's optimal operating range (neither rich nor lean). An integral offset value < 0 is indicative of the control system reacting to a rich post catalyst O2 sensor. If the failure is such that the control system utilizes all or most of its available authority, then P2096 will set.	Rich Fail counter High Vapor Feature: The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions are present. This HV condition is indicated when the purge valve is open AND percent vapor is >= 18 % for >= 5.0 seconds. Diagnosis resumes if the purge valve is closed OR the percent vapor is <= 14 % for >= 5.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary.	>= 80 counts per 100 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 <= 200 >= -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 0 0 0 0 0		

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).	<= N/A (control min.= 0) N/A (control min.= 0) -500 (control min.= -500) -500 (control min.= -500) -500 (control min.= -500) > 790 mV 790 mV 790 mV 790 mV 790 mV		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Post Catalyst Fuel Trim System High Limit Bank 1 (Too Lean)	P2097	Determines if the post catalyst O2 sensor based fuel control system has utilized all or most of it's high limit authority, indicating a lean emissions/exhaust gas condition. Note: If the post catalyst O2 voltage is too lean, the post catalyst O2 integral offset control is increased. This results in rich bias fuel control in an attempt to correct the lean condition. A perfectly balanced control system (no rich or lean bias required) is represented by an integral offset value of “0” and a post catalyst O2 sensor that is within it's optimal operating range (neither rich nor lean). An integral offset value > 0 is indicative of the control system reacting to a lean post catalyst O2 sensor. If the failure is such that the control system utilizes all or most of its available authority, then P2097 will set.	Lean Fail counter High Vapor Feature: The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions are present. This HV condition is indicated when the purge valve is open AND percent vapor is >= 18 % for >= 5.0 seconds. Diagnosis resumes if the purge valve is closed OR the percent vapor is <= 14 % for >= 5.0 seconds. This was done to minimize disabling the diagnostic for longer than necessary.	>= 80 counts per 100 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).	>= N/A (control max.= 0) N/A (control max.= 0) 700 (control max.= 700) 700 (control max.= 700) 700 (control max.= 700) < 690 mV 690 mV 690 mV 690 mV 690 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 >	7.91 percent	TPS minimum learn is not active and Throttle is being Controlled and (Engine Running or Ignition Voltage > or Ignition Voltage >)	Run/Crank voltage > 6.41 Ignition voltage failure is false (P1682)	15 counts; 12.5 ms/count in the primary processor	Type A, 1 Trips
			OR Difference between modeled throttle position and measured throttle position >	7.91 percent	Ignition voltage failure is false (P1682)	TPS minimum learn is not active and Throttle is being Controlled AND ((Engine Running AND Ignition Voltage > 5.50) OR Ignition Voltage > 11.00)		
			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	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Accelerator Pedal Position (APP) Sensor 1 Lo	P2122	Detect a continuous or intermittent short or open in the APP sensor #1 on Main processor	APP1 Voltage <	0.4625		Run/Crank voltage > 6.41 No 5V reference error or fault for # 4 5V reference circuit (P06A3)	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Accelerator Pedal Position (APP) Sensor 1 Hi	P2123	Detect a continuous or intermittent short or open in the APP sensor #1 on Main processor	APP1 Voltage >	4.7500		Run/Crank voltage > 6.41 No 5V reference error or fault for # 4 5V reference circuit (P06A3)	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Accelerator Pedal Position (APP) Sensor 2 Lo	P2127	Detect a continuous or intermittent short or open in the APP sensor #2 on Main processor	APP2 Voltage <	0.3250		Run/Crank voltage > 6.41 No 5V reference error or fault for # 4 5V reference circuit (P0697)	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Accelerator Pedal Position (APP) Sensor 2 Hi	P2128	Detect a continuous or intermittent short or open in the APP sensor #2 on Main processor	APP2 Voltage >	2.6000		Run/Crank voltage > 6.41 No 5V reference error or fault for # 4 5V reference circuit (P0697)	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Throttle Position (TP) Sensor 1-2 Correlation	P2135	Detects a continuous or intermittent correlation fault between TPS sensors #1 and #2 on Main processor	Difference between TPS1 displaced and TPS2 displaced >	6.797 % 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	

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 >= 5 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 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 >= 5 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 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 >= 5 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 >= 5 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 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 >= 5 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 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 >= 5 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 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 >= 5 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

14 OBDG05 ECM Summary Tables (Initial 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 >= 5 Seconds P062B not FA or TFTK	10 failures out of 20 samples 100 ms /sample Continuous	Type A, 1 Trips

14 OBDG05 ECM Summary Tables (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	2.0 secs	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling System Performance	P2181	This DTC detects thermostat malfunction (i.e. stuck open)	This diagnostic can be calibrated to fail in <u>one</u> of two methods based on the following calibration. This application has been calibrated as a Type 1 . <u>Type 0 - Airflow Method:</u> Engine Coolant Temp (ECT) is ≤ commanded temperature minus 18 Deg C and normalized ratio is ≤ than 0.00 . When above is present for more than 5 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 100.0 grams. <u>Type 1 - Energy Method:</u> Engine Coolant Temp (ECT) is ≤ commanded temperature minus 18 Deg C and normalized ratio is ≤ than 1.10 . When above is present for more than 5 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 ≥ 25,200 seconds 90 ≤ Time ≤ 1,800 seconds Ethanol ≤ 87 % -10.0 ≤ ECT ≤ 75.0 °C -7 °C ≤ IAT ≤ 52 °C. ≤ 20 % 8.0 ≤ Airflow ≤ 30.0 gps 500.0 kJ	30 failures out of 90 samples 1 sec/ sample Once per ignition key cycle	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor 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:	>= 11.00 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 (Supporting Table "**Variance Threshold Bank1**") and subtracting it from the measured Variance. The result is then divided by a normalizer calibration from another 17 x 17 table	0.70 If the diagnostic has reported a failure on the prior trip, the Filtered Ratio must fall below 0.49 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 0.70 .	System Voltage Fuel Level Engine Coolant Temperature Cumulative engine run time Diagnostic enabled at Idle (regardless of other operating conditions) Engine speed range Engine speed delta during a short term sample period Mass Airflow (MAF) range Cumulative delta MAF during a short term sample period Filtered MAF delta between samples Note: first order lag filter coefficient applied to MAF = 0.050 Air Per Cylinder (APC) APC delta during short term sample period Filtered APC delta between samples	no lower than 11.0 Volts for more than 0.2 seconds > 10.0 percent AND no fuel level sensor fault > -20 degrees C > 30.0 seconds No 1,250 to 4,000 RPM < 150 RPM 0 to 100 g/s < 2 g/s < 0.40 g/s 60 to 600 mg/cylinder < 40 mg/cylinder < 3.00 percent	Minimum of 1 test per trip, up to 4 tests per trip during RSR or FIR. The front O2 sensor voltage is sampled once per cylinder event. Therefore, the time required to complete a single test (when all enable conditions are met) decreases as engine speed increases. For example, 4.50 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.
			(Supporting Table "**Normali er Bank1**"). This quotient is then multiplied by a quality factor calibration from a 17 x 17 table (Supporting Table " **uality Factor Bank1**"). This result is referred to as the Ratio. Note that the quality factor ranges between 0 and 1 and represents robustness to false diagnosis in the current operating region. Regions with low quality factors are not used. Finally, a EWMA filter is applied to the Ratio metric to generate the Filtered Ratio malfunction criteria metric. Generally, a normal system will result in a negative Filtered Ratio while a failing system will result in a positive Filtered Ratio. The range of the Filtered Ratio metric is application specific since both the emissions sensitivity and relationship between imbalance and the Variance metric are application specific. Some applications may need to command a unique cam phaser value before performing the		Note: first order lag filter coefficient applied to APC = 0.100 Spark Advance Throttle Area (percent of max) Intake Cam Phaser Angle Exhaust Cam Phaser Angle Quality Factor (QF) QF calibrations are located in a 17x17 lookup table versus engine speed and load (Supporting Table " **uality Factor Bank1**"). QF values less than “1” indicate that we don’t have 4sigma/2sigma robustness in that region. The quality of the data is determined via statistical analysis of Variance data. Fuel Control Status Closed Loop and Long Term FT Enabled for: AIR pump not on CASE learn not active EGR - no device control, no intrusive diagnostics EVAP - no device control, no intrusive diagnostics Engine OverSpeed	 5 to 55 degrees 7 to 200 percent 0 to 35 degrees 0 to 35 degrees >= 0.99 >= 1.2 seconds (Please see "**Closed Loop Enable Criteria**" and "**Long Term FT Enable Criteria**" in Supporting Tables)	made within 5 minutes of operation. For RSR or FIR, 8 tests must complete before the diagnostic can report.	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			above calculations since cam phasing has been shown to have an impact on overall signal quality. This application Does Not Use this feature.		Protection Not Active Idle speed control normal PTO Not Active Injector base pulse width above min limit O2 Learned htr resistance Rapid Step Response (RSR): RSR will trigger if the Ratio result from the last test is AND it exceeds the last Filtered ratio by Once triggered, the filtered ratio is reset to: Fast Initial Response (FIR): FIR will trigger when an NVM reset or code clear occurs. Once triggered, the filtered ratio is reset to: No Fault Active for:	 = Valid (the O2 heater resistance has learned since NVM reset) >= 0.65 >= 0.63 0.00 0.00 EngineMisfireDetected_FA MAP_SensorFA MAF_SensorFA ECT_Sensor_FA TPS_ThrottleAuthorityDefaulted FuelInjectorCircuit_FA AIR System FA EvapExcessPurgePsbl_FA CamSensorAnyLocationFA		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 <= 1.24 miles > 20.0 kPa > 1.24 miles	No Active DTCs:	AmbPresSnsrCktFA ECT_Sensor_Ckt_FA IAT_SensorFA MAF_SensorFA AfterThrottlePressureFA TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA	320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips
			Barometric Pressure OR Barometric Pressure	< 50.0 kPa > 115.0 kPa	Time between current ignition cycle and the last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	> 409.6 seconds EngineModeNotRunTimer Error MAP_SensorFA TC_BoostPresSnsrCktFA AAP2_SnsrFA MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP	999 failures out of 5 samples 1 sample every 12.5 msec	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure (BARO) Sensor Circuit Low (non-boosted applications)	P2228	Detects a continuous short to low or open in either the signal circuit or the BARO sensor.	BARO Voltage	< 40.0 % of 5 Volt Range (2.0 Volts = 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 (non-boosted applications)	P2229	Detects an open sensor ground or continuous short to high in either the signal circuit or the BARO sensor.	BARO Voltage	> 90.0 % of 5 Volt Range (4.5 Volts = 115.0 kPa)			320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (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)	> 150 kPa 80 consecutive BARO samples			4 failures out of 5 samples Each sample takes 1.00 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Secondary AIR Pump Control Circuit Low Voltage	P2257	Diagnoses the Secondary AIR Pump Control 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	Powertrain relay Voltage	>= 11.00 volts	100 failures out of 120 samples 250ms / sample	Type B, 2 Trips Note: In certain controllers P0418 may also set (Secondary AIR Pump Control Circuit Open)

14 OBDG05 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Secondary AIR Pump Control Circuit High Voltage	P2258	Diagnoses the Secondary AIR Pump Control 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	Powertrain relay Voltage	>= 11.00 volts	100 failures out of 120 samples 250ms / sample	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 > 71 grams	No Active DTC's B1S2 DTC's Not active this key cycle System Voltage ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Pedal position Engine Airflow Closed loop integral Closed Loop Active Evap Ethanol	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013B, P013E, P013F, P2270 or P2271 10.0 < Volts < 32.0 = Not Valid = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab. = False ≤ 4.0 % 3 ≤ gps ≤ 11 0.85 ≤ C/L Int ≤ 1.07 = TRUE not in control of purge not in estimate mode	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Post fuel cell (Decel) Crankshaft Torque EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on Time Predicted Catalyst temp Fuel State ========== All of the above met for at least 0.0 seconds, and then check the following Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled) Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled) ========== All of the above met for at least 1.0 seconds, and then the Force Cat Rich intrusive stage is requested. ========== During Stuck Lean test the following must stay TRUE or the test will abort: 0.96 ≤ Commanded Fuel EQR ≤ 1.01	= enabled < 100.0 Nm = not active = not active ≥ 175.0 sec 600 ≤ ºC ≤ 850 = DFCO possible ========== 1,250 ≤ RPM ≤ 2,300 1,100 ≤ RPM ≤ 2,450 34.2 ≤ MPH ≤ 74.6 31.7 ≤ MPH ≤ 82.0		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Signal Stuck Rich Bank 1 Sensor 2	P2271	This DTC determines if the post catalyst O2 sensor is stuck in a normal rich voltage range and thereby can no longer be used for post oxygen sensor fuel control or for catalyst monitoring. The diagnostic is an intrusive test which requests the DFCO mode to achieve the required lean threshold.	Post O2 sensor signal AND The Accumulated mass air flow monitored during the Stuck Rich Voltage Test	> 100 mvolts > 41 grams	No Active DTC's B1S2 DTC's Not Active this key cycle System Voltage ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Engine Speed Engine Airflow Vehicle Speed Closed loop integral Closed Loop Active Evap Ethanol	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013B, P013E, P013F or P2270 10.0 < Volts < 32.0 = Not Valid = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria - Airflow** and **Multiple DTC Use_Green Sensor Delay Criteria - Limit** for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab. = False 1,250 ≤ RPM ≤ 2,300 3 ≤ gps ≤ 11 34.2 ≤ MPH ≤ 74.6 0.85 ≤ C/L Int ≤ 1.07 = TRUE not in control of purge not in estimate mode	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Power Take Off EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on Time Predicted Catalyst temp Fuel State DTC's Passed ========== After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).	= not active = not active = not active ≥ 175.0 sec 600 ≤ ºC ≤ 850 DFCO possible = P2270 (and P2272 if applicable) = P013E (and P014A if applicable) = P013A (and P013C if applicable) ==========		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	>= 11 Volts > 0.250 MPa >= 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	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 >= -20.0 degC -20 <=Temp degC <= 90		

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	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 and	>= 11 Volts > 0.250 MPa >= 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 failures out of 938 samples	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Engine movement detected is true andManufacturers enable counter is 0) Flex Fuel Sensor Not FA Ignition voltage out of correlation error(P1682) not active Barometric Pressure Inlet Air Temp Fuel Temp	 >= 70.0 KPA >= -20.0 DegC -20 <= Temp degC <= 90		

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

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

14 OBDG05 ECM Summary Tables (Initial DTCs)

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

14 OBDG05 ECM Summary Tables (Initial DTCs)

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

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

14 OBDG05 ECM Summary Tables (Initial DTCs)

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

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

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

14 OBDG05 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Secondary AIR System Pressure Sensor Circuit Ban 1	P2 30	This DTC detects a stuc in range pressure sensor signal hen the AIR pump is commanded on.	Average Pressure Error A D Signal Variation	0.50 Pa 0.15 Pa	BARO Inlet Air Temp Coolant Temp Engine off time System Voltage AP not Engine Speed AF not o active DTCs:	> 60 Pa > 11.0 deg C > 11.0 deg C 56.0 > 1, 00.0 seconds > 10.0 Volts 32.0 20 Pa for 2.0 sec 5,000 RP > 50 gm/s for 3.0 sec AIRValveControlCircuit FA AIRPumpControlCircuit FA AIRSysPressSnsrB1C t oFA AIRSysPressSnsrB1C tHi FA ControllerProcessorPerf FA	Stuc in range cumulative time > 5.0 seconds Fre uency: Once per trip hen SAI pump is commanded On	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Secondary AIR System Pressure Sensor Performance Bank 1	P2431	This DTC detects a skewed pressure sensor signal via a comparison of the AIR pressure sensor signal and estimated BARO, as well as an evaluation of the quality of the comparison.	Difference between AIR pressure sensor and BARO (Pump Commanded Off) or OR Difference between AIR pressure sensor and BARO (Pump Commanded On)	> 18.0 kPa < -10.0 kPa > 50.0 kPa	BARO Inlet Air Temp Coolant Temp Engine off time System Voltage MAP not Engine Speed MAF not Transfer Case not in 4WD Low Run/crank active No active DTCs:	> 60 kPa > -11.0 deg C > -11.0 deg C < 56.0 > 1,800.0 seconds > 10.0 Volts < 32.0 < 20 kPa for 2.0 sec < 5,000 RPM > 50 gm/s for 3.0 sec AIRValveControlCircuit FA AIRPumpControlCircuit FA AIRSysPressSnsrB1CktLoFA AIRSysPressSnsrB1CktHiFA MAF_SensorFA EngineMisfireDetected_FA ControllerProcessorPerf_FA	Skewed sensor cumulative test weight > 15.0 seconds Continuous 6.25ms loop Skewed sensor cumulatative test weight is based on distance from the last Baro update. See **Baro Skewed Sensor Weight Factor** table.	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Secondary AIR System Pressure Sensor Circuit Low Voltage Bank 1	P2432	This DTC detects an out of range low AIR pressure sensor signal	AIR Pressure Sensor signal	< 6 % of 5Vref for 800 failures out of 1,000 samples	No active DTCs:	ControllerProcessorPerf_FA	1,000 samples (6.25 ms per sample) Continuous	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (Initial DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Secondary AIR System Pressure Sensor Circuit Hi Voltage Bank 1	P2433	This DTC detects an out of range high AIR pressure sensor signal	AIR Pressure Sensor signal	> 94 % of 5Vref for 800 failures out of 1,000 samples	No active DTCs:	ControllerProcessorPerf_FA	1,000 samples (6.25 ms per sample) Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Secondary AIR System Shut-off Valve Stuck Open	P2440	This DTC detects if one or both of the AIR system control valves is stuck openThis test is run during Phase 2 (Pump commanded On, valve commanded closed)	Average Pressure Error or or	< **Bank 1 Valve Pressure Error** table < **Bank 2 Valve Pressure Error** table > 32 kPa for either Bank	BARO Inlet Air Temp Coolant Temp Engine off time System Voltage MAP not Engine Speed MAF not Stability Time AIR diagnostic Phase 1 passed No active DTCs:	> 60 kPa > -11.0 deg C > -11.0 deg C < 56.0 > 1,800.0 seconds > 10.0 Volts < 32.0 < 20 kPa for 2.0 sec < 5,000 RPM > 50 gm/s for 3.0 sec > 0.5 seconds AIRSystemPressureSensor FA AIRValveControlCircuit FA AIRPumpControlCircuit FA MAF_SensorFA AmbientAirDefault_NA IAT_SensorFA ECT_Sensor_FA EngineMisfireDetected_FA CatalystSysEfficiencyLoB1_FA CatalystSysEfficiencyLoB2_FA ControllerProcessorPerf_FA IgnitionOutputDriver_FA FuelInjectorCircuit_FA	Phase 2 Conditional test weight > 1.5 sec Frequency: Once per trip when AIR pump commanded On Conditional test weight is calculated by multiplying the following Factors: **Phase 2 Baro Test Weight Factor, Phase 2 MAF Test Weight Factor, Phase 2 System Volt Test Weight Factor, Phase 2 Ambient Temp Test Weight Factor** (see Supporting Tables)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Secondary AIR System Pump Stuck On	P2444	This DTC detects if the SAI pump is stuck On. This test is run during Phase 3 (Pump commanded Off, valve commanded closed)	Average Pressure Error or	> **Bank 1 Pump Pressure Error** table < -32 kPa	BARO Inlet Air Temp Coolant Temp Engine off time System Voltage MAP not Engine Speed MAF not Stability Time AIR diagnostic Phase 1 passed AIR diagnostic Phase 2 passed No active DTCs:	> 60 kPa > -11.0 deg C > -11.0 deg C < 56.0 > 1,800.0 seconds > 10.0 Volts < 32.0 < 20 kPa for > 2.0 sec. < 5,000 RPM > 50 gm/s for > 3.0 sec. > 4.0 seconds Phase 3 cumulatative test weight is based on the distance from the last Baro update. See **Baro Skewed Sensor Weight Factor** table. AIRSystemPressureSensorFA AIRValveControlCircuit FA AIRPumpControlCircuit FA MAF_SensorFA AmbientAirDefault_NA IAT_SensorFA ECT_Sensor_FA EngineMisfireDetected_FA CatalystSysEfficiencyLoB1_FA CatalystSysEfficiencyLoB2_FA ControllerProcessorPerf_FA IgnitionOutputDriver_FA FuelInjectorCircuit_FA	Phase 3 Cumlatative test weight > 2.0 sec. Frequency: Once per trip when AIR pump commanded On	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Control Torque Request Circuit	P2544	Determines if the torque request from the TCM is valid	Protect error - Serial Communication message - ($199 - PTEI3)	Message <> two's complement of message	Diagnostic enabled/ disabled	Enabled	>= 10 Protect errors during key cycle.	Type B, 2 Trips
					Power Mode	= Run	Performed on every received message	
			OR					
			Rolling count error - Serial Communication message ($199 - PPEI3) rolling count 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		
			Range Error - Serial Communication message - ($199 - PTEI3) TCM Requested Torque Increase	> 350 Nm			>= 6 range errors out of 10 samples.	
					No Serial communication loss to TCM (U0101)	No loss of communication	Performed on every received message	
			OR					
			Multi-transition error - Trans torque intervention type request change	Requested torque intervention type toggles from not increasing request to increasing request			>= 3 multi-transitions out of 5 samples. Performed every 200 msec	

Component/ System	Fault Code	Monitor 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 > 24.87 %.			Count Up Test: 4 failures out of 20 samples 1 sec / sample Continuous while run/crank is not active and until controller shutdown is initiated. Range Test: Once per trip when controller shutdown is initiated or run/ crank becomes active.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Malfunction Indicator Lamp (MIL) Control Circuit (ODM) Low	P263A	Diagnoses the malfunction indicator lamp control low side driver circuit for circuit faults.	Voltage low during driver off state (indicates short-to-ground)	Short to ground: ≤ 0.5 Ω impedance between signal and controller ground	Run/Crank Voltage Remote Vehicle Start is not active	Voltage ≥ 11 volts	50 failures out of 63 samples 50 ms / sample	Type B, No MIL NO MIL Note: In certain controllers P0650 may also set (MIL Control Open Circuit)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Malfunction Indicator Lamp (MIL) Control Circuit (ODM) High	P263B	Diagnoses the malfunction indicator lamp control low side driver circuit for circuit faults.	Voltage high during driver on state (indicates short to power)	Short to power: ≤ 0.5 Ω impedance between signal and controller power	Run/Crank Voltage Remote Vehicle Start is not active	Voltage ≥ 11 volts	4 failures out of 5 samples 50 ms / sample	Type B, No MIL NO MIL

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2Sensor Circuit Range / Performance Bank 1 Sensor 1	P2A00	This DTC determines if the O2 sensor voltage is not meeting the voltage criteria to enable closed loop fueling.	========== Closed Loop O2S ready flag A) O2S signal must be To set Closed Loop ready flag ========== Closed Loop O2S ready flag B) Once set to ready O2S cannot be for Then set Closed Loop ready flag ==========	========== = False < 1,250 mvolts = True ========== = True > 1,250 mvolts > 5.0 seconds = False ==========	No Active DTC's System Voltage Engine Speed Engine Airflow Engine Coolant Engine Metal Overtemp Active Converter Overtemp ActiveFuel State AFM Status Predicted Exhaust Temp (B1S1) Engine run time Fuel Enrichment All of the above met for	TPS_ThrottleAuthorityDefaulted MAP_SensorFA ECT_Sensor_FA FuelInjectorCircuit_FA P0131, P0151 P0132, P0152 10.0 < Volts < 32.0 500 ≤ RPM ≤ 3,400 3.2 ≤ gps ≤ 30.0 ≥ 70.0 ºC = False = False DFCO not active = All Cylinders active ≥ 0.0 ºC > 100 seconds = Not Active > 5 seconds	200 failures out of 250 samples. Frequency: Continuous 100 msec loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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: 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 >= 11.00 or >= 6.41 = run = 0 (1 indicates enabled) = Active > 11.00 > 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	 ≥ 12.0 seconds ≥ 12.0 seconds ≥ 12.0 seconds ≥ 12.0 seconds ≥ 12.0 seconds ≥ 12.0 seconds ≥ 12.0 seconds ≥ 12.0 seconds ≥ 12.0 seconds ≥ 12.0 seconds ≥ 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: 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 >= 11.00 or >= 6.41 = run = 0 (1 indicates enabled) = Active > 11.00	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 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: 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 >= 11.00 or >= 6.41 = run = 0 (1 indicates enabled) = Active > 11.00	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					not active for U0109 Fuel Pump 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 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	 ≥ 12.0 seconds ≥ 12.0 seconds ≥ 12.0 seconds ≥ 12.0 seconds ≥ 12.0 seconds ≥ 12.0 seconds ≥ 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: 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 >= 11.00 or >= 6.41 = run = 0 (1 indicates enabled) = Active > 11.00	Diagnostic runs in 12.5 ms loop	Type C, No MIL "Special Type C"

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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	 ≥ 12.0 seconds ≥ 12.0 seconds ≥ 12.0 seconds ≥ 12.0 seconds ≥ 12.0 seconds ≥ 12.0 seconds ≥ 12.0 seconds ≥ 12.0 seconds ≥ 12.0 seconds ≥ 12.0 seconds ≥ 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: 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 >= 11.00 or >= 6.41 = run = 0 (1 indicates enabled) = Active > 11.00 > 0.4000 seconds	Diagnostic runs in 12.5 ms loop	Type C, No MIL "Special Type C"

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					not active for 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.
Heater Coolant Pump Control Circuit Open	B269A	Diagnoses the Heater Coolant Pump 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 Ignition in Range Engine not cranking Run Crank active == Above is true and == Last Open Circuit Test	 = True = True = True ========== not Indeterminate	5 failures out of 10 samples 1 sec/ sample Continuous	Type B, 2 Trips Note: In certian controllers B269C may also set

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
eater Coolant Pump Control Circuit Low	269C	Diagnoses the eater Coolant Pump low side driver circuit for circuit faults.	Voltage low during driver off state indicates short to ground	Short to ground 0.5 impedance between signal and controller ground	Run Crank gnition in Range Engine not cranking Run Crank active Above is true and Last round Short Circuit Test	True True True not ndeterminate	5 failures out of 10 samples 1 sec/ sample Continuous	Type , 2 Trips Note n certian controllers 269A may also set

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Heater Coolant Pump Control Circuit High	B269D	Diagnoses the Heater Coolant Pump 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 Ignition in Range Engine not cranking Run Crank active == Above is true and == Last Power Short Circuit Test	 = True = True = True ========== not Indeterminate	5 failures out of 10 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 Performance	P0116	This DTC detects ECT temp sensor stuck in mid range.	A failure will be reported if any of the following (1-3) occur after the following soak conditions, Engine off time > 25,200 seconds Propulsion system off time > 0 seconds 1) ECT at power up > IAT at power up by an IAT based table lookup value (fast fail). 2) ECT at power up > IAT at power up by 15.8 Deg C and a block heater has not been detected. 3) ECT at power up > IAT at power up by 15.8 Deg C and the time spent cranking the engine without starting is greater than 10.0 seconds with the LowFuelConditionDiag	See the table named: **P0116_Fail if power up ECT exceeds IAT by these values** in the Supporting tables section = False	No Active DTC's Non-volatile memory initization Test complete this trip Test aborted this trip IAT LowFuelCondition Diag ========== Block Heater detection is enabled when either of the following occurs: 1) ECT at power up > IAT at power up by 2) Cranking time ========== Block Heater is detected and diagnostic is aborted when 1) or 2) occurs: 1a) Vehicle drive time 1b) Vehicle speed 1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is below 1b as follows: 1d) IAT drops from power up IAT	VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA IgnitionOffTimeValid = Not occurred = False = False ≥ -7 ºC = False ========== > 15.8 ºC < 10.0 seconds ========== > 400 seconds > 14.9 MPH 0.50 times the seconds with vehicle speed below 1b ≥ 5.3 ºC	1 failure 500 msec/ sample Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					2a) ECT drops from power up ECT 2b) Engine run time ========== Diagnostic is aborted when 3) or 4) occurs: 3) Engine run time with vehicle speed below 1b 4) Minimum IAT during test	≥ 1 ºC Within ≤ 60 seconds ========== > 1800 seconds ≤ -7 ºC		

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_StkPresMinFuelFlow (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)	DTC Type A 1 trip

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		

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	Fu Rail Pres sensor voltage	< 0.14 V	Ignition	Run or Crank	72 failures / 80 samples 1 sample/12.5 ms	DTC Type A 1 trip

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	Fu Rail Pres sensor voltage	> 4.86 V	Ignition	Run or Crank	72 failures / 80 samples 1 sample/12.5 millisec	DTC Type A 1 trip

14 OBDG05 ECM Summary Tables (Unique DTCs)

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	Fuel Pump Power Module Driver Circuit Ground Short enumeration	== Faulted (as reported by Fuel Pmp Pwr Mod)	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) 11v < System V > 32v f] <> TRUE g] == TRUE h] < 75A	64 failures / 80 samples 1 sample/12.5 millisec	DTC Type A 1 trip

14 OBDG05 ECM Summary Tables (Unique DTCs)

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 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] 7v < System V > 32v f] <> TRUE g] == TRUE	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 Open	P023F	This DTC detects if the fuel pump control circuit is open	Fuel Pump Power Module Driver Circuit Open enumeration	== Faulted (as reported by Fuel Pmp Pwr Mod)	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] 7v < System V > 32v	40 test failures / 80 test samples; 1 sample/12.5ms	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position Sensor Crankshaft Start Position ncorrect	P0 4A	onitors the position of the crankshaft during a hybrid auto start to verify that the sensor has reported the crankshaft position properly.	Crankshaft position is in error by a number of crankshaft wheel teeth	> 2 crankshaft teeth	Engine has started rotating during a hybrid auto start Crankshaft position is being verified o Active DTCs	5VoltReferenceB FA CrankSensorFA	2 failures out of samples a sample occurs each time the engine is started	Type B, 2 Trips
			Crankshaft position is in error by at least one crankshaft wheel tooth		Engine has started rotating during a hybrid auto start Crankshaft position is being verified o Active DTCs	5VoltReferenceB FA CrankSensorFA	4 failures out of 5 samples a sample occurs each time the engine is started	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position Sensor - Crankshaft Direction Incorrect	P034B	The Crankshaft Direction Incorrect test monitors the number of crankshaft reversals reported by a bi-directional crank sensor.	Number of crankshaft sensor reversals within a period of time	>= 3 <= 10.0 seconds	Engine Speed Engine Speed Engine Air Flow Engine Movement Detected No Active DTCs:	> 400 RPM < 2,000 RPM >= 3.0 g/s 5VoltReferenceB_FA CrankSensorFA	Continuous 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.
Cooling Fan 2 Relay Control Circuit Open (ODM)	P0481	Diagnoses the cooling fan 2 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 P0693 may also set (Fan 2 Short to Ground)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Booster Pressure Sensor Performance	P0556	Determines if the Brake Booster Vacuum Sensor is stuck or skewed within the normal operating range by comparing the engine vacuum to the brake booster vacuum when the engine is producing a large amount of vacuum	Engine vs brake booster vacuum sensor values are compared when % throttle < value for a time period. When throttle once again > calibrated value, min and max vacuum sensor values are normalized and subtracted from a 1st order lag filter value of 1. A properly operating vacuum sensor would have a normalized result of 1 or greater. If the normalized result is greater than 1 it is considered 1. The 1st order lag filter value would be 0 in a passing system. 1st order lag fail threshold 1st order lag re-pass threshold	 > 0.20 < 0.7	Throttle Area (with idle included) for time period of Ignition Voltage BrkBoostVacDiff For time period of AND Vacuum Delta Diagnostic enabled/ disabled No active DTC's	<= 5.0 Percent for > 3.0 seconds >= 11.0 V > 0.3 kPa >= 0.2 Seconds >= 6.0 kPa Enabled Fault bundles: MAP_SensorFA TPS_FA	Pass counter incremented when enable conditions are met, pass achieved when counter >= 8 Performed every 100 msec	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Booster Pressure Sensor Circuit Low Voltage	P0557	Determines if the Brake Booster Pressure Sensor circuit voltage is too low	(Brake Booster Pressure Sensor Voltage) / 5 Volts	< 2.0 percent	Brake booster diagnostic enabled/disabled Brake booster pressure sensor present	Enabled Present	320 failures out of 400 samples Performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Booster Pressure Sensor Circuit High Voltage	P0558	Determines if the Brake Booster Pressure Sensor circuit voltage is too high	(Brake Booster Pressure Sensor Voltage) / 5 Volts	> 87.0 percent	Brake booster diagnostic enabled/disabled Brake booster pressure sensor present	Enabled Present	2,000 failures out of 2,400 samples Performed every 12.5 msec	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Oil Pressure Sensor/ Switch 'B' Performance	P055B	This diagnostic detects if the oil pressure sensor B output is erroneous	The ECM compares the filtered oil pressure readings between sensors A & B under certain conditions. If they do not match within a limit, the DTC will set.	Oil Pressure Delta between sensors > 450.00 kPa	System supply voltage is within limits, Oil Pressure sensor is present No EOP sensor faults present (sensor A)	> 11.00 Volts Engine Speed < 1,850.00 Cam Phaser duty cycle < 5.00 Pct. Engine run time > 4.00 sec.	80 failures out of 100 samples, 25 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.
Engine Oil Pressure Sensor/ Switch 'B' Low	P055C	This diagnostic detects if the oil pressure sensor B circuit is open or shorted to ground by comparing the sensor feedback to normal operating ranges	This diagnostic detects if the oil pressure sensor B circuit is open or shorted to ground by comparing the sensor feedback to normal operating ranges	Sensor B oil pressure reading <= 50.00	System supply voltage is within limits, Output driver is commanded on, Ignition switch is in crank or run position No EOP sensor faults present (sensor A)	> 11.00 Volts	80 failures out of 100 samples, 25 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.
Engine Oil Pressure Sensor/ Switch 'B' High	P055D	This diagnostic detects if the oil pressure sensor B circuit is shorted to high by comparing the sensor feedback to normal operating ranges	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.	Sensor B oil pressure reading >= 950.00	System supply voltage is within limits, Output driver is commanded on, Ignition switch is in crank or run position No EOP sensor faults present (sensor A)	> 11.00 Volts	80 failures out of 100 samples, 25 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.
Battery Monitor Module Current Monitoring Performance	P058B	Determines that the Battery Monitor Module Current Monitoring is functioning properly by comparing it to a reference current sensor directly connected to, and measured by ECM.	The absolute value of the difference between the Battery Monitor Module current and the ECM measured reference current is greater than threshold value.	>= 10.00 Amp	Diagnostic Enabled P118C P118D Run/Crank or Accessory Hybrid Starter Status	TRUE Not FA or TFTKO Not FA or TFTKO TRUE <> Engine Starting or Engine Stopping for 160.00 counts	160.00 failures out of 100.00 samples 25 ms/sample continuous	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Monitor Module Voltage Monitoring Performance	P058D	Determines that the Battery Monitor Module Voltage Monitoring is functioning properly by comparing it to a reference battery voltage directly measured by ECM.	The absolute value of the difference between the Battery Monitor Module voltage and the ECM measured reference voltage is greater than threshold value.	>= 1.00 Volt	Diagnostic Enabled PT Relay Run/Crank or Accessory Hybrid Starter Status	TRUE Not FA or TFTKO TRUE <> Engine Starting or Engine Stopping for 160.00 counts	160.00 failures out of 200.00 samples 25 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.
Cooling Fan 2 Relay Control Circuit Low Voltage (ODM)	P0693	Diagnoses cooling fan 2 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 P0481 may also set (Fan 2 Open Circuit).

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan 2 Relay Control Circuit High Voltage (ODM)	P0694	Diagnoses the cooling fan 2 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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Auxiliary Transmission Fluid Pump Motor Supply Voltage Circuit/Open	P0B09	Detects when the auxiliary transmission fluid pump relay control circuit is failed (open, short to ground, short to power)	HWIO fault status	= Failed Open	Ignition voltage	≥ 6.41 volts	≥ 32.00 fail count out of ≥ 40.00 sample count Frequency 12.5ms	Type B, 2 Trips
			HWIO fault status	= Failed Short to Ground	Ignition voltage	≥ 6.41 volts	≥ 32.00 fail count out of 40.00 ≥sample count Frequency 12.5ms	
			HWIO fault status	= Failed Short to Power	Ignition voltage	≥ 6.41 volts	≥ 32.00 fail count out of ≥ 40.00 sample count Frequency 12.5ms	

14 OBDG05 ECM Summary Tables (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Current Sensor A Circuit Low	P118C	Detects a continuous short to ground or open in the Battery Current Sensor A signal.	Battery Current Sensor A is less than threshold.	-400.00 Amp	Diagnostic Enabled Run/Crank or Accessory	TRUE TRUE	160.00 failures out of 200.00 samples 25 ms/sample continuous	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Battery Current Sensor A Circuit High	P118D	Detects a continuous short to power in the Battery Current Sensor A signal.	Battery Current Sensor A is greater than threshold.	150.00 Amp	Diagnostic Enabled Run/Crank or Accessory	TRUE TRUE	160.00 failures out of 200.00 samples 25 ms/sample continuous	

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 Overtemperature enumeration	== Faulted (as reported by Fuel Pmp Pwr Mod)	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] 7V < System V < 32V	3 failures / 15 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 Driver Module-System Voltage Low	P129B	To detect if the system voltage is below a certain threshold	Battery Voltage	< 7 V	a) FPPM configuration KeFRPR_e_ChassisFuelPresSysType b) Diagnostic KeFRPR_b_FPPM_BatVoltLoDiagEnbld c) Engine status d) FPPM Power Consumption Alive Rolling Count result e) Diagnostic feedback received f) System Voltage	a) == CeFRPR_e_ECM_FPPM_Sys b) == TRUE c) == Running d) == VALID e) == TRUE f) 7v < System V > 32v	64 failures / 80 samples 1 sample / 12.5 millisec	Type C, No MIL

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Driver Module-System Voltage High	P129C	To detect if the system voltage is above a certain threshold	Battery Voltage	> 18 V	a) FPPM configuration KeFRPR_e_ChassisFuelPresSysType b) Diagnostic KeFRPR_b_FPPM_RunCrnkRatlEnbld 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) 7v < System V > 32v	64 failures / 80 samples 1 sample / 12.5 millisec	Type C, No MIL

14 OBDG05 ECM Summary Tables (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 A, 1 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	== enumeration faulted	a) FPPM configuration KeFRPR_e_ChassisFuelPresSysType 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) 7v < Sys Voltage > 32v	64 failures / 80 samples 1 sample / 12.5 millisec	Type A, 1 Trips
			FPPM Received Duty Cycle Protection Value	== enumeration faulted	a) FPPM configuration KeFRPR_e_ChassisFuelPresSysType 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) 7v < 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) >= 7 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	== enumeration faulted	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 A, 1 Trips
			FPPM Power Consumption Alive Rolling Count	== enumeration faulted	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	== enumeration faulted	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	== enumeration faulted	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	

14 OBDG05 ECM Summary Tables (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
A Rocker Arm Actuator 2 Control Circuit/Open Bank 1	P16CF	Diagnoses the VVL system driver circuit for open faults.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		System supply voltage is within limits, Ignition switch is in crank or run position	> 11.00 Volts	100 failures out of 120 samples250 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.
A Rocker Arm Actuator 2 System Performance /Stuck Off Bank 1	P16D0	Detects a Stuck Off Rocker Arm Actuator System by comparing phaser oil pressure signals when switching VVL to high and low lift	This is an intrusive test that changes valve lift states and compares results. Sampled oil pressure oscillations are compared to thresholds to determine if the system changes states as commanded.	OCV2_Stuck Off_EWMA Value > 6.00 % (CamTqFailSIH_OCV2)	DTC's are NOT active: AnyCamPhaser_TFTKO OilSenDiagBndl_TFTKO VVL is enabled	1,200 < Engine speed < 1,800 RPM; 40.00 < Commanded Torque < 230.00 Nm; 0.00 < Engine oil pressure < 1,000.00 kPa; 30.00 < Engine oil temperature < 500.00 C; Engine speed must be steady state for 1.00 sec; Commd Torque must be steady state for 1.00 sec; Cam Position error < 3.00 deg;	EWMA based diagnostic. Completes once per trip (typically) Runs on the engine cycle loop.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
A Rocker Arm Actuator 2 System Stuck On Bank 1	P16D1	Detects a Stuck On Rocker Arm Actuator System by comparing phaser oil pressure signals when switching VVL to high and low lift	This is an intrusive test that changes states and compares results. Sampled oil pressure oscillations are compared to thresholds to determine if the system changes states as commanded.	OCV2_Stuck On_EWMA Value < -9.00 % (CamTqFailSIL_OCV2)	DTC's are NOT active: AnyCamPhaser_TFTKO OilSenDiagBndl_TFTKO VVL is enabled	1,200 < Engine speed < 1,800 RPM; 40.00 < Commanded Torque < 230.00 Nm; 0.00 < Engine oil pressure < 1,000.00 kPa; 30.00 < Engine oil temperature < 500.00 C; Engine speed must be steady state for 1.00 sec; Commd Torque must be steady state for 1.00 sec; Cam Position error < 3.00 deg;	EWMA based diagnostic. Completes once per trip (typically) Runs on the engine cycle loop.	Type A, 1 Trips

14 OBDG05 ECM Summary Tables (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
A Rocker Arm Actuator 2 Control Circuit Low Bank 1	P16D2	Diagnoses the VVL system driver circuit for short to ground faults.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		System supply voltage is within limits, Ignition switch is in crank or run position	> 11.00 Volts	100 failures out of 120 samples250 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.
A Rocker Arm Actuator 2 Control Circuit High Bank 1	P16D3	Diagnoses the VVL system driver circuit for short to power faults.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		System supply voltage is within limits, Output driver is commanded on, Ignition switch is in crank or run position	> 11.00 Volts	100 failures out of 120 samples250 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.
Engine Hood Switch Performance	P257D	This DTC monitors the hood switch rationality	Hood Switch Sensor Reading	Dependant on Hood Switch Type: Resistance Type: < 6,775.00 Ohms and > 6,775.00 Ohms or < 1,400.00 Ohms and > 1,400.00 Ohms or < 300.00 Ohms and > 300.00 Ohms Percentage Type: < 93.00 Percent and > 82.70 Percent or < 70.70 Percent and > 52.80 Percent or < 27.00 Percent and > 16.70 Percent for 3.00 failed samples within 10.00 total samples	Hood Switch Type is set to use resistance (ohms) or percent: The diagnostic is enabled Diagnostic is active for Run/Crank powermode only or always	CeHSWR_e_Resistance = 1 (1 indicates enabled) = 1 (1 indicates Run/Crank powermode only, 0 indicates always)	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.
Engine Hood Switch Short to Ground / Low Voltage	P257E	This DTC monitors the hood switch for a short to ground or low voltage condition	Hood Switch Sensor Reading	Dependant on Hood Switch Type: <= 300.00 Ohms or <= 16.70 Percent for 8.00 failed samples within 10.00 total samples	Hood Switch Type is set to use resistance (ohms) or percent: The diagnostic is enabled Diagnostic is active for Run/Crank powermode only or always	CeHSWR_e_Resistance = 1 (1 indicates enabled) = 1 (1 indicates Run/Crank powermode only, 0 indicates always)	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.
Engine Hood Switch Short to Voltage / High Voltage	P257F	This DTC monitors the hood switch for a short to voltage or high voltage condition	Hood Switch Sensor Reading	Dependant on Hood Switch Type: >= 6,775.00 Ohms or >= 93.00 Percent for 8.00 failed samples within 10.00 total samples	Hood Switch Type is set to use resistance (ohms) or percent: The diagnostic is enabled Diagnostic is active for Run/Crank powermode only or always	CeHSWR_e_Resistance = 1 (1 indicates enabled) = 1 (1 indicates Run/Crank powermode only, 0 indicates always)	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.
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 (tabulated function of desired fuel rail pressure and fuel flow rate -- 15% of requested Target Pressure) OR >= High Threshold (tabulated function of desired fuel rail pressure and fuel flow rate -- 15% of requested Target Pressure) **(See Supporting Calibration Tables "P2635 Threshold High", "P2635 Threshold Low", "P2635 Threshold High Repass", "P2635 Threshold Low Repass", "P2635 Max Fuel Flow"**)	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	DTC 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		

14 OBDG05 ECM Summary Tables (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
“A” Rocker Arm Actuator Control Circuit/Open Bank 1	P2645	Diagnoses the VVL system driver circuit for open faults.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		System supply voltage is within limits, Ignition switch is in crank or run position	> 11.00 Volts	100 failures out of 120 samples250 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.
A Rocker Arm Actuator System Performance or Stuck Off Bank 1	P2646	Detects a Stuck Off Rocker Arm Actuator System by comparing phaser oil pressure signals when switching VVL to high and low lift	This is an intrusive test that changes valve lift states and compares results. Sampled oil pressure oscillations are compared to thresholds to determine if the system changes states as commanded.	OCV1_Stuck Off_EWMA Value > 5.50 % (CamTqFailSIH_OCV1)	DTC's are NOT active: AnyCamPhaser_TFTKO OilSenDiagBndl_TFTKO VVL is enabled	1,200 < Engine speed < 1,800 RPM; 40.00 < Commanded Torque < 230.00 Nm; 0.00 < Engine oil pressure < 1,000.00 kPa; 30.00 < Engine oil temperature < 500.00 C; Engine speed must be steady state for 1.00 sec; Commd Torque must be steady state for 1.00 sec; Cam Position error < 3.00 deg;	EWMA based diagnostic. Completes once per trip (typically) Runs on the engine cycle loop.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
A Rocker Arm Actuator System Stuck On Bank 1	P2647	Detects a Stuck On Rocker Arm Actuator System by comparing phaser oil pressure signals when switching VVL to high and low lift	This is an intrusive test that changes states and compares results. Sampled oil pressure oscillations are compared to thresholds to determine if the system changes states as commanded.	OCV1_Stuck On_EWMA Value < -9.00 % (CamTqFailSIL_OCV1)	DTC's are NOT active: AnyCamPhaser_TFTKO OilSenDiagBndl_TFTKO VVL is enabled	1,200 < Engine speed < 1,800 RPM; 40.00 < Commanded Torque < 230.00 Nm; 0.00 < Engine oil pressure < 1,000.00 kPa; 30.00 < Engine oil temperature < 500.00 C; Engine speed must be steady state for 1.00 sec; Commd Torque must be steady state for 1.00 sec; Cam Position error < 3.00 deg;	EWMA based diagnostic. Completes once per trip (typically) Runs on the engine cycle loop.	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
A Rocker Arm Actuator Control Circuit Low Bank 1	P2648	Diagnoses the VVL system driver circuit for short to ground faults.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		System supply voltage is within limits, Ignition switch is in crank or run position	> 11.00 Volts	100 failures out of 120 samples250 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.
A Rocker Arm Actuator Control Circuit High Bank 1	P2649	Diagnoses the VVL system driver circuit for short to power faults.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		System supply voltage is within limits, Output driver is commanded on, Ignition switch is in crank or run position	> 11.00 Volts	100 failures out of 120 samples250 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.
Auxiliary Transmission Fluid Pump Performance	P2797	Detects when the auxiliary transmission fluid pump system is not capable of maintaining adaquate hydraulic pressure. The diagnostic will monitor transmission clutch slip during the autostart event as the primary malfunction criteria.	Transmission turbine speed is greater than predicted turbine speed during autostart event	P2797 Predicted ≥turbine speed error Refer to "Transmission Supporting Tables" for details	PRNDL state defaulted Transmission shift lever position Propulsion system active Ignition voltage Ignition voltage Transmission fluid temp Transmission fluid temp Hybrid state AutoStop duration min During autostop Engine speed was ********** If above conditions are met then the following must occur: Turbine speed Engine speed Hydraulic pressure delay time If above conditions are met then increment time-out timer. Time-out timer Note: The initial fail	= False = Forward range A (Drive6) = True ≥ 9.00 volts ≤ 31.99 volts ≥ 0.00 °C ≤ 110.00 °C = Engine off ≥ 1.20 seconds ≤ 5.00 rpm ≥ 13.00 rpm ≥ 450.00 rpm ≥ P2797 Hydraulic pressure delay Refer to "Transmission Supporting Tables" for details ≤ 0.38 seconds	≥ 10.00 counts (initial fail count) Frequency =12.5ms Once the above counts are achieved then increment the final fail counter once. The final fail counter can only increment once per autostart event ≥ 7.00 counts (final fail counter) If above counter is greater than threshold then report DTC failed. Frequency = 12.5ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					counter must achieve it's fail threshold in less than the time-out time. ********** If vehicle is launched then: Transmission Ratio Trans Ratio band (1st gr) Trans Ratio band (1st gr) Trans Ratio band (2-6) Trans Ratio band (2-6) Valid transmission ratio achieved time OR If vehicle is not launched but autostart occurs then: Turbine speed Turbine speed less then above threshold for Note: During an autostart event the lack of hydraulic pressure will result in momentary clutch slip in the C1234 clutch. After the clutch slip event, the main transmission pump and clutch will gain capacity, clutch slip will go	 P2797 Transmission =forward gear ratios Refer to "Transmission Supporting Tables" for details ≤ 1.12 pct ≥ 0.88 pct ≤ 1.07 pct ≥ 0.93 pct ≥ 0.50 seconds ≤ 5.00 rpm ≥ 0.50 seconds		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					to zero. If the vehicle is launching (moving) then a valid transmission ratio can be achieved. Or if the brake is continually applied and an autostart occurs naturally, then no ratio can be measured. In this case turbine speed will return to near zero rpm. ********** DTCs not set	 CrankSensor_FA Transmission Output Shaft Angular Velocity Validity Transmission Turbine Angular Velocity Validity Transmission Oil Temperature Validity P0B09 U0101 P182E P1915		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Dual Battery Control Module Performance	P305F	Determines that the Dual Battery Control Module is functioning properly by detecting whether the battery voltage, as directly measured by ECM, fell below a threshold for n consecutive auto-start events, where each auto-start event had the threshold exceeded for m number of samples.	ECM measured battery voltage is less than threshold for present auto-start event.	10.00 Volt	Diagnostic Enabled Hybrid Starter Status	TRUE = Engine Starting for 0.00 counts	5.00 failures out of 10.00 samples taken during auto-start event. 6.25 ms/sample	Type B, 2 Trips
			Exceeded consecutive number of auto-start events where Present Auto-Start Event malfunction criteria was met.	2.00 auto-start events	Diagnostic Enabled	TRUE	2.00 auto-start events out of 3.00	

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: 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 >= 11.00 or >= 6.41 = run = 0 (1 indicates enabled) = Active > 11.00 > 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 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: 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 >= 11.00 or >= 6.41 = run = 0 (1 indicates enabled) =Active > 11.00 > 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.
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	FPPM Received Serial Data Communication Status	== enumeration faulted	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) 7v < Sys Voltage > 32v	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.
Secondary AIR Incorrect Airflow	P0411	Detects an insufficient flow condition.This test is run during Phase 1 (AIR pump commanded On, Valve commanded Open). Leaks downstream of the valve are detected via an evaluation of average pressure error and average “String Length”(SL) – a term that represents the absolute pressure delta accumulated every 6.25ms, then averaged over the duration of the test. Low SL values are indicative of downstream leaks or blockages.	Average Pressure Error or OR the following String Length (SL) Test: Average Pressure Error or and the Average String Length NOTE: Average Pressure Error is the average difference between the predicted pressure and the measured pressure	> 4.0 kPa < -5.0 kPa > 4.0 kPa < -2.8 kPa < **SL Threshold Bank 1 Table**	BARO Inlet Air Temp Coolant Temp Engine off time System Voltage MAP not Engine Speed MAF not SL Stability time SL RPM range No active DTCs:	> 60 kPa > -11.0 deg C > -11.0 deg C < 56.0 > 1,800.0 seconds > 10.0 Volts < 32.0 < 20 kPa for 2.0 sec < 5,000 RPM > 50 gm/s for 3.0 sec > 4.0 seconds < 4,700 RPM > 4,900 AIRSystemPressureSensor FA AIRValveControlCircuit FA AIRPumpControlCircuit FA MAF_SensorFA AmbientAirDefault_NA IAT_SensorFA ECT_Sensor_FA EngineMisfireDetected_FA CatalystSysEfficiencyLoB1_FA CatalystSysEfficiencyLoB2_FA ControllerProcessorPerf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA IgnitionOutputDriver_FA FuelInjectorCircuit_FA	Phase 1 Conditional test weight > 7.0 seconds Total 'String Length' accumulation time > 10.0 sec Frequency: Once per trip when AIR pump is commanded On Conditional test weight is calculated by multiplying the following Factors: **Phase 1 Baro Test Weight Factor, Phase 1 MAF Test Weight Factor, Phase 1 System Volt Test Weight Factor, Phase 1 Ambient Temp Test Weight Factor** (see Supporting Tables)	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Powertrain Control Module (HPC) Requested MIL Illumination	P0AC4	Monitors the HPC MIL request line to determine when the HPC has detected a MIL illuminating fault.	HPC 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.
Hybrid Control Torque Request Circuit	P15F2	Determines if torque request from the HCP is valid	1. Serial Communication 2's complement not equal for message $181 for Strong Hybrid or Mild Hybrid Applications OR 2. Serial Communication rolling count value shall be + 1 from previous $181 message for Strong Hybrid or Mild Hybrid Applications	Message <> 2's complement of Engine Torque Signal and if Mild Hybrid: Message <> 2's complement of Motor Torque Signal OR Message rolling count value <> previous message rolling count value plus one	Secondary High Speed Bus is Present and No Serial communication loss to HCP (U1817) Run Crank Active Ingintion Voltage No Serial communication loss to HCP (U1817) Hybrid Type = Mild or Strong If Mild Hybrid Only: Torque source type = Crankshaft Torque	No loss of communication >= 0.50 Sec > 6.41 = Mild = Crankshaft Torque	1. >= 10 Protect errors out of 16 samples OR 2. >= 10 Rolling count errors out of 16 samples Pass diagnostic if samples >= 16 Performed every received message	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Driver Motor Torque Delivered Circuit	P15F4	Determines if torque archieved from BCP is valid	1. Serial Communication 2's complement not equal for message $0BF for Mild Hybrid Applications OR 2. Serial Communication rolling count value shall be + 1 from previous $0BF message for Mild Hybrid Applications	Message <> 2's complement of Motor Torque Signal OR Message rolling count value <> previous message rolling count value plus one	Secondary High Speed Bus is Present and No Serial communication loss to BCP (U1817) Run Crank Active Low Voltage not Present	No loss of Communication >= 0.50 > 6.41	1. >= 10 Protect errors out of 16 samples OR 2. >= 10 Rolling count errors out of 16 samples Executes in a 12.5ms loop	Type A, 1 Trip

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Hybrid Control Speed Request Circuit	P15F9	Determines if torque request from the HCP is valid	1. Serial Communication 2's complement not equal for message $281 OR 2. Serial Communication rolling count value shall be + 1 from previous $281 message	Message <> 2's complement of message Message rolling count value <> previous message rolling count value plus one	Secondary High Speed Bus is Present No Serial communication loss to HCP (U1817) Run Crank Active	>= 0.50 Sec	>= 10.00 Password Protect errors out of 16.00 samples OR >= 10.00 Rolling count errors out of 16.00 samples Pass diagnostic if samples >= 16.00 Performed every 12.5 msec	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Pedal Position Sensor Signal Message Counter Incorrect	P15FB	Detects rolling count or protection value errors in Chassis Brake Pedal Position Emissions Related serial data signal	If x of y rolling count / protection value faults occur, default brake pedal positiion to zero for duration of fault		Chassis Brake Pedal Position Emissions Related Serial Data Error Diagnostic Enable	1.00	10.00 / 16.00 counts	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Secondary AIR System Pressure Sensor Circuit Ban 2	P2 35	This DTC detects a stuc in range pressure sensor signal hen the AIR pump is commanded on.	Average Pressure Error A D Signal Variation	0.50 Pa 0.15 Pa	BARO Inlet Air Temp Coolant Temp Engine off time System Voltage AP not Engine Speed AF not o active DTCs:	> 60 Pa > 11.0 deg C > 11.0 deg C 56.0 > 1, 00.0 seconds > 10.0 Volts 32.0 20 Pa for 2.0 sec 5,000 RP > 50 gm/s for 3.0 sec AIRValveControlCircuit FA AIRPumpControlCircuit FA AIRSysPressSnsrB1C t oFA AIRSysPressSnsrB1C tHi FA ControllerProcessorPerf FA 5VoltReferenceA FA 5VoltReferenceB FA	Stuc in range cumulative time > 5.0 seconds Fre uency: Once per trip hen SAI pump is commanded On	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Secondary AIR System Pressure Sensor Performance Bank 2	P2436	This DTC detects a skewed pressure sensor signal via a comparison of the AIR pressure sensor signal and estimated BARO, as well as an evaluation of the quality of the comparison.	Difference between AIR pressure sensor and BARO (Pump Commanded Off) or OR Difference between AIR pressure sensor and BARO (Pump Commanded On)	> 18.0 kPa < -10.0 kPa > 50.0 kPa	BARO Inlet Air Temp Coolant Temp Engine off time System Voltage MAP not Engine Speed MAF not Transfer Case not in 4WD Low Run/crank active No active DTCs:	> 60 kPa > -11.0 deg C > -11.0 deg C < 56.0 > 1,800.0 seconds > 10.0 OR < 32.0 Volts < 20 kPa for 2.0 sec < 5,000 RPM > 50 gm/s for 3.0 sec AIRValveControlCircuit FA AIRPumpControlCircuit FA AIRSysPressSnsrB1CktLoFA AIRSysPressSnsrB1CktHiFA MAF_SensorFA EngineMisfireDetected_FA ControllerProcessorPerf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA	Skewed sensor cumulative test weight > 15.0 seconds Continuous 6.25ms loop Skewed sensor cumulatative test weight is based on distance from the last Baro update. See **Baro Skewed Sensor Weight Factor** table.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Secondary AIR System Pressure Sensor Circuit Low Voltage Bank 2	P2437	This DTC detects an out of range low AIR pressure sensor signal	AIR Pressure Sensor signal	< 6 % of 5Vref for 800 failures out of 1,000 samples	No active DTCs:	ControllerProcessorPerf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA	1,000 samples (6.25 ms per sample) Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Secondary AIR System Pressure Sensor Circuit Hi Voltage Bank 2	P2438	This DTC detects an out of range high AIR pressure sensor signal	AIR Pressure Sensor signal	> 94 % of 5Vref for 800 failures out of 1,000 samples	No active DTCs:	ControllerProcessorPerf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA	1,000 samples (6.25 ms per sample) Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Secondary AIR System Shut-off Valve Stuck Open	P2440	This DTC detects if the AIR system control valve is stuck openThis test is run during Phase 2 (Pump commanded On, valve commanded closed)	Average Pressure Error or	< **Bank 1 Valve Pressure Error** table > 32 kPa	BARO Inlet Air Temp Coolant Temp Engine off time System Voltage MAP not Engine Speed MAF not Stability Time AIR diagnostic Phase 1 passed No active DTCs:	> 60 kPa > -11.0 deg C > -11.0 deg C < 56.0 > 1,800.0 seconds > 10.0 Volts < 32.0 < 20 kPa for 2.0 sec < 5,000 RPM > 50 gm/s for 3.0 sec > 0.5 seconds AIRSystemPressureSensor FA AIRValveControlCircuit FA AIRPumpControlCircuit FA MAF_SensorFAAmbientAirDefault_NA IAT_SensorFAECT_Sensor_FA EngineMisfireDetected_FA CatalystSysEfficiencyLoB1_FA CatalystSysEfficiencyLoB2_FA ControllerProcessorPerf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA IgnitionOutputDriver_FA FuelInjectorCircuit_FA	Phase 2 Conditional test weight > 1.5 sec Frequency: Once per trip when AIR pump commanded On Conditional test weight is calculated by multiplying the following Factors: **Phase 2 Baro Test Weight Factor, Phase 2 MAF Test Weight Factor, Phase 2 System Volt Test Weight Factor, Phase 2 Ambient Temp Test Weight Factor** (see Supporting Tables)	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Secondary AIR System Pump Stuck On	P2444	This DTC detects if the SAI pump is stuck On. This test is run during Phase 3 (Pump commanded Off, valve commanded closed)	Average Pressure Error or or	> **Bank 1 Pump Pressure Error** table > **Bank 2 Pump Pressure Error** table < -32 kPa for either bank	BARO Inlet Air Temp Coolant Temp Engine off time System Voltage MAP not Engine Speed MAF not Stability Time AIR diagnostic Phase 1 passed AIR diagnostic Phase 2 passed No active DTCs:	> 60 kPa > -11.0 deg C > -11.0 deg C < 56.0 > 1,800.0 seconds > 10.0 Volts < 32.0 < 20 kPa for > 2.0 sec < 5,000 RPM > 50 gm/s for > 3.0 sec > 4.0 seconds Phase 3 cumulatative test weight is based on the distance from the last Baro update. See **Baro Skewed Sensor Weight Factor** table. AIRSystemPressureSensorFA AIRValveControlCircuit FA AIRPumpControlCircuit FA MAF_SensorFA AmbientAirDefault_NA IAT_SensorFA ECT_Sensor_FA EngineMisfireDetected_FA CatalystSysEfficiencyLoB1_FA CatalystSysEfficiencyLoB2_FA ControllerProcessorPerf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA IgnitionOutputDriver_FA FuelInjectorCircuit_FA	Phase 3 Cumlatative test weight > 2.0 sec. Frequency: Once per trip when AIR pump is commanded On	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Hybrid Powertrain Control Module	U0293	This DTC monitors for a loss of communication with the Hybrid Powertrain Control Module.	Message is not received from controller for Message $0B4 Message $0D3 Message $164 Message $186 Message $1DF Message $3C1	 ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 0.5 seconds ≥ 10.0 seconds ≥ 10.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_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 >= 11.00 or >= 6.41 = run = 0 (1 indicates enabled) = Active > 11.00	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Network Management is not active for U0293 Hybrid Powertrain 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 Hybrid Powertrain Control Module on Bus B	U1817	This DTC monitors for a loss of communication with the Hybrid Powertrain Control Module on Bus B	Message is not received from controller for Message $0A7 Message $0A9 Message $181 Message $1D3 Message $1D7 Message $1E3 Message $281 Message $291	 ≥ 10.0 seconds ≥ 10.0 seconds ≥ 0.5 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 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: 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 >	 Not Active on Current Key Cycle Enabled Not Active Not Active >= 11.00 or >= 6.41 = run = 0 (1 indicates enabled) = Active and > 11.00	Diagnostic runs in 12.5 ms loop	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					3.0000 seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for U1817 Hybrid Powertrain 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.
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	> 11.0 Volts	50 failures out of 63 samples 100 ms loop Continuous	Type B, 2 Trips

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	> 11.0 Volts	50 failures out of 63 samples 100 ms loop Continuous	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 contained below applies to applications that use the Idle Catalyst Monitor Algorithm 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 Lean and Rich 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 table (based on temp and exhaust gas flow)	Normalized Ratio OSC Value (EWMA filtered)	< 0.35	There must be a valid idle period. The criteria are: Driver must be off the accel pedal. This checks that the final accel pedal position (comprehending deadband and hysteresis) is essentially zero. Idle Speed Control System Is Active Vehicle Speed Engine speed Engine run time Tests attempted this trip The catalyst diagnostic has not yet completed for the current trip. Catalyst Idle Conditions Met Criteria is satified which includes the General Enable met and the Valid Idle Period	 < 1.24 MPH > 1,100 RPM for a minimum of 25 seconds since end of last idle period. > **CatmonMinEngineRunTimeToEnable** This is a function of Coolant Temperature, please see "Supporting Tables" for details. < 255	1 test attempted per valid idle period Minimum of 1 test per trip Maximum of 8 tests per trip Frequency: Fueling Related : 12.5 ms OSC Measurements: 100 ms Temp Prediction: 12.5ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		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.The Catalyst Monitoring Test is done during idle. Several conditions must be meet in order to execute this test. These conditions and their related values are listed in the secondary parameters area of this document. Refer to the **P0420_WorstPassing OSCTableB1** and **P0420_BestFailingOS CTableB1** table in the **Supporting Tables** tab for details			Criteria met, as well as: Green Converter Delay Induction Air Intrusive test(s): Fueltrim Post O2 EVAP EGROther vehicle functions: Power Take Off RunCrank Voltage Ethanol Estimation ECT Barometric Pressure Idle Time before going intrusive is Idle time is incremented if Vehicle speed Short Term Fuel Trim	 Not Active > -20 ° C < 250 ° C Not Active Not Active > 10.90 Volts NOT in Progress > 50 ° C < 130 ° C > 70 KPA < 50 Seconds < 1.24 MPH and the drivers foot is off accel pedal and the idle speed control system is active as identified in the Valid Idle Period Criteria section. > 0.90 < 1.30		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Predicted catalyst temp AND Engine Airflow for at least with a closed throttle time Also, in order to increment the WarmedUpEvents counter, either the vehicle speed must exceed the vehicle speed cal or the driver must NOT be off the accel pedal as stated in the Valid Idle Period Criteria section above.	> 600.00 degC > **CatmonMinAirflowForWarmCatalystDetermination** table (g/s) (refer to "Supporting Tables" tab) (Based on engine coolant at the time the WarmedUpEvents counter resets to 0.) 28 seconds < 120 seconds consecutively (closed throttle consideration involves having the driver off the accel pedal as stated in the Valid Idle Period Criteria Section) .		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Closed loop fueling (Please see "Closed Loop Enable Criteria" section of the "Supporting Tables" tab for details.)			
					PRNDL	Enabled in Drive Range on an Auto Transmission vehicle.		
					Idle Stable Criteria:	Must hold true from after Catalyst Idle Conditions Met to the end of test		
					MAF	> 2.50 g/s < 11.00 g/s		
					Predicted catalyst temperature	< 900 degC		
					Engine Fueling Criteria at Beginning of Idle Period The following fueling related must also be met from between 4 and 7 seconds after the Catalyst Idle Conditions Met Criteria has been met for at least 4 seconds prior to allowing intrusive control:			
					Number of pre-O2 switches	>= 2		
					Short Term Fuel Trim Avg	> 0.96 < 1.04		
					Rapid Step Response			

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					(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 RSR tests to detect failure when RSR is enabled. Green Converter Delay Criteria This is part of the check for the Catalyst Idle Conditions Met Criteria section The diagnostic will not be enabled until the following has been met: Predicted catalyst temperature for Note: this feature is only enabled when the vehicle is new and cannot be enabled in service PTO General Enable DTC's Not Set	 > 0.46 < 0.10 24 > 0 ° C 0 seconds non-continuously. Not Active MAF_SensorFA MAF_SensorTFTKO AmbPresDfltdStatus		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						IAT_SensorCircuitFA IAT_SensorCircuitTFTKO ECT_Sensor_FA O2S_Bank_1_Sensor_1_FA O2S_Bank_1_Sensor_2_FA O2S_Bank_2_Sensor_1_FA O2S_Bank_2_Sensor_2_FA FuelTrimSystemB1_FA FuelTrimSystemB1_TFTKO FuelTrimSystemB2_FA FuelTrimSystemB2_TFTKO EngineMisfireDetected_FA EvapPurgeSolenoidCircuit_FA IAC_SystemRPM_FA EGRValvePerformance_FA EGRValveCircuit_FA CamSensorAnyLocationFA CrankSensorFA TPS_Performance_FA EnginePowerLimited		

14 OBDG05 ECM Summary Tables (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	> 11.0 Volts	50 failures out of 63 samples 100 ms loop Continuous	Type B, 2 Trips

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		Diagnostic Enabled EnabledPowertrain relay Voltage Ignition run crank voltage Engine is not cranking	1 >= 11.00 Volts >= 5.00 Volts	20 failures out of 100 samples 1 sample every 100ms	Type B, 2 Trips

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		Diagnostic Enabled EnabledPowertrain relay Voltage Ignition run crank voltage Engine is not cranking	1 >= 11.00 Volts >= 5.00 Volts	20 failures out of 100 samples 1 sample every 100ms	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbo/Super Charger Bypass al e Control Circuit igh	P00 5	Detect Turbocharger Bypass al e - Shorted to Power	EC detects that commanded and actual states of output dri er do not match because the output is shorted to power		Diagnostic Enabled EnabledPowertrain relay oltage gnition run crank oltage Engine is not cranking	1 olts 11.00 5.00 olts	20 failures out of 100 samples 1 sample e ery 100ms	Type B, 2 Trips

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 (single turbo)	P00C7	Detects an inconsistency between pressure sensors in the induction system in which a particular sensor cannot be identified as the failed sensor	ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure) AND ABS(Turbocharger Boost Pressure - Baro Pressure) OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure) AND ABS(Turbocharger Boost Pressure - Baro Pressure) OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure) AND ABS(Turbocharger Boost Pressure - Baro Pressure) OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold	> 10.0 kPa <= 10.0 kPa <= 10.0 kPa <= 10.0 kPa > 10.0 kPa <= 10.0 kPa <= 10.0 kPa <= 10.0 kPa > 10.0 kPa > 10.0 kPa	Time between current ignition cycle and the last time the engine was running Engine is not rotating Manifold Pressure Manifold Pressure Baro Pressure Baro Pressure Turbocharger Boost Pressure Turbocharger Boost Pressure No Active DTCs: No Pending DTCs:	> 10.0 seconds >= 50.0 kPa <= 115.0 kPa >= 50.0 kPa <= 115.0 kPa >= 50.0 kPa <= 115.0 kPa EngineModeNotRunTimer Error MAP_SensorFA AAP_SnsrFA AAP2_SnsrFA MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP	4 failures out of 5 samples 1 sample every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Pressure) AND ABS(Turbocharger Boost Pressure - Baro Pressure)	> 10.0 kPa > 10.0 kPa				

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)	<= 30 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 >= 11.00 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 >= 11.00 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 >= 11.00 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		

14 OBDG05 ECM Summary Tables (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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Inta e 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 e ery 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 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 DegC 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.
Mass Air Flow System Performance (single turbo)	P0101	Determines if the MAF sensor is stuck within the normal operating range	See table "**Turbocharger Intake Flow Rationality Diagnostic Failure Matrix**" for combinations of model failures that can set this DTC. MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered MAP1 model fails when ABS(Measured MAP – MAP Model 1) Filtered MAP2 model fails when ABS(Measured MAP – MAP Model 2) Filtered MAP3 model fails when ABS(Measured MAP – MAP Model 3) Filtered TIAP1 model fails when ABS(Measured TIAP – TIAP Model 1) Filtered TPS model fails when Filtered Throttle Model Error TIAP Correlation model fails when High Engine Air Flow is TRUE AND Measured TIAP - measured MAP - offset as a function of engine speed	 > 20.0 grams/sec > 24.0 kPa > 30.0 kPa > 30.0 kPa > 30.0 kPa > 300 kPa*(g/s) > 24.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 400 RPM <= 6,000 RPM > -7 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.50 Modeled Air Flow Error multiplied by **MAF Residual Weight Factor based on RPM** and **MAF Residual Weight Factor based on MAF Est** MAP Model 1 Error multiplied by **MAP1 Residual Weight Factor based on RPM** MAP Model 2 Error multiplied by **MAP2 Residual Weight Factor based on RPM** MAP Model 3 Error multiplied by **MAP3 Residual Weight Factor based on RPM** TIAP Model 1 Error multiplied by **TIAP Residual Weight Factor based on RPM** Filtered Throttle Model Error multiplied by **TPS Residual Weight Factor based on RPM**	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.
			See table "**TIAP-MAP Correlation Offset**" OR Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table "**TIAP-Baro Correlation Offset**" TIAP Correlation is valid when High Engine Air Flow has been TRUE for a period of time OR Low Engine Air Flow has been TRUE for a period of time High Engine Air Flow is TRUE when Mass Air Flow AND Manifold Pressure AND	 > 24.0 kPa > 1.0 seconds > 1.0 seconds > a threshold in gm/sec as a function of engine speed See table "**TIAP-MAP Correlation Min Air Flow**" > a threshold in kPa as a function of engine speed See table "**TIAP-MAP Correlation Min MAP**"	 No Active DTCs: No Pending DTCs:	See Residual Weight Factor tables. MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTempSensorFA TC_BoostPresSnsrCktFA AmbientAirDefault EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP MnfdTempSensorCktFP		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Filtered Mass Air Flow - Mass Air Flow	< 3.0 gm/sec				
			Low Engine Air Flow is TRUE when Mass Air Flow	< a threshold in gm/sec as a function of engine speed See table "**TIAP-Baro Correlation Max Air Flow**"				
			AND Manifold Pressure	< a threshold in kPa as a function of engine speed See table "**TIAP-Baro Correlation Max MAP**"				
			AND Mass Air Flow - Filtered Mass Air Flow	< 2.0 gm/sec				

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Manifold Absolute Pressure Sensor Performance (single turbo)	P0106	Determines if the MAP sensor is stuck within the normal operating range	See table "**Turbocharger Intake Flow Rationality Diagnostic Failure Matrix**" for combinations of model failures that can set this DTC. MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered MAP1 model fails when ABS(Measured MAP – MAP Model 1) Filtered MAP2 model fails when ABS(Measured MAP – MAP Model 2) Filtered MAP3 model fails when ABS(Measured MAP – MAP Model 3) Filtered TIAP1 model fails when ABS(Measured TIAP – TIAP Model 1) Filtered TPS model fails when Filtered Throttle Model Error TIAP Correlation model fails when High Engine Air Flow is TRUE AND Measured TIAP - measured MAP - offset as a function of engine speed See table "**TIAP-MAP**	 > 20.0 grams/sec > 24.0 kPa > 30.0 kPa > 30.0 kPa > 30.0 kPa > 300 kPa*(g/s) > 24.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 400 RPM <= 6,000 RPM > -7 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.50 Modeled Air Flow Error multiplied by **MAF Residual Weight Factor based on RPM** and **MAF Residual Weight Factor based on MAF Est** MAP Model 1 Error multiplied by **MAP1 Residual Weight Factor based on RPM** MAP Model 2 Error multiplied by **MAP2 Residual Weight Factor based on RPM** MAP Model 3 Error multiplied by **MAP3 Residual Weight Factor based on RPM** TIAP Model 1 Error **multiplied** by **TIAP Residual Weight Factor based on RPM** Filtered Throttle Model Error multiplied by **TPS Residual Weight Factor based on RPM**	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.
			Correlation Offset" OR Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table "**TIAP-Baro Correlation Offset**" TIAP Correlation is valid when High Engine Air Flow has been TRUE for a period of time OR Low Engine Air Flow has been TRUE for a period of time High Engine Air Flow is TRUE when Mass Air Flow AND Manifold Pressure AND Filtered Mass Air Flow - Mass Air Flow	 > 24.0 kPa > 1.0 seconds > 1.0 seconds > a threshold in gm/sec as a function of engine speed See table "**TIAP-MAP Correlation Min Air Flow**" > a threshold in kPa as a function of engine speed See table "**TIAP-MAP Correlation Min MAP**" < 3.0 gm/sec	 No Active DTCs: No Pending DTCs:	See Residual Weight Factor tables. MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTempSensorFA TC_BoostPresSnsrCktFA AmbientAirDefault EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP MnfdTempSensorCktFP		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Low Engine Air Flow is TRUE when Mass Air Flow AND Manifold Pressure AND Mass Air Flow - Filtered Mass Air Flow	< a threshold in gm/sec as a function of engine speed See table "**TIAP-Baro Correlation Max Air Flow**" < a threshold in kPa as a function of engine speed See table "**TIAP-Baro Correlation Max MAP**" < 2.0 gm/sec				
			Manifold Pressure OR Manifold Pressure OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure) AND ABS(Turbocharger Boost Pressure - Baro Pressure)	< 50.0 kPa > 115.0 kPa > 10.0 kPa > 10.0 kPa <= 10.0 kPa	Time between current ignition cycle and the last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	> 10.0 seconds EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA AAP2_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP	4 failures out of 5 samples 1 sample every 12.5 msec	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit Performance (applications with humidity sensor and manifold temperature sensor)	P0111	Detects an IAT sensor that has stuck in range by comparing to IAT2 and IAT3 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)	> 30 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 >= 11.00 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 IAT2 is between Power Up IAT and Power Up IAT3 AND ABS(Power Up IAT - Power Up IAT3) AND ABS(Power Up IAT2 - Power Up IAT) > ABS(Power Up IAT2 - Power Up IAT3)	 > 25 deg C	Time between current ignition cycle and the last time the engine was running Powertrain Relay Voltage for a time No Active DTCs:	> 28,800 seconds >= 11.00 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 IAT3 is between Power Up IAT and Power Up IAT2 AND ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up IAT3 -	 > 30 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 >= 11.00 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 IAT) > ABS(Power Up IAT3 - Power Up IAT2)			HumTempSnsrCktFA		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Throttle Position Sensor Performance (single turbo)	P0121	Determines if the Throttle Position Sensor input is stuck within the normal operating range	See table "**Turbocharger Intake Flow Rationality Diagnostic Failure Matrix**" for combinations of model failures that can set this DTC. MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered MAP1 model fails when ABS(Measured MAP – MAP Model 1) Filtered MAP2 model fails when ABS(Measured MAP – MAP Model 2) Filtered MAP3 model fails when ABS(Measured MAP – MAP Model 3) Filtered TIAP1 model fails when ABS(Measured TIAP – TIAP Model 1) Filtered TPS model fails when Filtered Throttle Model Error TIAP Correlation model fails when High Engine Air Flow is TRUE AND Measured TIAP - measured MAP - offset as a function of engine speed See table "**TIAP-MAP**	 > 20.0 grams/sec > 24.0 kPa > 30.0 kPa > 30.0 kPa > 30.0 kPa > 300 kPa*(g/s) > 24.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 400 RPM <= 6,000 RPM > -7 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.50 Modeled Air Flow Error multiplied by **MAF Residual Weight Factor based on RPM** and **MAF Residual Weight Factor based on MAF Est** MAP Model 1 Error multiplied by **MAP1 Residual Weight Factor based on RPM** MAP Model 2 Error multiplied by **MAP2 Residual Weight Factor based on RPM** MAP Model 3 Error multiplied by **MAP3 Residual Weight Factor based on RPM** TIAP Model 1 Error multiplied by **TIAP Residual Weight Factor based on RPM** Filtered Throttle Model Error multiplied by **TPS Residual Weight Factor based on RPM**	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.
			Correlation Offset"					
			OR			See Residual Weight Factor tables.		
			Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table "**TIAP-Baro Correlation Offset**"	> 24.0 kPa	No Active DTCs:	MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTempSensorFA TC_BoostPresSnsrCktFA AmbientAirDefault		
			TIAP Correlation is valid when High Engine Air Flow has been TRUE for a period of time	> 1.0 seconds	No Pending DTCs:	EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP MnfdTempSensorCktFP		
			OR Low Engine Air Flow has been TRUE for a period of time	> 1.0 seconds				
			High Engine Air Flow is TRUE when Mass Air Flow	> a threshold in gm sec as a function of engine speed See table "**TIAP-MAP Correlation Min Air Flow**"				
			AND Manifold Pressure	> a threshold in kPa as a function of engine speed See table "**TIAP-MAP Correlation Min MAP**"				
			AND Filtered Mass Air Flow - Mass Air Flow	< 3.0 gm/sec				

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Low Engine Air Flow is TRUE when Mass Air Flow AND Manifold Pressure AND Mass Air Flow - Filtered Mass Air Flow	< a threshold in gm sec as a function of engine speed See table "**TIAP-Baro Correlation Max Air Flow**" < a threshold in kPa as a function of engine speed See table "**TIAP-Baro Correlation Max MAP**" < 2.0 gm/sec				

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbo/Super Charger Engine Overboost Turbocharger with wastegate. Not supercharger with mechanical compressor	P0234	Detect Negative Boost Pressure Control Deviation	Desired Boost Pressure - Actual Boost Pressure	< (KtBSTD_p_CntrlDevNegLim - KtBSTD_p_CntrlDevAmbAirCorr) See Tables in Supporting Tables Sheet	Diagnostic Enabled Engine Speed Engine Speed Desired Boost Pressure Desired Boost Pressure Desired Boost Pressure Derivative Desired Boost Pressure Derivative Ambient Pressure Ambient Pressure Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Wait for steady state: No Active DTCs:	1 > 1,600 rpm < 6,000 rpm > 140.0 kPa < 300.0 kPa > -75.0 kPa/s < 75.0 kPa/s > 60.0 kPa < 120.0 kPa > -40.0 Deg C < 120.0 Deg C > -40.0 Deg C < 80.0 Deg C > KtBSTD_t_CntrlDevEnblDelay See Table in Supporting Tables Sheet Desired Boost Pressure > BasicPressure AmbientAirDefault_Snsr BSTR_b_PCA_CktFA BSTR_b_TurboBypassCktFA ECT_Sensor_FAIAT_Sen	14 failures out of 15 samples 1 sample every 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No Active DVCs:	sorFA BSTR_b_ExcsvBstTFTKO BSTR_b_PCA_CktTFTKO TC_BoostPresSnsrFA AnyCamPhaser_FA BSTR_b_PresCntrlTooLoTFTKO BSTR_b_PresCntrlTooHiTFTKO EnginePowerLimited BSTR_b_DVC_PCA_DC_Actv BSTR_b_DVC_PCA_PstnActv BSTR_b_DVC_TurboComprBypActv		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger Boost Pressure (TIAP) Sensor Performance (single turbo)	P0236	Determines if the Turbocharger Boost (TIAP) Pressure Sensor input is stuck within the normal operating range	See table "**Turbocharger Intake Flow Rationality Diagnostic Failure Matrix**" for combinations of model failures that can set this DTC. MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered MAP1 model fails when ABS(Measured MAP – MAP Model 1) Filtered MAP2 model fails when ABS(Measured MAP – MAP Model 2) Filtered MAP3 model fails when ABS(Measured MAP – MAP Model 3) Filtered TIAP1 model fails when ABS(Measured TIAP - TIAP Model 1) Filtered TPS model fails when Filtered Throttle Model Error TIAP Correlation model fails when High Engine Air Flow is TRUE AND Measured TIAP - measured MAP - offset as a function of engine speed See table "**TIAP-MAP Correlation Offset**"	 > 20.0 grams/sec > 24.0 kPa > 30.0 kPa > 30.0 kPa > 30.0 kPa > 300 kPa*(g/s) > 24.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 400 RPM <= 6,000 RPM > -7 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.50 Modeled Air Flow Error multiplied by **MAF Residual Weight Factor based on RPM** and **MAF Residual Weight Factor based on MAF Est** MAP Model 1 Error multiplied by **MAP1 Residual Weight Factor based on RPM** MAP Model 2 Error multiplied by **MAP2 Residual Weight Factor based on RPM** MAP Model 3 Error multiplied by **MAP3 Residual Weight Factor based on RPM** TIAP Model 1 Error multiplied by **TIAP Residual Weight Factor based on RPM** Filtered Throttle Model Error multiplied by **TPS Residual Weight Factor based on RPM**	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.
			OR Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table "**TIAP-Baro Correlation Offset**" TIAP Correlation is valid when High Engine Air Flow has been TRUE for a period of time OR Low Engine Air Flow has been TRUE for a period of time High Engine Air Flow is TRUE when Mass Air Flow AND Manifold Pressure AND Filtered Mass Air Flow - Mass Air Flow	 > 24.0 kPa > 1.0 seconds > 1.0 seconds > a threshold in gm/sec as a function of engine speed See table "**TIAP-MAP Correlation Min Air Flow**" > a threshold in kPa as a function of engine speed See table "**TIAP-MAP Correlation Min MAP**" < 3.0 gm/sec	 No Active DTCs: No Pending DTCs:	See Residual Weight Factor tables. MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTempSensorFA TC_BoostPresSnsrCktFA AmbientAirDefault EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP MnfdTempSensorCktFP		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Low Engine Air Flow is TRUE when Mass Air Flow AND Manifold Pressure AND Mass Air Flow - Filtered Mass Air Flow	< a threshold in gm/ sec as a function of engine speed See table "**TIAP-Baro Correlation Max Air Flow**" < a threshold in kPa as a function of engine speed See table "**TIAP-Baro Correlation Max MAP**" < 2.0 gm/sec				
			Turbocharger Boost Pressure OR Turbocharger Bosst Pressure OR ABS(Manifold Pressure - Baro Pressure) AND ABS(Turbocharger Boost Pressure - Manifold Pressure) AND ABS(Turbocharger Boost Pressure - Baro Pressure)	< 50.0 kPa > 115.0 kPa <= 10.0 kPa > 10.0 kPa > 10.0 kPa	Time between current ignition cycle and the last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	> 10.0 seconds EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA AAP2_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP	4 failures out of 5 samples 1 sample every 12.5 msec	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger Boost Pressure Sensor Circuit Low	P0237	Detects a continuous short to low or open in either the signal circuit or the turbocharger boost pressure sensor.	Turbocharger Boost Pressure Voltage	< 19.4 % of 5 Volt Range (This is equal to 0.97 Volts, or 49.9 kPa)	Engine Run Time	> 0.00 seconds	320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger Boost Pressure Sensor Circuit High	P0238	Detects an open sensor ground or continuous short to high in either the signal circuit or the turbocharger boost pressure sensor.	Turbocharger Boost Pressure Voltage	> 78.0 % of 5 Volt Range (This is equal to 3.90 Volts, or 299.0 kPa)	Engine Run Time	> 0.00 seconds	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.
Turbocharger Wastegate / Supercharger Boost Solenoid A Control Circuit	P0243	Detect Turbocharger Boost Solenoid -Open Circuit	ECM detects that commanded and actual states of output driver do not match because the output is open circuit		Diagnostic Enabled Powertrain relay voltage Ignition run crank voltage Engine is not cranking	1 >= 11.00 Volts >= 5.00 Volts	10 failures out of 20 samples 1 sample every 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbocharger Wastegate / Supercharger Boost Solenoid A Control Circuit Low	P0245	Detect Turbocharger Boost Solenoid - Shorted to ground	ECM detects that commanded and actual states of output driver do not match because the output is shorted to ground		Diagnostic Enabled Powertrain relay voltage Ignition run crank voltage Engine is not cranking	1 >= 11.00 Volts >= 5.00 Volts	10 failures out of 20 samples 1 sample every 100ms	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Tur ocharge r Wastegate Supercharge r Boost Solenoid A Control Circuit igh	P024	Detect Tur ocharger Boost Solenoid - Shorted to Power	EC detects that commanded and actual states of output driver do not match ecause the output is shorted to power		Diagnostic Ena led Powertrain relay voltage Ignition run crank voltage Engine is not cranking	1 >= 11.00 olts >= 5.00 olts	10 failures out of 20 samples 1 sample every 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Turbo/Super Charger Engine Underboost Turbocharger with wastegate. Not supercharger with mechanical compressor	P0299	Detect Positive Boost Pressure Control Deviation	Desired Boost Pressure - Actual Boost Pressure	> (KtBSTD_p_CntrlDevPosLim + KtBSTD_p_CntrlDevAmbAirCorr) See Tables in Supporting Tables Sheet	Diagnostic Enabled Engine Speed Engine Speed Desired Boost Pressure Desired Boost Pressure Desired Boost Pressure Derivative Desired Boost Pressure Derivative Ambient Pressure Ambient Pressure Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Wait for steady state: No Active DTCs:	1 > 1,600 rpm < 6,000 rpm > 140.0 kPa < 300.0 kPa > -75.0 kPa/s < 75.0 kPa/s > 60.0 kPa < 120.0 kPa > -40.0 Deg C < 120.0 Deg C > -40.0 Deg C < 80.0 Deg C > KtBSTD_t_CntrlDevEnblDelay See Table in Supporting Tables Sheet Desired Boost Pressure > Basic Pressure AmbientAirDefault_Snsr BSTR_b_PCA_CktFA BSTR_b_TurboBypassCktFA ECT_Sensor_FA	14 failures out of 15 samples 1 sample every 100ms	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No Active DVCs:	IAT_SensorFA BSTR_b_ExcsvBstTFTKO BSTR_b_PCA_CktTFTKO TC_BoostPresSnsrFA AnyCamPhaser_FA BSTR_b_PresCntrlTooLoTFTKO BSTR_b_PresCntrlTooHiTFTKO EnginePowerLimited BSTR_b_DVC_PCA_DC_Actv BSTR_b_DVC_PCA_PstnActv BSTR_b_DVC_TurboComprBypActv		

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	90.0 ≤ N-M ≤ 8,191.8 ≥ 8.0 % 1,500 ≤ RPM ≤ 6,500 11.0 ≤ 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 B, 2 Trips

14 OBDG05 ECM Summary Tables (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 11.0 ≤ Volts ≤ 32.00 200 ≤ RPM ≤ 7,500 for ≥ 5.0 seconds ≤ 511.99 MPH for ≥ 5.0 sec not active	≥ 3.3 sec	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Cancel witch Circuit	P0 C		Cruise Control Cancel switch remains applied for greater than a calibratable period of time for architecture where cruise switch states are recei ed o er serial data		CAN cruise switch diagnostic enable in ECM	.00	fail continuously for greater than 0.00 seconds	MIL Type C, No MIL

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
ColdStrtA_CamPstnB1	P05CC	Detects a VVT system error during Cold Starts 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 > 6.00 deg.	DTC's are NOT active: P0010, IntakeCamSensorTFTKO CrankSensorTFTKO CrankIntakeCamCorrelationFA.	System Voltage > 11.00 Volts, Engine is running VVT is enabled CSER is active Desired cam position > 0 Power Take Off (PTO) not active Both Desired & Measured cam positions cannot be < 6.00 or have both > 26.00 deg. (PerfMaxIc1). Desired cam position cannot vary more than 3.00 Cam Deg for at least 3.00 sec. (StablePositionTimeIc1)	65 failures out of 75 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.
ColdStrtB_CamPstnB1	P05CE	Detects a VVT system error during Cold Starts by comparing the desired and actual cam positions when VVT is activated	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive	(Exhaust cam Bank 1) Cam Position Error > 6.00 deg.	DTC's are NOT active: P0010, ExhaustCamSensorTFTKO CrankSensorTFTKO CrankExhaustCamCorrelationFA.	System Voltage > 11.00 Volts, Engine is running VVT is enabled CSER is active Desired cam position > 0 Power Take Off (PTO) not active Both Desired & Measured cam positions cannot be < 6.00 or have both > 26.00 deg. (PerfMaxEc1). Desired cam position cannot vary more than 3.00 Cam Deg for at least 3.00 sec. (StablePositionTimeEc1)	65 failures out of 75 samples 100 ms /sample	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (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 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 > 6.2 MPH > **EngTorqueThreshold** (see Supporting Tables) < **ResidualErrEnableLow** (see Supporting Tables) > **ResidualErrEnableHigh** (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

14 OBDG05 ECM Summary Tables (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 No active DTCs:	> 11.0 Volts	25 ms loop Continuous	Type A, 1 Trips

14 OBDG05 ECM Summary Tables (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 No active DTCs:	> 11.0 Volts	25 ms loop Continuous	Type A, 1 Trips

14 OBDG05 ECM Summary Tables (Unique DTCs)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Clutch Pedal Position ot Learned	P080A	Detects n alid Clutch Pedal ully Applied Learn Position alues	ully Applied Learn Position R	14. 42.8	BD anufacturer s Enable Counter	0	250 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.
Inlet Airflow System Performance (single turbo)	P1101	Determines if there are multiple air induction problems affecting airflow and/or manifold pressure.	See table "**Turbocharger Intake Flow Rationality Diagnostic Failure Matrix**" for combinations of model failures that can set this DTC. MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered MAP1 model fails when ABS(Measured MAP – MAP Model 1) Filtered MAP2 model fails when ABS(Measured MAP – MAP Model 2) Filtered MAP3 model fails when ABS(Measured MAP – MAP Model 3) Filtered TIAP1 model fails when ABS(Measured TIAP – TIAP Model 1) Filtered TPS model fails when Filtered Throttle Model Error TIAP Correlation model fails when High Engine Air Flow is TRUE AND Measured TIAP - measured MAP - offset as a function of engine speed See table "**TIAP-MAP**	 > 20.0 grams/sec > 24.0 kPa > 30.0 kPa > 30.0 kPa > 30.0 kPa > 300 kPa*(g/s) > 24.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 400 RPM <= 6,000 RPM > -7 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.50 Modeled Air Flow Error multiplied by **MAF Residual Weight Factor based on RPM** and **MAF Residual Weight Factor based on MAF Est** MAP Model 1 Error multiplied by **MAP1 Residual Weight Factor based on RPM** MAP Model 2 Error multiplied by **MAP2 Residual Weight Factor based on RPM** MAP Model 3 Error multiplied by **MAP3 Residual Weight Factor based on RPM** TIAP Model 1 Error multiplied by **TIAP Residual Weight Factor based on RPM** Filtered Throttle Model Error multiplied by **TPS Residual Weight Factor based on RPM**	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.
			Correlation Offset"					
			OR			See Residual Weight Factor tables.		
			Low Engine Air Flow is TRUE AND Measured TIAP - measured Baro - offset as a function of engine speed See table "**TIAP-Baro Correlation Offset**"	> 24.0 kPa	No Active DTCs:	MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA MnfdTempSensorFA TC_BoostPresSnsrCktFA AmbientAirDefault		
			TIAP Correlation is valid when High Engine Air Flow has been TRUE for a period of time	> 1.0 seconds	No Pending DTCs:	EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP MnfdTempSensorCktFP		
			OR Low Engine Air Flow has been TRUE for a period of time	> 1.0 seconds				
			High Engine Air Flow is TRUE when Mass Air Flow	> a threshold in gm sec as a function of engine speed See table "**TIAP-MAP Correlation Min Air Flow**"				
			AND Manifold Pressure	> a threshold in kPa as a function of engine speed See table "**TIAP-MAP Correlation Min MAP**"				
			AND Filtered Mass Air Flow - Mass Air Flow	< 3.0 gm/sec				

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Low Engine Air Flow is TRUE when Mass Air Flow AND Manifold Pressure AND Mass Air Flow - Filtered Mass Air Flow	< a threshold in gm sec as a function of engine speed See table "**TIAP-Baro Correlation Max Air Flow**" < a threshold in kPa as a function of engine speed See table "**TIAP-Baro Correlation Max MAP**" < 2.0 gm/sec				

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
arometric Pressure AR) Sensor Performance single turbo)	P2227	Compares baro sensor to the calculated baro estimate part throttle calculation or unthrottled MAP)	Difference bet een baro sensor reading and estimated baro hen distance since last estimated baro update R Difference bet een baro sensor reading and estimated baro hen 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 , 2 Trips
			arometric Pressure R arometric Pressure R A S Manifold Pressure aro Pressure) AND A S Turbocharger oost Pressure Manifold Pressure) AND A S Turbocharger oost Pressure aro Pressure)	< 50.0 kPa > 115.0 kPa > 10.0 kPa <= 10.0 kPa > 10.0 kPa	Time bet een current ignition cycle and the last time the engine as running Engine is not rotating No Active DTCs No Pending DTCs	 > 10.0 seconds EngineModeNotRunTimer Error MAP_SensorCircuitFA AAP_SnsrCktFA AAP2_SnsrCktFA MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP	4 failures out of 5 samples 1 sample every 12.5 msec	

14 OBDG05 ECM Summary Tables (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)	P2228	Detects a continuous short to low or open in either the signal circuit or the BARO sensor.	BARO Voltage	< 39.3 % of 5 Volt Range (2.0 Volts = 50.0 kPa)			320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips

14 OBDG05 ECM Summary Tables (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 High (boosted applications)	P2229	Detects an open sensor ground or continuous short to high in either the signal circuit or the BARO sensor.	BARO Voltage	> 90.0 % of 5 Volt Range (4.5 Volts = 115.0 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.

Turbo/Super Charger Bypass Valve - Mechanical Turbocharger with wastegate. Not supercharger with mechanical compressor	P2261	Detect Stuck Closed Bypass Valve	Accumulation time is high pass filtered. Accumulated air mass flow or boost pressure larger then thresholds
			
			Filter Frequency
			
			Filtered Air Mass Flow
			
			Filtered Boost Pressure
				0.25 Second < Accumulation time < 1.00 Second
				
				10.00 Hz
				
				> 65.000 g/s
				
				> 100.00 kPa
					Diagnostic Enabled
					
					Engine Speed
					
					Pressure ratio over the compressor
					
					Relative Boost Pressure (Boost - Ambient) and Negative Transient in Manifold Air Pressure
					
					Bypass Valve Commanded Open
					
					No Active DTCs:
						1
						
						>= 1,500 rpm
						
						>KtBSTD_r_ExcsvBstPresLim Enable condition kept true for 0.8 seconds extra
						See Tables in Supporting Tables Sheet
						
						IF (RelativeBoost < 0.0 kPa OR DerivativeMAP > 10.00 kPa/s)
						[FALSE]
						Else
						(RelativeBoost >= 35.0 kPa AND DerivativeMAP <= -250.00 kPa)
						[TRUE]
						
						> 6.0 percentEnable condition kept true for 0.50 seconds extra
						
						TC_BoostPresSnsrFA
						MAF_SensorFABSTR_b_TurboBypassCktFA
							7
							Failed tests out of 10
							Tests
							
							1 sample every 25ms
								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: 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 >= 11.00 or >= 6.41 = run = 0 (1 indicates enabled) = Active > 11.00	Diagnostic runs in 12.5 ms loop	Type X, No MIL

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		

14 OBDG05 ECM Summary Tables (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 MIL

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 MIL

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 MIL

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	 ≥ 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: 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 >= 11.00 or >= 6.41 = run = 0 (1 indicates enabled) = Active > 11.00	Diagnostic runs in 12.5 ms loop	Type C, No MIL

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Network Management is not active for U0104 Cruise 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.
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) Torque Request Speed Request OR Rolling count error - Serial Communication message ($1C8) rolling count value	 Message <> two's complement of message Message <> two's complement of message Message <> previous message rolling count value + one	Diagnostic enabled/ disabled Run/Crank Active Ignition Voltage No Serial communication loss to EBTCM (U0121)	Enabled > 0.50 seconds > 6.41 volts No loss of communication	 Fail Condition >= 10 Protect errors during key cycle. Pass Condition >= 10 samples during key cycle. >= 6 Rolling count errors out of 10 samples Performed on every received message	Type B, 2 Trips

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

Engine run time greater than
KtFSTA_t_ClosedLoopAutostart **(HYBRID ONLY)**

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

and
KtFSTA_t_ClosedLoopTime

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

and pre converter 02 sensor voltage less than
KfFULC_U_O2_SensorReadyThrsh
Lo

Voltage < *XXXX* milliVolts

for
KcFULC_O2_SensorReadyEvents

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

and
COSC (Converter Oxygen Storage Control) not enabled
and
Consumed AirFuel Ratio is stoichiometry i.e. not in component protection
and
POPD or Catalyst Diagnostic not intrusive
and
Turbo Scavenging Mode not enabled
and
All cylinders whose valves are active also have their injectors enabled
and
O2S_Bank_ 1_TFTKO, O2S_Bank_ 2_TFTKO, FuelInjectorCircuit_FA and CylinderDeacDriverTFTKO = False

Long Term FT Enable Criteria

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

Closed Loop Enable and
Coolant greater than
KfFCLL_T_AdaptiveLoCoolant

Coolant	> *XXXX*Celcius

or less than
KfFCLL_T_AdaptiveHiCoolant

Coolant	< *XXXX*Celcius

and
KtFCLL_p_AdaptiveLowMAP_Limit

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

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

Secondary Fuel Trim Enable Criteria

Closed Loop Enable and
KfFCLP_U_O2ReadyThrshLo

Voltage	< *XXXX*milliVolts

for
KcFCLP_Cnt_O2RdyCyclesThrsh

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

Long Term Secondary Fuel Trim Enable Criteria

KtFCLP_t_PostIntglDisableTime

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

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

Plus
KtFCLP_t_PostIntglRampInTime

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

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

Modeled converter sulfur percent < XXXX Percent

and
Post Integral < KaFCLP_U_SlphrIntglOfst_Thrsh)

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

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

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

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

y/x	1
1	22

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

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

Notes: Used for: P0133, P013A, P013B, P013C, P013D, P013E, P013F, P014A, P014B, P0153, P015A, P015B, P015C, P015D, P1133, P1153, P2270, P2271, P2272 and P2273. Note: This feature is only enabled when the vehicle is new and cannot be enabled in service

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

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

Description: KtEPSI_t_RtnHomeDlyLmt

Notes:

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 MAF Residual Weight Factor based on MAF Est

Description: P0101_P0106_P0121_P012B_P0236_P1101 MAF Residual Weight Factor based on MAF Est

Notes:

y/x	0	50	70	73	76	79	82	85	89	95	100	110	120	150	200	280	350
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

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

Description: P0101_P0106_P0121_P012B_P0236_P1101 MAF Residual Weight Factor based on RPM

Notes:

y/x	0	400	800	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,600
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.976	0.857	1.000	0.903	0.602	0.885	0.918

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

Initial Supporting table - P0101_P0106_P0121_P012B_P0236_P1101 MAP2 Residual Weight Factor based on RPM

Description: P0101_P0106_P0121_P012B_P0236_P1101 MAP2 Residual Weight Factor based on RPM

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	6,600
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Initial Supporting table - P0101_P0106_P0121_P012B_P0236_P1101 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

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

Initial Supporting table - P0101_P0106_P0121_P012B_P1101 Boost Residual Weight Factor based on % of Boost

Description: P0101_P0106_P0121_P012B_P1101 Boost Residual Weight Factor based on % of Boost

Notes:

y/x	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Initial Supporting table - P0101_P0106_P0121_P012B_P1101 SCIAP1 Residual Weight Factor based on RPM

Description: P0101_P0106_P0121_P012B_P1101 SCIAP1 Residual Weight Factor based on RPM

Notes:

y/x	0	1,500	2,200	2,500	2,800	3,100	3,200	3,300	3,500	3,700	4,000	4,200	4,500	5,000	5,500	6,500	8,000
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Initial Supporting table - P0101_P0106_P0121_P012B_P1101 SCIAP2 Residual Weight Factor based on RPM

Description: P0101_P0106_P0121_P012B_P1101 SCIAP2 Residual Weight Factor based on RPM

Notes:

y/x	0	1,500	2,200	2,500	2,800	3,100	3,200	3,300	3,500	3,700	4,000	4,200	4,500	5,000	5,500	6,500	8,000
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Initial Supporting table - P0101_P0106_P0121_P0236_P1101 TIAP Residual Weight Factor based on RPM

Description: P0101_P0106_P0121_P0236_P1101 TIAP Residual Weight Factor based on RPM

Notes:

y/x	0	400	800	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,600
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Initial Supporting table - P0101_P0106_P0121_P0236_P1101 TIAP-Baro Correlation Max Air Flow

Description: P0101_P0106_P0121_P0236_P1101 TIAP-Baro Correlation Max Air Flow

Notes:

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	5.0	9.0	13.0	16.0	20.0	24.0	28.0	31.0	32.0

Initial Supporting table - P0101_P0106_P0121_P0236_P1101 TIAP-Baro Correlation Max MAP

Description: P0101_P0106_P0121_P0236_P1101 TIAP-Baro Correlation Max MAP

Notes:

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0

Initial Supporting table - P0101_P0106_P0121_P0236_P1101 TIAP-Baro Correlation Offset

Description: P0101_P0106_P0121_P0236_P1101 TIAP-Baro Correlation Offset

Notes:

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	0.0	1.5	3.5	6.0	9.0	12.0	16.0	20.0	25.0

Initial Supporting table - P0101_P0106_P0121_P0236_P1101 TIAP-MAP Correlation Min Air Flow

Description: P0101_P0106_P0121_P0236_P1101 TIAP-MAP Correlation Min Air Flow

Notes:

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	17.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0

Initial Supporting table - P0101_P0106_P0121_P0236_P1101 TIAP-MAP Correlation Min MAP

Description: P0101_P0106_P0121_P0236_P1101 TIAP-MAP Correlation Min MAP

Notes:

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0

Initial Supporting table - P0101_P0106_P0121_P0236_P1101 TIAP-MAP Correlation Offset

Description: P0101_P0106_P0121_P0236_P1101 TIAP-MAP Correlation Offset

Notes:

y/x	1,000	1,750	2,500	3,250	4,000	4,750	5,500	6,250	7,000
1	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

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: Maximum Total Energy transferred to Cooling System for Ambient and Start-up ECT conditions (Alternate Test)

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

y/x	-40	-7	10	20	79	81	86
1	13,584	10,206	8,466	7,442	1,402	1,200	1,200

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

Description: Maximum Total Energy transferred to Cooling System for Ambient and Start-up ECT conditions (Primary Test)

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

y/x	-40	-7	10	20	79	81	86
1	26,376	21,452	18,916	17,424	8,622	8,328	7,503

Initial Supporting table - P0133_KnEOSD_t_ST_LRC_LimRS1

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

Notes:

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	0.000	0.010	0.022	0.034	0.046	0.058	0.070	0.082	0.094	0.105	0.117	0.129	0.141	0.153	0.165	0.177	2.000

Initial Supporting table - P0133_KnEOSD_t_ST_RLC_LimRS1

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

Notes:

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	0.000	0.010	0.023	0.037	0.050	0.063	0.077	0.090	0.104	0.117	0.130	0.144	0.157	0.170	0.184	0.197	2.000

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

Description: KaEOSD_x_ST_ResponseLimRS1[x][y]

Notes: X axis is Lean to Rich response time (in sec), Please see the table below named "KnEOSD_t_ST_LRC_LimRS1" for the 17 X axis table breakpoints. Y axis is Rich to Lean response time (sec), Please see the cal table below named "KnEOSD_t_ST_RLC_LimRS1" for the 17 Y axis table breakpoints. Z axis is the pass/fail result, Note: If the cell contains a "0" then the fault is indicated, if it contains a "1" a fault is not indicated.

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

Initial Supporting table - P0153_KnEOSD_t_ST_LRC_LimRS2

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

Notes:

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	0.000	0.010	0.022	0.034	0.046	0.058	0.070	0.082	0.094	0.105	0.117	0.129	0.141	0.153	0.165	0.177	2.000

Initial Supporting table - P0068_Delta MAF Threshold f(TPS)

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

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	18.33	17.10	17.10	18.21	21.80	27.38	41.76	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	33.36	35.16	32.36	25.88	25.00	21.95	24.70	255.00	255.00

Initial Supporting table - P0068_Maximum MAF f(RPM)

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

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	8.00	27.00	41.00	59.00	79.00	105.00	122.00	141.00	149.00

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	31.00	72.00	130.00	190.00	238.00	238.00	238.00	238.00	238.00

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_NonSelectedCell
P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage - Part 3				
y/x	CeFADR_e_Cell08_PurgOffAirMode5	CeFADR_e_Cell09_PurgOffAirMode4	CeFADR_e_Cell10_PurgOffAirMode3	CeFADR_e_Cell11_PurgOffAirMode2
1	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell
P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage - Part 4				
y/x	CeFADR_e_Cell12_PurgOffAirMode1	CeFADR_e_Cell13_PurgOffAirMode0	CeFADR_e_Cell14_PurgOffIdle	CeFADR_e_Cell15_PurgOffDecel
1	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_NonSelectedCell

Initial Supporting table - P0521_LowMinOilPresFail - Two Stage Oil Pump

Description: Minimum expected oil presure readings - Two Stage Oil Pump

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	5,000.0
1.0	125.1	188.7	197.2	211.5	224.3	231.2	237.2	244.4	250.0

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

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

Notes: P0606, KaPISD_t_LastSeedTimeout[x]

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

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

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

Notes: P0606, KaPISD_b_ProgSeqWatchEnbl

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

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

Description: Fail threshold for PSW per operating loop.

Notes: P0606, KaPISD_Cnt_SequenceFail[x]

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

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

Description: Sample threshold for PSW per operating loop.

Notes: P0606, KaPISD_Cnt_SequenceSmpl[x]

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

Initial Supporting table - 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	0.0	0.0	140.0	140.0	140.0	140.0	140.0	0.0	0.0

Initial Supporting table - P06DD_P06DE_MaxEnableTorque_OP_Axis

Description: Engine Speed Axis for Two Stage Oil Pump maximum torque enable threshold

Notes: KnLUBD_n_OP_InDiEngTorqMxRPMAxs X Axis for KtLUBD_M_OP_InDiagEngTorqMax

y/x	1	2	3	4	5	6	7	8	9
1	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000

Initial 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	20.0	20.0	20.0	20.0	20.0	0.0	0.0

Initial Supporting table - P06DD_P06DE_MinEnableTorque_OP_Axis

Description: Engine Speed Axis for Two Stage Oil Pump minimum torque enable threshold

Notes: KnLUBD_n_OP_InDiEngTorqMnRPMAxs X Axis for KtLUBD_M_OP_InDiagEngTorqMin

y/x	1	2	3	4	5	6	7	8	9
1	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000

Initial Supporting table - P06DD_P06DE_OP_HiStatePressure

Description: Two Stage Oil Pump Oil Pressure in High State

Notes: For 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	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0
1,000.0	519.5	489.4	459.3	429.2	399.1	369.0	338.9	308.8	278.7
1,500.0	568.9	544.6	520.3	496.0	471.7	447.4	423.1	398.8	374.4
2,000.0	604.1	581.6	559.2	536.7	514.2	491.8	469.3	446.8	424.4
2,500.0	622.5	600.9	579.3	557.7	536.1	514.5	493.0	471.4	449.8
3,000.0	624.6	604.8	584.9	565.1	545.3	525.5	505.6	485.8	466.0
3,500.0	613.8	597.4	580.9	564.5	548.0	531.6	515.1	498.7	482.2
4,000.0	596.9	585.0	573.1	561.2	549.3	537.4	525.5	513.6	501.7
4,500.0	583.4	575.7	567.9	560.2	552.4	544.7	537.0	529.2	521.5
5,000.0	586.3	579.6	572.9	566.2	559.5	552.8	546.1	539.4	532.7

Initial 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	40	50	60	70	80	90	100	110	120
1,000	351	338	325	312	300	287	274	261	248
1,500	372	362	352	342	332	322	311	301	291
2,000	383	374	365	356	348	339	330	321	312
2,500	385	378	370	363	355	347	340	332	325
3,000	382	376	370	364	358	352	346	341	335
3,500	376	371	367	362	358	353	348	344	339
4,000	370	366	363	360	356	353	350	346	343
4,500	365	363	361	359	357	355	352	350	348
5,000	366	364	362	361	359	357	355	353	351

Initial Supporting table - P06DD_P06DE_OP_PressureRPMAxis

Description: Engine Speed Axis for Two Stage Oil Pump Pressure estimate

Notes: KnLUBD_n_OP_OilPresRPMAxs X Axis for KtLUBD_p_OP_OilPresHighState X Axis

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

Initial Supporting table - P06DD_P06DE_OP_PressureTempAxis

Description: Oil Temperature Axis for Two Stage Oil Pump Pressure estimate

Notes: KnLUBD_T_OP_OilPresTempAxs Y Axis for KtLUBD_p_OP_OilPresHighState

y/x	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0
1.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0

Initial Supporting table - P06DD_P06DE_OP_StateC angeMin

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	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0
1,000.0	80.0	50.0	42.0	35.0	28.0	21.0	14.0	6.0	0.0
1,500.0	79.0	72.0	65.0	58.0	51.0	44.0	36.0	29.0	22.0
2,000.0	91.0	84.0	77.0	70.0	62.0	55.0	49.0	41.0	34.0
2,500.0	97.0	90.0	84.0	77.0	70.0	64.0	57.0	51.0	44.0
3,000.0	99.0	93.0	87.0	81.0	75.0	69.0	62.0	56.0	50.0
3,500.0	103.0	98.0	92.0	87.0	81.0	75.0	70.0	65.0	59.0
4,000.0	105.0	101.0	96.0	92.0	88.0	84.0	80.0	76.0	72.0
4,500.0	105.0	102.0	99.0	96.0	93.0	90.0	87.0	85.0	82.0
5,000.0	106.0	105.0	102.0	100.0	98.0	96.0	94.0	92.0	90.0

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	21.95	21.95	21.95	21.95	21.95	21.95

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	62.73	59.22	62.53	53.63	57.72	52.33	49.03	49.34	48.91	48.27	47.02	44.83	42.63	42.39	42.39	42.39
160.00	125.00	51.05	42.83	44.63	44.50	45.72	43.11	41.06	41.06	40.14	39.03	37.89	36.70	35.52	35.39	35.39	35.39
240.00	125.00	42.52	32.38	34.52	37.73	37.88	36.69	35.33	34.55	33.16	31.66	30.69	30.55	30.41	30.39	30.39	30.39
320.00	125.00	33.63	25.67	28.16	31.41	32.09	30.56	29.39	28.92	27.73	26.44	25.64	25.64	25.64	25.64	25.64	25.64
400.00	125.00	27.81	21.28	23.77	26.89	27.83	26.16	25.03	24.84	23.83	22.69	22.00	21.98	21.97	21.97	21.97	21.97
480.00	125.00	23.72	18.17	20.56	23.52	24.56	22.84	21.81	21.77	20.89	19.88	19.25	19.23	19.23	19.22	19.22	19.22
560.00	125.00	20.67	15.84	18.13	20.89	21.91	20.27	19.31	19.38	18.59	17.69	17.13	17.11	17.09	17.09	17.09	17.09
640.00	125.00	18.31	14.06	16.20	18.78	19.75	18.20	17.33	17.45	16.75	15.92	15.42	15.39	15.38	15.38	15.38	15.38
720.00	125.00	16.45	12.63	14.66	17.00	17.97	16.41	15.67	15.69	15.11	14.44	14.02	14.00	13.98	13.98	13.98	13.98
800.00	125.00	16.03	12.31	14.30	16.59	17.55	15.98	15.27	15.28	14.72	14.09	13.70	13.67	13.66	13.66	13.66	13.66
880.00	125.00	16.03	12.31	14.30	16.59	17.55	15.98	15.27	15.28	14.72	14.09	13.70	13.67	13.66	13.66	13.66	13.66
960.00	125.00	16.03	12.31	14.30	16.59	17.55	15.98	15.27	15.28	14.72	14.09	13.70	13.67	13.66	13.66	13.66	13.66
1,040.00	125.00	16.03	12.31	14.30	16.59	17.55	15.98	15.27	15.28	14.72	14.09	13.70	13.67	13.66	13.66	13.66	13.66
1,120.00	125.00	16.03	12.31	14.30	16.59	17.55	15.98	15.27	15.28	14.72	14.09	13.70	13.67	13.66	13.66	13.66	13.66
1,200.00	125.00	16.03	12.31	14.30	16.59	17.55	15.98	15.27	15.28	14.72	14.09	13.70	13.67	13.66	13.66	13.66	13.66
1,280.00	125.00	16.03	12.31	14.30	16.59	17.55	15.98	15.27	15.28	14.72	14.09	13.70	13.67	13.66	13.66	13.66	13.66
1,360.00	125.00	16.03	12.31	14.30	16.59	17.55	15.98	15.27	15.28	14.72	14.09	13.70	13.67	13.66	13.66	13.66	13.66

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	-20.00	-10.00	0.00	50.00	90.00
450.00	248.00	248.00	248.00	248.00	248.00	248.00
550.00	248.00	248.00	248.00	248.00	248.00	248.00
650.00	165.00	160.53	156.94	100.40	83.43	69.30
700.00	165.00	160.53	156.94	100.42	79.21	66.18
800.00	165.00	160.28	155.00	103.26	77.38	64.94
900.00	160.00	162.64	150.00	100.94	75.01	78.79
1,000.00	163.62	169.68	153.75	89.49	72.73	85.22
1,100.00	156.37	167.22	131.34	88.17	70.85	79.79
1,300.00	137.00	128.00	125.00	87.00	83.31	72.97
1,500.00	110.00	110.00	110.00	85.00	42.56	45.31
2,000.00	15.00	15.00	16.00	18.00	15.00	16.00
2,500.00	15.00	15.00	16.00	18.00	15.00	16.00
3,000.00	5.00	5.00	6.00	8.00	5.00	6.00
3,500.00	-5.00	-5.00	-4.00	-2.00	-5.00	-4.00
4,500.00	29.00	20.00	18.00	14.00	12.00	2.00
5,500.00	48.00	38.00	35.00	31.00	25.00	16.00
7,200.00	64.00	53.00	50.00	45.00	37.00	28.00

Initial Supporting table - P219A Normalizer Bank1 Table

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

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

y/x	250	500	750	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,500	4,000	4,500	5,000	6,000
40	9,999.00	9,999.00	9,999.00	203.75	203.75	56.50	23.25	27.50	43.50	53.25	49.00	46.50	43.50	40.25	40.25	9,999.00	9,999.00
80	9,999.00	9,999.00	9,999.00	203.75	203.75	56.50	23.25	27.50	43.50	53.25	49.00	46.50	47.75	40.25	40.25	9,999.00	9,999.00
120	9,999.00	9,999.00	9,999.00	133.50	133.50	104.00	83.00	75.50	78.25	84.75	78.50	69.00	56.50	62.50	62.50	9,999.00	9,999.00
160	9,999.00	9,999.00	9,999.00	161.75	161.75	153.25	80.00	118.00	199.75	165.50	164.25	135.25	158.25	160.50	160.50	9,999.00	9,999.00
200	9,999.00	9,999.00	9,999.00	146.25	146.25	118.50	112.75	126.25	135.75	108.25	113.00	107.00	104.75	105.00	105.00	9,999.00	9,999.00
240	9,999.00	9,999.00	9,999.00	180.50	180.50	177.25	122.50	133.00	130.00	122.00	124.50	121.00	117.00	116.75	116.75	9,999.00	9,999.00
280	9,999.00	9,999.00	9,999.00	264.00	264.00	230.25	170.00	160.00	215.50	160.00	154.50	114.50	112.00	109.75	109.75	9,999.00	9,999.00
320	9,999.00	9,999.00	9,999.00	278.75	278.75	260.75	246.25	251.50	249.75	245.00	204.00	190.50	114.75	131.50	131.50	9,999.00	9,999.00
360	9,999.00	9,999.00	9,999.00	284.00	284.00	263.75	230.00	252.50	267.25	252.50	241.25	235.00	165.50	172.50	172.50	9,999.00	9,999.00
400	9,999.00	9,999.00	9,999.00	249.75	249.75	289.25	286.00	281.75	253.50	202.25	245.75	192.50	223.00	200.00	200.00	9,999.00	9,999.00
440	9,999.00	9,999.00	9,999.00	265.00	265.00	281.50	279.00	244.75	270.25	228.25	218.75	195.25	221.75	182.50	182.50	9,999.00	9,999.00
480	9,999.00	9,999.00	9,999.00	211.50	211.50	308.00	288.50	263.75	264.75	247.75	259.75	226.50	225.25	181.50	181.50	9,999.00	9,999.00
520	9,999.00	9,999.00	9,999.00	211.50	259.25	306.75	287.50	306.00	279.75	270.00	263.75	236.00	200.00	190.75	181.50	9,999.00	9,999.00
560	9,999.00	9,999.00	9,999.00	9,999.00	242.00	242.00	302.25	297.25	236.00	220.00	251.25	235.00	234.00	234.00	9,999.00	9,999.00	9,999.00
640	9,999.00	9,999.00	9,999.00	9,999.00	242.00	242.00	302.25	297.25	236.00	220.00	251.25	235.00	234.00	234.00	9,999.00	9,999.00	9,999.00
720	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
800	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00

Initial Supporting table - P219A Quality Factor Bank1 Table

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

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

y/x	250	500	750	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,500	4,000	4,500	5,000	6,000
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	0.00	0.00	0.00	0.00	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
120	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	0.00	0.00	0.00
160	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
200	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
240	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
280	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
320	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
360	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
400	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
440	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
480	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
520	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
560	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
640	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
720	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
800	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Initial Supporting table - P219A Variance Threshold Bank1 Table

Description: Bank 1 lookup table of Variance metric used to calculate the Ratio for the current sample period

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

y/x	250	500	750	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,500	4,000	4,500	5,000	6,000
40	9,999.00	9,999.00	9,999.00	4.25	4.25	3.25	5.00	5.75	4.50	4.00	4.50	2.75	3.00	3.50	3.50	9,999.00	9,999.00
80	9,999.00	9,999.00	9,999.00	4.25	4.25	3.25	5.00	5.75	4.50	4.00	4.50	2.75	3.75	3.50	3.50	9,999.00	9,999.00
120	9,999.00	9,999.00	9,999.00	5.75	5.75	5.00	3.25	4.50	2.75	3.50	5.75	5.25	5.00	6.00	6.00	9,999.00	9,999.00
160	9,999.00	9,999.00	9,999.00	7.00	7.00	6.50	5.25	7.00	5.50	3.25	3.00	4.75	6.00	5.75	5.75	9,999.00	9,999.00
200	9,999.00	9,999.00	9,999.00	10.00	10.00	8.00	8.25	7.00	5.75	4.25	8.00	6.25	9.25	7.75	7.75	9,999.00	9,999.00
240	9,999.00	9,999.00	9,999.00	19.50	19.50	12.00	8.50	8.75	9.50	6.75	8.00	6.50	8.50	5.50	5.50	9,999.00	9,999.00
280	9,999.00	9,999.00	9,999.00	18.25	18.25	12.00	19.25	11.25	10.75	10.50	11.25	10.50	12.00	9.00	9.00	9,999.00	9,999.00
320	9,999.00	9,999.00	9,999.00	23.50	23.50	23.00	21.25	15.25	12.25	16.00	16.50	14.50	13.00	9.25	9.25	9,999.00	9,999.00
360	9,999.00	9,999.00	9,999.00	39.00	39.00	42.25	23.50	20.00	18.75	25.50	20.00	15.25	12.75	9.00	9.00	9,999.00	9,999.00
400	9,999.00	9,999.00	9,999.00	47.00	47.00	41.50	28.00	28.25	28.75	31.75	30.25	31.50	17.75	17.75	17.75	9,999.00	9,999.00
440	9,999.00	9,999.00	9,999.00	64.25	64.25	54.00	51.50	44.00	30.00	27.25	30.50	27.50	15.25	19.50	19.50	9,999.00	9,999.00
480	9,999.00	9,999.00	9,999.00	46.25	46.25	44.50	46.50	37.25	37.00	38.25	30.50	26.75	27.50	32.50	32.50	9,999.00	9,999.00
520	9,999.00	9,999.00	9,999.00	46.25	46.75	47.00	53.25	48.75	45.00	36.50	40.75	30.25	41.75	37.25	32.50	9,999.00	9,999.00
560	9,999.00	9,999.00	9,999.00	9,999.00	71.75	71.75	51.00	44.50	45.00	38.00	60.00	47.00	28.25	28.25	9,999.00	9,999.00	9,999.00
640	9,999.00	9,999.00	9,999.00	9,999.00	71.75	71.75	51.00	44.50	45.00	38.00	60.00	47.00	28.25	28.25	9,999.00	9,999.00	9,999.00
720	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00
800	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00	9,999.00

Initial Supporting table - 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	2,048	2,048
CiFCLP_Idle	2,048	2,048
CiFCLP_Cruise	2,048	2,048
CiFCLP_LightAccel	2,048	2,048
CiFCLP_HeavyAccel	2,048	2,048

Initial Supporting table - Closed Loop Enable Clarification - KcFCLP_Cnt_O2RdyCyclesThrsh

Description: Number of 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	255

Initial Supporting table - Closed Loop Enable Clarification - KeFCLP_T_IntegrationCatalystMax

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

Notes: Modeled catalyst Temperature in Celcius

y/x	1
1	930

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	120

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	40

Initial Supporting table - Closed Loop Enable Clarification - KfFCLP_U_O2ReadyThrshLo

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

Notes: Voltage in millivolts

y/x	1
1	1,100

Initial Supporting table - Closed Loop Enable Clarification - KfFULC_U_O2_SensorReadyThrshLo

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

Notes: Voltage in millivolts

y/x	1
1	1,250

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	14.0	14.0	14.0	14.5	15.0	15.5	16.0	16.0	16.0

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	400.0	400.0	400.0	275.0	150.0	150.0	150.0	150.0	150.0	100.0	50.0	10.0	10.0	10.0	10.0	10.0	10.0

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	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	40.0	30.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0

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	100.0	100.0	100.0	55.0	19.0	18.0	18.0	18.0	18.0	18.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - Closed Loop Enable Clarification - KtFSTA_t_ClosedLoopTime

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

Notes: Time in seconds

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	200.0	180.0	100.0	55.0	19.0	18.0	18.0	18.0	18.0	18.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Initial 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	60.0	60.0	60.0	20.0	20.0	20.0	40.0	60.0	60.0

Initial 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	-32	-24	-16	-8	0	8	16	20	24	32	40	48	64	80	96	112
0	10.0	10.0	10.0	4.0	3.0	1.0	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
13	10.0	10.0	10.0	4.0	3.0	1.0	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
25	10.0	10.0	10.0	4.0	3.0	1.0	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
38	10.0	10.0	10.0	8.0	4.0	2.0	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
50	10.0	10.0	10.0	10.0	6.0	6.0	2.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
63	10.0	10.0	10.0	10.0	10.0	6.0	3.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
75	10.0	10.0	10.0	10.0	10.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
88	10.0	10.0	10.0	10.0	10.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
100	10.0	10.0	10.0	10.0	10.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0

Initial 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	-32	-24	-16	-8	0	8	16	20	24	32	40	48	64	80	96	112
1	5.0	5.0	5.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0

Initial Supporting table - 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	-32	-24	-16	-8	0	8	16	20	24	32	40	48	64	80	96	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

Initial 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	-32	-24	-16	-8	0	8	16	20	24	32	40	48	64	80	96	112
0	2.0	2.0	2.0	2.0	1.0	0.7	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
13	2.0	2.0	2.0	2.0	1.0	0.7	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
25	2.0	2.0	2.0	2.0	1.0	0.7	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
38	2.0	2.0	2.0	2.0	1.0	0.7	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
50	2.0	2.0	2.0	2.0	1.0	0.7	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
63	2.0	2.0	2.0	2.0	1.0	0.7	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
75	2.0	2.0	2.0	2.0	1.0	0.7	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
88	2.0	2.0	2.0	2.0	1.0	0.7	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
100	2.0	2.0	2.0	2.0	1.0	0.7	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

Initial Supporting table - P0191 - KtFHPD_Cnt_SnsPrfIdlePumpOffDly

Description: The delay counter following the disabling of the high pressure pump used Only for the Sensor Performance Idle Test

Notes:

y/x	0	13	25	38	50	63	75	88	100
65	195.0	195.0	195.0	195.0	195.0	195.0	195.0	195.0	195.0
70	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0
75	185.0	185.0	185.0	185.0	185.0	185.0	185.0	185.0	185.0
80	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0
85	175.0	175.0	175.0	175.0	175.0	175.0	175.0	175.0	175.0
90	170.0	170.0	170.0	170.0	170.0	170.0	170.0	170.0	170.0
95	165.0	165.0	165.0	165.0	165.0	165.0	165.0	165.0	165.0
100	160.0	160.0	160.0	160.0	160.0	160.0	160.0	160.0	160.0
105	160.0	160.0	160.0	160.0	160.0	160.0	160.0	160.0	160.0

Initial Supporting table - P0191 - KtFHPD_t_SnsPrfStuckCrankTmout

Description: The maximum crank time allowed before allowing the Sensor Performance Stuck Test to fail

Notes:

y/x	-30	-20	-10	0	10	20	80	100	110
1	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0

Initial Supporting table - P0324_P0326_P0331_AbnormalNoise_CylsEnabled

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

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

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

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

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

Initial Supporting table - P0324_P0326_P0331_AbnormalNoise_Threshold

Description: Fail threshold for the Knock Performance Abnormal Noise Diagnostic

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

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.154	0.158	0.160	0.167	0.168	0.175	0.187	0.234	0.228	0.247	0.244	0.280	0.292	0.292	0.292	0.292	0.292

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	33.4434	32.9434	32.7695	32.7949	32.8926	32.9355	32.7930	32.3379	31.4453	29.9863	27.8301	24.8516	21.3594	21.3594	21.3594	21.3594	21.3594

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	10.2227	9.9746	9.8594	9.8359	9.8594	9.8828	9.8672	9.7637	9.5332	9.1289	8.5059	7.6250	6.4355	5.2383	5.2383	5.2383	5.2383

Initial Supporting table - P0325_P0330_OpenCktThrshMin (Normal Noise)

Description: Knock Open Circuit Diagnostic Minimum Threshold when using the Normal Noise method (see "OpenMethod" description): When using the Normal Noise method (see "OpenMethod" description).

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

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

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

Initial Supporting table - P0325_P0330_OpenMethod

Description:

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

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

P0325_P0330_OpenMethod - Part 1

y/x	0	1	2	3	4	5
1	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz

P0325_P0330_OpenMethod - Part 2

y/x	6	7	8	9	10	11
1	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz

P0325_P0330_OpenMethod - Part 3

y/x	12	13	14	15	16	
1	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	

Initial Supporting table - P0411 Phase 1 Amb Temp Test Weight Factor

Description: SAI Flow (Phase 1) Test ambient temperature weight factor.

Notes: DTC: P0411; Cal: KtAIRD_K_SAI_TstTempDsbld; Axis is Ambient (IAT) Temp (C).

y/x	-30	-20	-10	0	10	20	30	40	50
1	0.0	0.0	0.0	0.5	1.0	1.0	1.0	1.0	1.0

Initial Supporting table - P0411 Phase 1 Baro Test Weight Factor

Description: SAI Flow (Phase 1) Test baro weight factor.

Notes: DTC: P0411; Cal: KtAIRD_K_SAI_TstBaroDsbld; Axis is atmospheric pressure (kPa)

y/x	40	50	60	70	80	90	100	110	120
1	0.0	0.0	0.5	1.0	1.0	1.0	1.0	1.0	0.0

Initial Supporting table - P0411 Phase 1 MAF Test Weight Factor

Description: tAIRD_ _SAI_TstMAF_Dsbld: SAI Flo (Phase 1) Test MAF eight actor.

Notes: Axis is Mass Air lo (g/sec).

/x	0.0	3.0	6.0	9.0	12.0	15.0	18.0	21.0	24.0	27.0	30.0	33.0	36.0	39.0	42.0	45.0	48.0
1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.5	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - P0411 Phase 1 System Volt Test Weight Factor

Description: SAI Flow (Phase 1) Test system voltage weight factor.

Notes: DTC: P0411; Cal: KtAIRD_K_SAI_TstVoltDsbld; Axis is system voltage (V).

y/x	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	19.0	20.0	21.0
1.0	0.0	0.0	0.0	0.0	0.0	0.5	0.8	1.0	1.0	1.0	1.0	1.0	0.8	0.5	0.5	0.5	0.5

Initial Supporting table - P0411 SL Threshold Bank 1 Table

Description: Bank 1 SAI Flow (Phase 1) Test Average String Length failure threshold versus MAF (g/sec).

Notes: DTCs: P0411; Cal: KtAIRD_dp_SAI_SL_ThrshBank1

y/x	0.0	3.0	6.0	9.0	12.0	15.0	18.0	21.0	24.0	27.0	30.0	33.0	36.0	39.0	42.0	45.0	48.0
1.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0

Initial Supporting table - P0420_BestFailingOSCTableB1

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

Notes: KtCATD_t_1_OSC_BestFailing - used for P0420 norm ratio calculation

y/x	2.00	2.40	2.80	3.20	3.60	4.00	4.40	4.80	5.20	5.60	6.00	6.40	6.80	7.20	7.60	8.00	8.40
550.00	1.33	1.23	1.13	1.07	1.01	0.94	0.83	0.71	0.61	0.55	0.50	0.43	0.39	0.37	0.35	0.33	0.32
600.00	1.35	1.26	1.15	1.09	1.04	0.96	0.86	0.74	0.64	0.57	0.51	0.46	0.41	0.39	0.37	0.35	0.34
650.00	1.39	1.28	1.18	1.12	1.06	0.98	0.89	0.76	0.66	0.60	0.54	0.48	0.43	0.40	0.38	0.37	0.36
700.00	1.42	1.32	1.21	1.16	1.10	1.01	0.92	0.79	0.69	0.62	0.56	0.50	0.45	0.42	0.40	0.39	0.38
750.00	1.46	1.35	1.25	1.20	1.14	1.04	0.94	0.82	0.71	0.65	0.59	0.53	0.47	0.44	0.42	0.41	0.40
800.00	1.50	1.39	1.29	1.24	1.19	1.08	0.97	0.85	0.74	0.67	0.61	0.55	0.49	0.46	0.44	0.43	0.41
850.00	1.54	1.43	1.34	1.29	1.24	1.12	1.01	0.88	0.77	0.70	0.64	0.57	0.52	0.49	0.46	0.45	0.43
900.00	1.59	1.48	1.39	1.33	1.28	1.17	1.05	0.91	0.80	0.73	0.67	0.61	0.55	0.51	0.49	0.47	0.45
950.00	1.63	1.52	1.43	1.37	1.33	1.21	1.09	0.95	0.83	0.77	0.70	0.64	0.58	0.54	0.51	0.49	0.47

Initial Supporting table - P0420_WorstPassingOSCTableB1

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

Notes: KtCATD_t_1_OSC_WorstPassing - used for P420 norm ratio calculation

y/x	2.00	2.40	2.80	3.20	3.60	4.00	4.40	4.80	5.20	5.60	6.00	6.40	6.80	7.20	7.60	8.00	8.40
550.00	3.23	3.00	2.80	2.46	2.17	1.94	1.78	1.61	1.38	1.25	1.17	1.09	1.06	1.03	1.00	0.98	0.96
600.00	3.26	3.03	2.83	2.49	2.19	1.96	1.79	1.63	1.40	1.27	1.19	1.11	1.07	1.05	1.02	1.00	0.98
650.00	3.31	3.07	2.85	2.51	2.21	1.97	1.81	1.65	1.43	1.29	1.21	1.13	1.09	1.07	1.04	1.01	0.99
700.00	3.35	3.10	2.88	2.53	2.23	1.99	1.83	1.67	1.46	1.31	1.24	1.15	1.11	1.09	1.06	1.04	1.01
750.00	3.39	3.14	2.91	2.57	2.26	2.02	1.86	1.70	1.49	1.34	1.26	1.17	1.13	1.11	1.09	1.06	1.04
800.00	3.44	3.19	2.95	2.61	2.30	2.06	1.89	1.73	1.51	1.37	1.29	1.21	1.16	1.14	1.12	1.09	1.07
850.00	3.51	3.25	3.01	2.67	2.34	2.10	1.93	1.76	1.54	1.40	1.32	1.24	1.20	1.17	1.15	1.13	1.11
900.00	3.58	3.33	3.08	2.73	2.40	2.15	1.98	1.81	1.58	1.44	1.35	1.28	1.23	1.21	1.19	1.17	1.14
950.00	3.65	3.40	3.14	2.80	2.47	2.20	2.02	1.86	1.62	1.48	1.40	1.33	1.27	1.25	1.23	1.21	1.18

Unique Supporting table - P0420_P0430_CatmonMinEngineRunTimeToEnable

Description: This cal value is a 1x5 array of minimum engine run time values based on powerup coolant temperatures. When the appropriate required minimum engine run time value is chosen based on the coolant temperature at powerup, this value is the minimum time from engine start before stabilized conditions are met. Used in determining if a ValidIdleIsMet condition exists.

Notes: KtCATD_t_EngRunTimeMin - Used for P0420 and P0430. Axis is the coolant and the output is the min engine run time

y/x	40	50	60	70	80
1	0	0	0	0	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	18	18	18	18	18
0.125	18	18	18	18	18
0.250	18	18	18	18	18
0.375	18	18	18	18	18
0.500	18	18	18	18	18
0.625	18	18	18	18	18
0.750	18	18	18	18	18
0.875	18	18	18	18	18
1.000	18	18	18	18	18

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	0.260	0.293	0.305	0.309	0.313	0.326	0.361	0.428	0.537	0.695	0.918	1.211	1.588	2.059	2.631	3.316	4.125

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	0.135	0.141	0.145	0.145	0.145	0.148	0.158	0.176	0.205	0.248	0.307	0.385	0.484	0.607	0.760	0.939	1.150

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	3	3	4	5	10	15	20	30
1	0	0	1	1	1	1	1	1	1

Initial Supporting table - P1400_ColdStartDiagnosticDelayBasedOnEngineRunTimeCalAxis

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

Notes: KnCSED_t_TimeWght - This is used for P1400.

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

Initial Supporting table - P1400_EngineSpeedResidual_Axis

Description: This calibration is used as the x-axis for KtCSED_dm_Exh. An engine speed value will be chosen from this axis based on the value of VeSPDR_n_EngDsrd or actual engine speed. Subsequently, the engine speed value chosen from KnCSED_n_Exh determines the appropriate exhaust airflow value from the KtCSED_dm_Exh calibration table.

Notes: KnCSED_n_Exh-Used for P1400

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	0	300	500	900	925	1,000	1,300	1,332	1,350	1,400	1,500	1,600	1,700	1,800	1,900	2,000	2,500

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 - Used for P1400

y/x	0	300	500	900	925	1,000	1,300	1,332	1,350	1,400	1,500	1,600	1,700	1,800	1,900	2,000	2,500
1	4	4	4	4	12	12	12	16	16	16	16	16	16	16	16	16	16

Initial Supporting table - P1400_SparkResidual_Axis

Description: Calibratible axis into KtCSED_E_ExhEngyPerUnitMass. This is a table of spark values. Spark value used for desired spark is the desired spark during cat light off. Actual spark value used is the final commanded spark.

Notes: KnCSED_phi_ExhEngyPerUnitMass - Used for P1400

y/x	1	2	3	4	5	6	7	8	9
1	-10.00	-8.00	-5.00	0.00	4.00	7.00	9.00	10.00	15.00

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 - Used for P1400

y/x	-10	-8	-5	0	4	7	9	10	15
1	1.00	1.00	1.00	1.00	1.00	0.90	0.70	0.50	0.50

Initial Supporting table - P2440 Bank 1 Valve Pressure Error

Description: Sensor 1 minimum average pressure error (kPa) threshold for the valve-shut (Phase 2) test .

Notes: DTCs: P2440; Cal: KaAIRD_p_VlvTstPresErrMin[CeAIRR_e_PresSnsrOne]; Axis is Conditional Test Weight Time in seconds.

y/x	0	1	2	3	4	5	6	7	8
1	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0

Initial Supporting table - P2440 Phase 2 Amb Temp Test Weight Factor

Description: Ambient Temperature component of the conditional test weight for the valve-shut (Phase 2) test.

Notes: DTCs: P2440; Cal: KtAIRD_K_VlvTstTempDsbld; Axis is ambient temperature (IAT) in Deg C.

y/x	-30	-20	-10	0	10	20	30	40	50
1	0.0	0.0	0.0	0.5	1.0	1.0	1.0	1.0	1.0

Initial Supporting table - P2440 Phase 2 Baro Test Weight Factor

Description: Ambient pressure component of the conditional test weight for the valve-shut (Phase 2) test .

Notes: DTCs: P2440; Cal: KtAIRD_K_VlvTstBaroDsbld; Axis is ambient pressure (kPa).

y/x	40	50	60	70	80	90	100	110	120
1	0.0	0.0	0.5	1.0	1.0	1.0	1.0	1.0	0.0

Initial Supporting table - P2440 Phase 2 MAF Test Weight Factor

Description: Mass Airflow (MAF) component of the conditional test weight for the valve-shut (Phase 2) test.

Notes: DTCs: P2440; Cal: KtAIRD_K_VlvTstMAF_Dsbld; Axis is mass airflow (g/s).

y/x	0.0	3.0	6.0	9.0	12.0	15.0	18.0	21.0	24.0	27.0	30.0	33.0	36.0	39.0	42.0	45.0	48.0
1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.5	0.0	0.0	0.0	0.0	0.0

Initial Supporting table - P2440 Phase 2 System Volt Test Weight Factor

Description: System Voltage component of the conditional test weight for the valve-shut (Phase 2) test.

Notes: DTCs: P2440; Cal: KtAIRD_K_VlvTstVoltDsbld; Axis is system volts (V).

y/x	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	19.0	20.0	21.0
1.0	0.0	0.0	0.0	0.0	0.0	0.5	0.8	1.0	1.0	1.0	1.0	1.0	0.8	0.5	0.5	0.5	0.5

Initial Supporting table - P2444 Bank 1 Pump Pressure Error

Description: Sensor 1 maximum average pressure error threshold for the pump-off (Phase 3) test.

Notes: DTCs: P2444; Cal: KaAIRD_p_PmpTstPresErrMax[CeAIRR_e_PresSnsrOne]; Axis is Conditional Test Weight Time in seconds.

y/x	0	1	2	3	4	5	6	7	8
1	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5

Initial Supporting table - P057B KtBRKI_K_CmpltTestPointWeight

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 - P057B KtBRKI_K_CmpltTestPointWeight

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 - P057B KtBRKI_K_CmpltTestPointWeight

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

Initial Supporting table - P0011_PerfMaxIc1

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

Notes:

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
2	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
3	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
4	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
5	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
6	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
7	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
8	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
10	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
11	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
12	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
13	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
14	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
15	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
16	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
17	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0

Initial Supporting table - P0011_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	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
800	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
1,200	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
1,600	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
2,000	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
2,400	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
2,800	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
3,200	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
3,600	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
4,000	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
4,400	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
4,800	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
5,200	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
5,600	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
6,000	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
6,400	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
6,800	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0

Initial Supporting table - P0014_CamPosErrorLimEc1

Description: P0014 - Cam Position Error Limit for performance diagnostic

Notes: KtPHSD_phi_CamPosErrorLimEc1

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
400	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
800	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
1,200	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
1,600	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
2,000	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
2,400	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
2,800	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
3,200	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
3,600	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
4,000	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
4,400	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
4,800	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
5,200	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
5,600	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
6,000	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
6,400	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
6,800	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Initial Supporting table - P0014_PerfMaxEc1

Description: P0014 - Range of phaser travel where diagnostic cannot make a decision if both desired & measured positions are greater than

Notes:

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5
2	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5
3	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5
4	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5
5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5
6	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5
7	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5
8	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5
9	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5
10	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5
11	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5
12	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5
13	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5
14	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5
15	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5
16	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5
17	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5

Initial Supporting table - P0014_StablePositionTimeEc1

Description: P0014 - Delay after transient move

Notes: KtPHSD_t_StablePositionTimeEc1

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
400	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
800	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
1,200	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
1,600	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
2,000	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
2,400	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
2,800	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
3,200	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
3,600	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
4,000	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
4,400	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
4,800	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
5,200	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
5,600	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
6,000	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
6,400	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
6,800	100.0	80.0	20.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0

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

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

Notes: KtEONV_t_VolatilityTimeMax

y/x	-10	-4	1	7	13	18	24	29	35	41	46	52	58	63	69	74	80
1	30	30	45	60	80	120	220	300	400	400	400	400	400	400	400	400	400

Initial Supporting table - P0442: Engine Off Time Before Vehicle Off Maximum as a Function of Estimated Ambient Temp 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	44	44	44	44	68	82	105	153	320	480	480	480	480	480	480	480	480

Initial Supporting table - P0442: EONV Pressure Threshold (Pascals) 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	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6
2	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6
3	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6
4	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6
5	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6
6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6
7	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6
8	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6
9	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6
10	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6
11	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6
12	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6
13	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6
14	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6
15	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6
16	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6
17	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6	-373.6

Initial 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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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

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	68	67	66	65	64	64	63	62	61	60	59	58	57	56	55	54	53

Unique Supporting table - P0411 Phase 1 Amb Temp Test Weight Factor

Description: A Flo (P ase 1) Test am ient temperature ei t factor

Notes: DTC P0411 Cal KtA D_K_ A _TstTempDs ld Axis is Am ient (AT) Temp (C)

y/x	30	20	10	0	10	20	30	40	50
1	0 0	0 0	0 5	1 0	1 0	1 0	1 0	1 0	1 0

Unique Supporting table - P0411 Phase 1 Baro Test Weight Factor

Description: SAI Flow (Phase 1) Test baro weight factor.

Notes: DTC: P0411; Cal: KtAIRD_K_SAI_TstBaroDsbld; Axis is atmospheric pressure (kPa)

y/x	40	50	60	70	80	90	100	110	120
1	0.0	0.0	0.5	1.0	1.0	1.0	1.0	1.0	0.0

Unique Supporting table - P0411 Phase 1 MAF Test Weight Factor

Description: KtAIRD_K_SAI_TstMAF_Dsbld: SAI Flow (Phase 1) Test MAF weight factor.

Notes: Axis is Mass Airflow (g/sec).

y/x	0.0	3.0	6.0	9.0	12.0	15.0	18.0	21.0	24.0	27.0	30.0	33.0	36.0	39.0	42.0	45.0	48.0
1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.5	0.0	0.0	0.0	0.0	0.0

Unique Supporting table - P0411 Phase 1 System Volt Test Weight Factor

Description: SAI Flow (Phase 1) Test system voltage weight factor.

Notes: DTC: P0411; Cal: KtAIRD_K_SAI_TstVoltDsbld; Axis is system voltage (V).

y/x	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	19.0	20.0	21.0
1.0	0.0	0.0	0.0	0.0	0.0	0.5	0.8	1.0	1.0	1.0	1.0	1.0	0.8	0.5	0.5	0.5	0.5

Unique Supporting table - P0411 SL Threshold Bank 1 Table

Description: Bank 1 SAI Flow (Phase 1) Test Average String Length failure threshold versus MAF (g/sec).

Notes: DTCs: P0411; Cal: KtAIRD_dp_SAI_SL_ThrshBank1

y/x	0.0	3.0	6.0	9.0	12.0	15.0	18.0	21.0	24.0	27.0	30.0	33.0	36.0	39.0	42.0	45.0	48.0
1.0	100.0	100.0	125.0	175.0	225.0	225.0	225.0	225.0	225.0	225.0	225.0	225.0	225.0	225.0	225.0	225.0	225.0

Unique Supporting table - P0411 SL Threshold Bank 2 Table

Description: Bank 2 SAI Flow (Phase 1) Test Average String Length failure threshold versus MAF (g/sec).

Notes: DTCs: P0411; Cal: KtAIRD_dp_SAI_SL_ThrshBank2: For dual valve SAI systems only.

y/x	0.0	3.0	6.0	9.0	12.0	15.0	18.0	21.0	24.0	27.0	30.0	33.0	36.0	39.0	42.0	45.0	48.0
1.0	100.0	100.0	125.0	175.0	225.0	225.0	225.0	225.0	225.0	225.0	225.0	225.0	225.0	225.0	225.0	225.0	225.0

Unique Supporting table - P0420_BestFailingOSCTableB1

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

Notes: KtCATD_t_1_OSC_BestFailing - Use for norm ratio calculation for P0420

y/x	2.50	3.10	3.70	4.30	4.90	5.50	6.10	6.70	7.30	7.90	8.50	9.10	9.70	10.30	10.90	11.50	12.10
550.00	0.91	0.80	0.69	0.58	0.50	0.48	0.43	0.40	0.37	0.34	0.32	0.30	0.27	0.26	0.23	0.21	0.20
600.00	0.92	0.81	0.70	0.59	0.51	0.48	0.44	0.41	0.37	0.35	0.33	0.30	0.28	0.26	0.24	0.21	0.20
650.00	0.93	0.83	0.71	0.60	0.52	0.48	0.44	0.41	0.38	0.35	0.33	0.30	0.28	0.26	0.24	0.22	0.20
700.00	0.95	0.85	0.73	0.62	0.53	0.49	0.44	0.41	0.38	0.35	0.33	0.31	0.28	0.26	0.24	0.22	0.21
750.00	0.97	0.86	0.75	0.63	0.54	0.50	0.45	0.42	0.39	0.35	0.33	0.31	0.29	0.26	0.24	0.22	0.21
800.00	0.99	0.88	0.77	0.65	0.55	0.51	0.46	0.42	0.39	0.36	0.34	0.31	0.29	0.27	0.25	0.22	0.21
850.00	1.00	0.90	0.78	0.67	0.56	0.52	0.47	0.43	0.40	0.36	0.34	0.32	0.30	0.28	0.25	0.23	0.21
900.00	1.01	0.92	0.80	0.68	0.58	0.53	0.48	0.44	0.41	0.37	0.35	0.33	0.30	0.28	0.26	0.23	0.22
950.00	1.02	0.93	0.80	0.70	0.58	0.54	0.49	0.45	0.41	0.38	0.36	0.33	0.31	0.29	0.26	0.24	0.22

Unique Supporting table - P2431_P2436 Baro Skewed Sensor Weight Factor

Description: The AIR Pressure Sensor Test quality factor based on the distance traveled since the last unthrottled ambient pressure update.

Notes: DTCs: P2431 & P2436; Cal: KtAIRD_K_APPD_BaroQlty; P2436 is applicable on dual valve applications only. Axis is distance traveled from last Baro update in Km (1Km = 0.62 Miles).

y/x	0.0	2.0	4.0	6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0	32.0
1.0	1.0	0.8	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Unique Supporting table - P2440 Bank 1 Valve Pressure Error

Description: Sensor 1 minimum average pressure error (kPa) threshold for the valve-shut (Phase 2) test .

Notes: DTCs: P2440; Cal: KaAIRD_p_VlvTstPresErrMin[CeAIRR_e_PresSnsrOne]; Axis is Conditional Test Weight Time in seconds.

y/x	0	1	2	3	4	5	6	7	8
1	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2

Unique Supporting table - P2440 Bank 2 Valve Pressure Error

Description: Sensor 2 minimum average pressure error (kPa) threshold for the valve-shut (Phase 2) test .

Notes: DTCs: P2440; Cal: KaAIRD_p_VlvTstPresErrMin[CeAIRR_e_PresSnsrTwo]; For dual valve SAI systems only. Axis is Conditional Test Weight Time in seconds.

y/x	0	1	2	3	4	5	6	7	8
1	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2

Unique Supporting table - P2440 Phase 2 Amb Temp Test Weight Factor

Description: Ambient Temperature component of the conditional test weight for the valve-shut (Phase 2) test.

Notes: DTCs: P2440; Cal: KtAIRD_K_VlvTstTempDsbld; Axis is ambient temperature (IAT) in Deg C.

y/x	-30	-20	-10	0	10	20	30	40	50
1	0.0	0.0	0.5	1.0	1.0	1.0	1.0	1.0	1.0

Unique Supporting table - P2440 Phase 2 Baro Test Weight Factor

Description: Ambient pressure component of the conditional test weight for the valve-shut (Phase 2) test .

Notes: DTCs: P2440; Cal: KtAIRD_K_VlvTstBaroDsbld; Axis is ambient pressure (kPa).

y/x	40	50	60	70	80	90	100	110	120
1	0.0	0.0	0.5	1.0	1.0	1.0	1.0	1.0	0.0

Unique Supporting table - P2440 Phase 2 MAF Test Weight Factor

Description: Mass Airflow (MAF) component of the conditional test weight for the valve-shut (Phase 2) test.

Notes: DTCs: P2440; Cal: KtAIRD_K_VlvTstMAF_Dsbld; Axis is mass airflow (g/s).

y/x	0.0	3.0	6.0	9.0	12.0	15.0	18.0	21.0	24.0	27.0	30.0	33.0	36.0	39.0	42.0	45.0	48.0
1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.5	0.0	0.0	0.0	0.0	0.0

Unique Supporting table - P2440 Phase 2 System Volt Test Weight Factor

Description: System Voltage component of the conditional test weight for the valve-shut (Phase 2) test.

Notes: DTCs: P2440; Cal: KtAIRD_K_VlvTstVoltDsbld; Axis is system volts (V).

y/x	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	19.0	20.0	21.0
1.0	0.0	0.0	0.0	0.0	0.0	0.5	0.8	1.0	1.0	1.0	1.0	1.0	0.8	0.5	0.5	0.5	0.5

Unique Supporting table - P2444 Bank 1 Pump Pressure Error

Description: Sensor 1 maximum average pressure error threshold for the pump-off (Phase 3) test.

Notes: DTCs: P2444; Cal: KaAIRD_p_PmpTstPresErrMax[CeAIRR_e_PresSnsrOne]; Axis is Conditional Test Weight Time in seconds.

y/x	0	1	2	3	4	5	6	7	8
1	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5

Unique Supporting table - P2444 Bank 2 Pump Pressure Error

Description: Sensor 2 maximum average pressure error threshold for the pump-off (Phase 3) test.

Notes: DTCs: P2444; Cal: KaAIRD_p_PmpTstPresErrMax[CeAIRR_e_PresSnsrTwo]; For dual sensor SAI systems only. Axis is Conditional Test Weight Time in seconds.

y/x	0	1	2	3	4	5	6	7	8
1	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5

Initial Supporting table - P0300 EngineOverSpeedLimit

Description: Engine OverSpeed Limit versus gear

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

P0300 EngineOverSpeedLimit - Part 1

y/x	CeTGRR_e_TransGr1	CeTGRR_e_TransGr2	CeTGRR_e_TransGr3	CeTGRR_e_TransGr4	CeTGRR_e_TransGr5	CeTGRR_e_TransGr6	CeTGRR_e_TransGrEVT1
1	7,000	7,000	7,000	7,000	7,000	7,000	7,000

P0300 EngineOverSpeedLimit - Part 2

y/x	CeTGRR_e_TransGrEVT2	CeTGRR_e_TransGrNeut	CeTGRR_e_TransGrRvrs	CeTGRR_e_TransGrPark	CeTGRR_e_TransGr7	CeTGRR_e_TransGr8	
1	7,000	4,000	7,000	4,000	7,000	7,000	

Initial Supporting table - P0300 Number of Normals

Description: Number of Normals for the Driveline Ring Filter
After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.

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

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

Initial Supporting table - P0300 Ring Filter

Description: Driveline Ring Filter
After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.

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

y/x	0	1	2	3	4	5	6	7	8
1	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00

Initial Supporting table - P0300_Abnormal Cylinder Mode

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

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

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

Initial Supporting table - P0300_Abnormal Rev Mode

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

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

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

Initial Supporting table - P0300_Abnormal SCD Mode

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

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

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

Initial Supporting table - P0300_AFM_Decel

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

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

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500
0	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
6	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
13	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
19	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
25	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
31	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
38	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
44	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
50	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
56	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
63	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
69	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
75	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
81	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
88	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
94	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
100	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - P0300_Catalyst_Damage_Misfire_Percentage

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

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

y/x	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000
0	22.1	22.1	22.1	19.6	7.5	7.1	4.6	4.6
10	22.1	22.1	22.1	16.3	7.1	6.5	4.6	4.6
20	22.1	22.1	22.1	14.0	6.5	6.0	4.6	4.6
30	19.6	19.6	16.3	9.8	5.0	4.6	4.6	4.6
40	19.6	16.3	11.0	8.0	4.6	4.6	4.6	4.6
50	16.3	11.0	5.0	4.6	4.6	4.6	4.6	4.6
60	11.0	5.0	4.6	4.6	4.6	4.6	4.6	4.6
70	5.0	4.6	4.6	4.6	4.6	4.6	4.6	4.6
80	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
90	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
100	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6

Initial Supporting table - P0300_CylMode_Decel

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

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

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
7	1,800	1,800	1,800	1,400	1,150	800	575	500	280	165	125	80	75	70	30	20	20	20	12	22	12	13	11	10	8	7
9	1,800	1,800	1,800	1,400	1,150	800	575	525	300	170	125	82	75	70	40	25	25	22	12	10	11	12	7	10	8	7
11	1,800	1,800	1,800	1,600	1,150	800	575	525	375	175	125	95	95	82	45	30	28	28	13	10	10	10	8	7	8	7
12	1,800	1,800	1,800	1,600	1,150	850	600	550	375	200	125	100	80	75	45	40	30	28	15	11	9	7	8	7	7	7
13	1,800	1,800	1,800	1,600	1,200	900	650	550	400	200	150	120	80	75	45	40	30	28	17	11	9	6	8	7	7	7
15	1,800	1,800	1,800	1,600	1,300	1,050	650	550	400	250	160	120	90	75	45	40	30	30	19	12	9	7	8	7	7	7
17	1,800	1,800	1,800	2,000	1,500	1,100	825	550	400	275	200	130	100	75	50	50	35	30	23	12	10	8	8	7	7	7
19	1,800	1,800	1,800	2,200	1,700	1,250	900	600	500	300	225	150	120	75	65	60	45	40	24	15	12	9	8	7	7	7
22	1,800	1,800	1,800	2,300	1,900	1,500	1,100	700	600	350	225	175	120	100	75	60	50	40	25	17	13	10	8	7	7	7
25	3,500	3,500	3,500	2,500	1,900	1,600	1,100	800	600	350	275	200	140	120	90	65	55	50	30	19	16	10	8	8	7	7
29	3,500	3,500	3,500	3,000	2,200	1,800	1,200	900	700	450	300	240	150	140	100	85	60	55	32	22	18	12	9	8	7	7
33	4,500	4,500	4,500	3,000	2,800	2,300	1,400	1,000	700	500	300	275	200	150	100	85	70	60	35	25	18	14	10	9	7	7
38	4,500	4,500	4,500	3,500	3,000	2,400	1,500	1,100	800	650	350	300	200	170	120	100	80	70	45	27	22	16	12	10	7	7
42	5,000	5,000	5,000	4,000	3,500	2,500	1,800	1,400	1,000	700	375	350	210	170	135	125	90	75	45	35	25	18	13	12	8	8
48	5,500	5,500	5,500	4,500	3,500	3,000	2,500	2,000	1,400	700	500	350	260	200	180	150	90	75	50	40	26	19	15	13	9	9
54	6,000	6,000	6,000	5,000	4,000	3,500	2,500	2,500	1,600	700	500	400	300	220	190	150	115	100	70	45	32	22	18	14	14	14
61	6,500	6,500	6,500	5,500	4,500	4,000	3,000	3,000	2,000	800	600	450	350	275	200	175	135	125	80	65	35	25	22	16	15	15

Initial Supporting table - P0300_CylMode_Jerk

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

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

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
7	1,400	1,400	1,400	1,400	1,200	800	600	550	350	250	175	125	105	90	55	40	35	30	22	22	13	13	11	10	12	12
9	1,400	1,400	1,400	1,400	1,200	800	600	550	400	250	190	130	115	110	65	50	35	30	20	14	14	12	10	10	12	12
11	1,500	1,500	1,500	1,500	1,200	825	800	550	475	320	220	130	130	110	65	50	40	36	23	16	14	10	10	10	11	11
12	1,800	1,800	1,800	1,500	1,200	900	800	575	475	300	200	130	120	110	65	50	40	36	24	18	14	11	10	10	11	11
13	1,800	1,800	1,800	1,500	1,200	1,000	800	575	500	300	200	130	110	110	65	50	45	36	27	20	14	11	10	10	11	11
15	1,800	1,800	1,800	1,600	1,400	1,300	800	575	500	300	200	145	110	110	80	75	50	40	27	22	15	12	10	10	11	11
17	1,800	1,800	1,800	2,100	1,550	1,300	800	700	600	300	225	170	125	110	90	75	50	40	30	24	18	13	10	11	10	10
19	2,000	2,000	2,000	2,200	2,000	1,300	1,000	1,000	600	450	275	200	175	135	100	95	60	60	30	27	19	15	12	11	10	10
22	2,400	2,400	2,400	2,500	2,100	1,800	1,300	1,000	750	500	310	225	200	150	140	115	80	70	35	27	21	17	13	11	10	10
25	3,800	3,800	3,800	2,500	2,100	2,500	1,300	1,300	1,000	800	475	275	250	200	180	125	100	75	45	35	22	18	16	13	10	10
29	4,000	4,000	4,000	3,400	2,600	3,000	1,300	1,300	1,200	800	475	325	250	225	200	140	125	85	55	40	28	20	20	13	11	11
33	5,500	5,500	5,500	4,000	3,500	3,800	1,600	1,400	1,200	800	500	400	300	250	200	155	135	100	65	50	34	23	22	13	13	13
38	6,000	6,000	6,000	4,500	3,500	3,800	1,800	1,500	1,200	1,200	525	500	350	350	225	180	155	125	70	55	39	27	24	14	14	14
42	8,000	8,000	8,000	5,000	4,000	4,000	2,400	2,000	1,400	1,200	625	500	400	350	300	200	170	135	75	65	43	29	24	16	16	16
48	9,000	9,000	9,000	5,500	5,000	5,000	3,000	2,500	2,000	1,200	700	650	500	400	300	225	190	140	85	75	50	35	25	18	20	20
54	9,000	9,000	9,000	6,000	5,500	5,500	3,500	3,000	2,200	1,200	750	650	600	400	350	300	225	175	110	85	55	55	32	22	25	25
61	9,500	9,500	9,500	6,500	6,000	6,000	4,000	3,500	2,600	1,200	800	700	650	450	350	300	250	200	150	95	70	55	36	25	27	27

Initial Supporting table - P0300_IdleCylModeDecel

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

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

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
7	4,500	4,500	4,000	1,700	1,200	800	600	450	300	175	75	80	75
9	4,500	4,500	4,900	2,000	1,300	800	450	425	300	175	100	82	75
11	4,500	4,500	4,900	2,000	1,600	800	450	425	300	175	100	95	95
12	4,500	4,500	4,900	2,000	1,600	900	550	500	300	175	100	100	80
13	4,500	4,500	4,900	2,000	1,600	1,200	800	500	300	175	100	120	80
15	4,500	4,500	4,000	1,700	1,600	1,500	950	500	350	225	125	120	90
17	4,500	4,500	4,000	1,700	1,500	1,500	1,100	1,000	450	225	150	130	100
19	4,500	4,500	4,000	1,700	1,500	1,500	1,100	1,000	450	250	175	150	120
22	4,500	4,500	4,000	1,700	1,500	1,600	1,100	1,000	550	450	275	175	120
25	4,500	4,500	4,000	2,150	1,500	1,600	1,100	1,000	750	700	500	200	140
29	4,500	4,500	4,000	2,400	1,500	1,600	1,100	1,000	900	750	500	240	150
33	4,500	4,500	4,500	3,000	1,800	1,800	1,100	1,000	900	750	500	275	200
38	4,500	4,500	4,500	3,500	2,000	1,800	1,100	1,000	900	750	500	300	200
42	5,000	5,000	5,000	4,000	3,000	2,500	1,500	1,400	1,000	750	500	350	210
48	5,500	5,500	5,500	4,500	3,500	3,000	2,500	2,000	1,400	750	500	350	260
54	6,000	6,000	6,000	5,000	4,000	3,500	2,500	2,500	1,600	750	500	400	300
60	6,500	6,500	6,500	5,500	4,500	4,000	3,000	3,000	2,000	750	600	450	350

Initial Supporting table - P0300_IdleCylModeJerk

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

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

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
7	4,500	4,500	4,000	1,600	1,300	800	600	840	400	300	175	125	105
9	4,500	4,500	4,000	2,000	1,300	800	600	450	450	300	175	125	105
11	4,500	4,500	4,900	2,000	1,600	800	800	500	475	300	200	130	130
12	4,500	4,500	4,900	2,000	1,600	1,000	800	575	475	300	200	130	120
13	4,500	4,500	4,900	2,000	1,600	1,300	1,200	575	400	300	200	130	110
15	4,500	4,500	4,000	1,800	1,600	1,500	1,200	575	450	375	200	145	110
17	4,500	4,500	4,000	2,100	1,500	1,500	1,200	700	600	400	225	170	125
19	4,500	4,500	4,000	2,200	2,000	1,500	1,200	1,000	600	450	275	200	175
22	4,500	4,500	4,000	2,500	2,100	1,800	1,300	1,000	750	500	310	225	200
25	4,500	4,500	4,000	2,500	2,100	2,500	1,300	1,200	1,050	750	525	275	250
29	4,500	4,500	4,000	3,400	2,600	3,000	1,300	1,200	1,050	750	525	325	250
33	5,500	5,500	5,500	4,000	3,500	3,800	1,600	1,300	1,050	750	525	400	300
38	6,000	6,000	6,000	4,500	3,500	3,800	1,800	1,500	1,050	750	550	500	350
42	8,000	8,000	8,000	5,000	4,000	4,000	2,400	2,000	1,400	750	625	500	400
48	9,000	9,000	9,000	5,500	5,000	5,000	3,000	2,500	2,000	800	700	650	500
54	9,000	9,000	9,000	6,000	5,500	5,500	3,500	3,000	2,200	1,200	750	650	600
60	9,500	9,500	9,500	6,500	6,000	6,000	4,000	3,500	2,600	1,200	800	700	650

Initial Supporting table - P0300_IdleSCD_Decel

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

Notes: Used for P0300-P0308. Cal Name: KtMISF_dt_SCD_IdleMode
Note: Misfire's Load term is %, but not PID$04. PID $04 is not robust to temperature and alititude shifts. (especially decel and jerk thresholds since they track actual air trapped in cylinder)

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
7	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
9	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
11	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
13	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
15	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
17	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
19	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
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
25	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
29	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
33	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
38	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
42	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
48	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
54	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
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

Initial Supporting table - P0300_IdleSCD_Jerk

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

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

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
7	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
9	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
11	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
13	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
15	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
17	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
19	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
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
25	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
29	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
33	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
38	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
42	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
48	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
54	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
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

Initial Supporting table - P0300_Max_PatternMultiplier

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

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

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

Initial Supporting table - P0300_Min_PatternMultiplier

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

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

y/x	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000
1	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85

Initial Supporting table - P0300_RevMode_Decel

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

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

y/x	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
7	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	23	20	15	11	10	10
9	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	26	20	15	14	11	11
11	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32	24	17	14	11	11
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	34	26	17	17	13	13
13	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	40	30	22	18	15	15
15	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	45	35	25	20	16	16
17	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	50	38	25	22	17	17
19	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	55	40	30	25	20	20
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	60	50	35	30	24	22
25	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	70	50	40	30	26	25
29	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	80	60	45	40	30	27
33	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	90	70	50	40	35	30
38	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	100	80	60	50	35	35
42	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	115	90	70	55	45	40
48	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	120	100	80	60	50	45
54	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	130	110	90	70	55	50
61	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	140	110	100	80	65	60

Initial Supporting table - P0300_SCD_Decel

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

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

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
7	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
9	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
11	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
13	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
15	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
17	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
19	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
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
25	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
29	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
33	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
38	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
42	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
48	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
54	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
61	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - P0300_SCD_Jerk

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

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

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
7	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
9	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
11	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
13	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
15	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
17	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
19	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
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
25	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
29	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
33	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
38	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
42	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
48	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
54	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
61	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

Initial Supporting table - P0300_TOSSRoughRoadThres

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

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

y/x	600	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000
100	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
200	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
300	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
400	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
500	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
600	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
700	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
800	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
900	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
1,000	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
1,100	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
1,200	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
1,300	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
1,400	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0

Initial Supporting table - P0300_WSSRoughRoadThres

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

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

y/x	0	12	24	36	48	60	72	85	97	109	121	133	145	157	169	181	193
1	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

Initial Supporting table - P0300_ZeroTorqBaro

Description: adjusts zero torque for altitude

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

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

Initial Supporting table - P0300_ZeroTorqDoD

Description: Zero torque engine load while in Active Fuel Management

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

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
1	12.00	10.00	8.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	8.00	8.00	8.00	8.00	8.00	8.00	8.50	10.87	13.24	15.61	17.98	20.35	22.72	25.09	27.46

Initial Supporting table - P0300_ZeroTorqueEngLoad

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

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

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
1	12.00	10.00	8.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.50	8.00	8.00	8.00	8.00	8.00	8.00	8.50	10.87	13.24	15.61	17.98	20.35	22.72	25.09	27.46

Fault Bundle Definitions

Bundle Name: 5VoltReferenceA_FA
P0641
Bundle Name: 5VoltReferenceB_FA
P0651
Bundle Name: 5VoltReferenceMAP_OOR_Flt
P0697
Bundle Name: A/F Imbalance Bank1
P219A
Bundle Name: A/F Imbalance Bank2
P219B
Bundle Name: AAP3_SnsrCktFA
P222C, P222D
Bundle Name: AAP3_SnsrCktFP
P222C, P222D
Bundle Name: AccCktLo_FA
P2537
Bundle Name: AcceleratorPedalFailure
P2122, P2123, P2127, P2128, P2138, P0697, P06A3
Bundle Name: ACCMLostComm
U016B
Bundle Name: ACFailedOnSD
See ACCM Document
Bundle Name: ACHighSidePressSnsrCktFA
P0532, P0533
Bundle Name: ACThrmlRefrigSpdVld
See ACCM Document
Bundle Name: AfterThrottlePressTFTKO
Naturally Aspirated or Turbocharged: P0106, P0107, P0108. Supercharged: P012B, P012C, P012D.
Bundle Name: AfterThrottlePressureFA
Naturally Aspirated or Turbocharged: P0106, P0107, P0108. Supercharged: P012B, P012C, P012D.
Bundle Name: AfterThrottleVacuumTFTKO
Naturally Aspirated or Turbocharged: P0106, P0107, P0108. Supercharged: P012B, P012C, P012D.
Bundle Name: AIR System FA
P0411, P2440, P2444
Bundle Name: AIRPumpControlCircuit FA
P0418, P2257, P2258
Bundle Name: AIRSystemPressureSensor FA
P2430, P2431, P2432, P2433, P2435, P2436, P2437, P2438

Fault Bundle Definitions

Bundle Name: AIRValveControlCircuit FA
P0412, P041F, P044F
Bundle Name: AmbPresSnsr2_CktFA
P222C, P222D
Bundle Name: AnyCamPhaser_FA
P0010, P0011, P0013, P0014, P0020, P0021, P0023, P0024, P2088, P2089, P2090, P2091, P2092, P2093, P2094, P2095
Bundle Name: AnyCamPhaser_TFTKO
P0010, P0011, P0013, P0014, P0020, P0021, P0023, P0024, P2088, P2089, P2090, P2091, P2092, P2093, P2094, P2095
Bundle Name: BrakeBoosterSensorFA
P0556, P0557, P0558
Bundle Name: BrakeBoosterVacuumValid
P0556, P0557, P0558
Bundle Name: BSTR_b_IC_Pmp_EffPerfTFTKO
P026A
Bundle Name: CamLctnExhFA
P0017, P0019, P0365, P0366, P0390, P0391
Bundle Name: CamLctnIntFA
P0016, P0018, P0340, P0341, P0345, P0346
Bundle Name: CamSensor_FA
P0016, P0017, P0018, P0019, P0340, P0341, P0345, P0346, P0365, P0366, P0390, P0391
Bundle Name: CamSensor_TFTKO
P0016, P0017, P0018, P0019, P0340, P0341, P0345, P0346, P0365, P0366, P0390, P0391
Bundle Name: CamSensorAnyLctnTFTKO
P0016, P0017, P0018, P0019, P0340, P0341, P0345, P0346, P0365, P0366, P0390, P0391
Bundle Name: CamSensorAnyLocationFA
P0016, P0017, P0018, P0019, P0340, P0341, P0345, P0346, P0365, P0366, P0390, P0391
Bundle Name: CamSensorFA
P0016, P0017, P0018, P0019, P0340, P0341, P0345, P0346, P0365, P0366, P0390, P0391
Bundle Name: CamSensorTFTKO
P0016, P0017, P0018, P0019, P0340, P0341, P0345, P0346, P0365, P0366, P0390, P0391
Bundle Name: CatalystSysEfficiencyLoB1_FA
P0420
Bundle Name: CatalystSysEfficiencyLoB2_FA
P0430
Bundle Name: ClutchPstnSnsr FA
P0806, P0807, P0808
Bundle Name: ClutchPstnSnsrCktHi FA
P0808

Fault Bundle Definitions

Bundle Name: ClutchPstnSnsrCktLo FA
P0807
Bundle Name: ClutchPstnSnsrNotLearned
P080A
Bundle Name: CommBusAOff_VICM_FA
U0073
Bundle Name: CommBusBOff_VICM_FA
U0074
Bundle Name: CoolingFanSpeedTooHigh_FA
P0495
Bundle Name: CrankCamCorrelationTFTKO
P0016, P0017, P0018, P0019
Bundle Name: CrankExhaustCamCorrelationFA
P0017, P0019
Bundle Name: CrankExhaustCamCorrFA
P0017, P0019
Bundle Name: CrankIntakeCamCorrelationFA
P0016, P0018
Bundle Name: CrankIntakeCamCorrFA
P0016, P0018
Bundle Name: CrankSensor_FA
P0335, P0336
Bundle Name: CrankSensor_TFTKO
P0335, P0336
Bundle Name: CrankSensorFA
P0335, P0336
Bundle Name: CrankSensorFaultActive
P0335, P0336
Bundle Name: CrankSensorTestFailedTKO
P0335, P0336
Bundle Name: CrankSensorTFTKO
P0335, P0336
Bundle Name: CylDeacDriverFault
P3401, P03403, P03404, P3409, P03411, P03412, P3417, P3419, P3420, P3425, P3427, P3428, P3433, P3435, P3436, P3441, P3443, P3444, P3449, P3451, P3452, P3457, P3459, P3460
Bundle Name: CylDeacSystemTFTKO
P3400
Bundle Name: ECT_Sensor_Ckt_FA

Fault Bundle Definitions

P0117, P0118, P0119
Bundle Name: ECT_Sensor_Ckt_FP
P0117, P0118
Bundle Name: ECT_Sensor_Ckt_High_FP
P0118
Bundle Name: ECT_Sensor_Ckt_Low_FP
P0117
Bundle Name: ECT_Sensor_Ckt_TFTKO
P0117, P0118, P0119
Bundle Name: ECT_Sensor_Ckt_TPTKO
P0117, P0118, P0019
Bundle Name: ECT_Sensor_DefaultDetected
P0117, P0118, P0116, P0125
Bundle Name: ECT_Sensor_FA
P0117, P0118, P0116, P0125, P0128
Bundle Name: ECT_Sensor_Perf_FA
P0116
Bundle Name: ECT_Sensor_TFTKO
P0117, P0118, P0116, P0125, P0119
Bundle Name: EGRValve_FP
P0405, P0406, P042E
Bundle Name: EGRValveCircuit_FA
P0403, P0404, P0405, P0406
Bundle Name: EGRValveCircuit_TFTKO
P0403, P0404, P0405, P0406
Bundle Name: EGRValvePerformance_FA
P0401, P042E
Bundle Name: EGRValvePerformance_TFTKO
P0401, P042E
Bundle Name: ELCP_PumpCircuit_FA
P2400, P2401, P2402
Bundle Name: ELCP_SwitchCircuit_FA
P2418, P2419, P2420
Bundle Name: ELCPCircuit_FA
P24BA, P24BB
Bundle Name: EngineMetalOvertempActive
P1258
Bundle Name: EngineMisfireDetected_FA

Fault Bundle Definitions

P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308
Bundle Name: EngineMisfireDetected_TFTKO
P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308
Bundle Name: EngineModeNotRunTimer_FA
P2610
Bundle Name: EngineModeNotRunTimerError
P2610
Bundle Name: EnginePowerLimited
P0068, P00C8, P00C9, P00CA, P0090, P0091, P0092, P0122, P0123, P0191, P0192, P0193, P0222, P0223, P0601, P0604, P0606, P0697, P06A3, P06DB, P06DE, P0A1D, P1104, P127A, P127C, P127D, P15F2, P160D, P160E, P1682, P16A0, P16A1, P16A2, P16F3, P2100, P2101, P2102, P2103, P2122, P2123, P2127, P2128, P2135, P2138, P215B, P2176, P228C, P228D, U0073, U0074, U0293, U1817
Bundle Name: EngineTorqueEstInaccurate
EngineMisfireDetected_FA, FuelInjedtorCircuit_FA, FuelInjedtorCircuit_TFTKO, FuelTrimSystemB1_FA, FuelTrimSystemB2_FA, MAF_SensorTFTKO, MAP_SensorTFTKO, EGRValuePerforamnce_FA
Bundle Name: EngModeNotRunTmErr
P2610
Bundle Name: EngOilModeledTempValid
ECT_Sensor_FA, IAT_SensorCircuitFA
Bundle Name: EngOilPressureSensorCktFA
P0522, P0523
Bundle Name: EngOilPressureSensorFA
P0521, P0522, P0523
Bundle Name: EngOilTempFA
EngOilTempSensorCircuitFA, EngOilModeledTempValid, P16F3
EngOilTempFA - Other Definitions: P16F3 with GetXOYR_b_SecurityFlt(CeXOYR_e_EOTR_SecurityFlt)
Bundle Name: EngOilTempSensorCircuitFA
P0197, P0198
Bundle Name: Ethanol Composition Sensor FA
P0178, P0179, P2269
Bundle Name: EvapEmissionSystem_FA
P0455, P0446
Bundle Name: EvapExcessPurgePsbl_FA
ELCP sealed/vented fuel system, P0442, P0455, P0458 OR Conventional fuel system, P0442, P0455, P0458, P0496
Bundle Name: EvapFlowDuringNonPurge_FA
P0496
Bundle Name: EvapPurgeSolenoidCircuit_FA
P0443, P0458, P0459
Bundle Name: EvapReducedPurgePsbl_FA

Fault Bundle Definitions

ELCP sealed/vented fuel system, P0443, P0446, P0449, P0459, P0497, P0499, P1463, P2419, P2422 OR Conventional fuel system, P0443, P0446, P0455, P0459, P0498
Bundle Name: EvapSmallLeak_FA
P0442
Bundle Name: EvapVentSolenoidCircuit_FA
P0449, P0498, P0499
Bundle Name: ExhaustCamSensor_FA
P0017, P0019, P0365, P0366, P0390, P0391
Bundle Name: ExhaustCamSensor_TFTKO
P0017, P0019, P0365, P0366, P0390, P0391
Bundle Name: ExhaustCamSensorFA
P0017, P0019, P0365, P0366, P0390, P0391
Bundle Name: ExhaustCamSensorTFTKO
P0017, P0019, P0365, P0366, P0390, P0391
Bundle Name: FanOutputDriver_FA
P0480, P0481, P0482, P0691, P0692, P0693, P0694, P0695, P0696, P1485 (EREV), P1486 (EREV), P1487 (EREV)
Bundle Name: FHPD_b_HPC_PresErrNeg_FA
P228D
Bundle Name: FHPD_b_HPC_PresErrNeg_TFTKO
P228D
Bundle Name: FHPD_b_HPC_PresErrPos_FA
P228C
Bundle Name: FHPD_b_HPC_PresErrPos_TFTKO
P228C
Bundle Name: FHPD_b_HPC_Windup_ TFTKO
P0089
Bundle Name: FHPD_b_HPC_Windup_FA
P0089
Bundle Name: FHPD_b_PumpCurr_FA
P163A
Bundle Name: FHPD_b_PumpCurr_TFTKO
P163A
Bundle Name: FHPR_b_FRP_SnsrCkt_FA
P0192, P0193, P127C, P127D
Bundle Name: FHPR_b_FRP_SnsrCkt_TFTKO
P0192, P0193, , P127C, P127D
Bundle Name: FHPR_b_FRP_SnsrPerfDiag_FA
P0191, P127A
Bundle Name: FHPR_b_FRP_SnsrPerfDiag_TFTKO

Fault Bundle Definitions

P0191, P127A
Bundle Name: FHPR_b_PumpCkt_FA
P0090, P0091, P0092, P00C8, P00C9, P00CA
Bundle Name: FHPR_b_PumpCkt_TFTKO
P0090, P0091, P0092, P00C8, P00C9, P00CA
Bundle Name: FourWheelDriveLowStateInvalid
P2771
Bundle Name: FTP_SensorCircuit_FA
P0452, P0453
Bundle Name: FuelInjectorCircuit_FA
PFI: P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0261, P0264, P0267, P0270, P0273, P0276, P0279, P0282, P0262, P0265, P0268, P0271, P0274, P0277, P0280, P0283 SIDI: P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0261, P0264, P0267, P0270, P0273, P0276, P0279, P0282, P0262, P0265, P0268, P0271, P0274, P0277, P0280, P0283, P2147, P2150, P2153, P2156, P216B, P216E, P217B, P217E, P2148, P2151, P2154, P2157, P216C, P216F, P217C, P217F, P1248, P1249, P124A, P124B, P124C, P124D, P124E, P124F
Bundle Name: FuelInjectorCircuit_TFTKO
PFI: P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0261, P0264, P0267, P0270, P0273, P0276, P0279, P0282, P0262, P0265, P0268, P0271, P0274, P0277, P0280, P0283 SIDI: P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0261, P0264, P0267, P0270, P0273, P0276, P0279, P0282, P0262, P0265, P0268, P0271, P0274, P0277, P0280, P0283, P2147, P2150, P2153, P2156, P216B, P216E, P217B, P217E, P2148, P2151, P2154, P2157, P216C, P216F, P217C, P217F, P1248, P1249, P124A, P124B, P124C, P124D, P124E, P124F
Bundle Name: FuelLevelDataFault
P0461, P0462, P0463, P2066, P2067, P2068
Bundle Name: FuelTankPressureSnsrCkt_FA
P0452, P0453
Bundle Name: HumidityFA
P0097, P0098, P11C2, P11C3, P2227, P2228, P2229, P2230
Bundle Name: HumTempSnsrCktFA
P0097, P0098
Bundle Name: HumTempSnsrCktFP
P0097, P0098
Bundle Name: HumTempSnsrFA
P0096, P0097, P0098, P0099
Bundle Name: IAC_SystemRPM_FA
P0506, P0507
Bundle Name: IAT_ContCorrFA
P2199
Bundle Name: IAT_SensorCircuitFA
P0112, P0113
Bundle Name: IAT_SensorCircuitFP
P0112, P0113

Fault Bundle Definitions

Bundle Name: IAT_SensorCircuitTFTKO
P0112, P0113
Bundle Name: IAT_SensorFA
P0111, P0112, P0113, P0114
Bundle Name: IAT_SensorTFTKO
P0111, P0112, P0113, P0114
Bundle Name: IgnitionOffTimer_FA
P2610
Bundle Name: IgnitionOffTimeValid
P2610
Bundle Name: IgnitionOutputDriver_FA
P0351, P0352, P0353, P0354, P0355, P0356, P0357, P0358, P2300, P2301, P2303, P2304, P2306, P2307, P2309, P2310, P2312, P2313, P2315, P2316, P2318, P2319, P2321, P2322
Bundle Name: IntakeCamSensor_FA
P0016, P0018, P0340, P0341, P0345, P0346
Bundle Name: IntakeCamSensor_TFTKO
P0016, P0018, P0340, P0341, P0345, P0346
Bundle Name: IntakeCamSensorFA
P0016, P0018, P0340, P0341, P0345, P0346
Bundle Name: IntakeCamSensorTFTKO
P0016, P0018, P0340, P0341, P0345, P0346
Bundle Name: IntkCamPhaser_FA
P0010, P0011, P0020, P0021, P2088, P2089, P2092, P2093
Bundle Name: KS_Ckt_Perf_B1B2_FA
P0324, P0325, P0326, P0327, P0328, P0330, P0332, P0333, P06B6, P06B7
Bundle Name: LostCommBCM_FA
U0140
Bundle Name: LostCommBusB_VICM_FA
U182D
Bundle Name: LowFuelConditionDiagnostic
LowFuelConditionDiagnostic - Other Definitions: Flag set to TRUE if the fuel level < 10.0 % AND No Active DTCs: FuelLevelDataFault, P0462, P0463 for at least 30.0 seconds
Bundle Name: MAF_SensorPerfFA
P0101
Bundle Name: MAF_SensorPerfTFTKO
P0101
Bundle Name: MAF_Snsr1_FA

Fault Bundle Definitions

P0101, P0102, P0103
Bundle Name: MAF_Snsr2_FA
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_SensorPerfFA
P0106
Bundle Name: MAP_SensorPerfTFTKO
P0106
Bundle Name: MAP_SensorTFTKO
P0106, P0107, P0108
Bundle Name: MnfdTempSensorCktFA
Turbocharged or Supercharged, with Humidity sensor: P112C, P112D. Turbocharged or Supercharged, without Humidity sensor: P0097, P0098. Naturally Aspirated: P0112, P0113.
Bundle Name: MnfdTempSensorCktFP
Turbocharged or Supercharged, with Humidity sensor: P112C, P112D. Turbocharged or Supercharged, without Humidity sensor: P0097, P0098. Naturally Aspirated: P0112, P0113.
Bundle Name: MnfdTempSensorCktTFTKO
Turbocharged or Supercharged, with Humidity sensor: P112C, P112D. Turbocharged or Supercharged, without Humidity sensor: P0097, P0098. Naturally Aspirated: P0112, P0113.
Bundle Name: MnfdTempSensorFA
Turbocharged or Supercharged, with Humidity sensor: P112B, P112C, P112D, P112E. Turbocharged or Supercharged, without Humidity sensor: P0096, P0097, P0098, P0099. Naturally Aspirated: P0111, P0112, P0113, P0114.
Bundle Name: MnfdTempSensorTFTKO
Turbocharged or Supercharged, with Humidity sensor: P112B, P112C, P112D, P112E. Turbocharged or Supercharged, without Humidity sensor: P0096, P0097, P0098, P0099. Naturally Aspirated: P0111, P0112, P0113, P0114.
Bundle Name: ModuleOffTime_FA
P2610
Bundle Name: ModuleOffTimeErr
P2610
Bundle Name: OAT_AmbientFilteredFA
ECM OAT: P0071, P0072, P0073, P0074, EngModeNotRunTmErr, VehicleSpeedSensor_FA, IAT_SensorFA, ECT_Sensor_DefaultDetected, MAF_SensorFA. VIMC OAT: P0072, P0073, EngModeNotRunTmErr, VehicleSpeedSensor_FA, ECT_Sensor_DefaultDetected. IAT-Based OAT: not applicable. All other cases: not applicable.
Bundle Name: OAT_AmbientSensorFA
ECM OAT: P0071, P0072, P0073, P0074. VIMC OAT: P0071, P0072, P0073, EngModeNotRunTmErr, VehicleSpeedSensor_FA, ECT_Sensor_DefaultDetected. IAT-Based OAT: not applicable. All other cases: not applicable.

Fault Bundle Definitions

Bundle Name: OAT_EstAmbTemp_FA
ELCP sealed/vented fuel system, P0071, P0072, P0073, P0502, P0503, P0722, P0723 OR Conventional fuel system, P0071, P0072, P0073, P0074, P2610
Bundle Name: OAT_PtEstFiltFA
ECM OAT: P0071, P0072, P0073, P0074, EngModeNotRunTmErr, VehicleSpeedSensor_FA, IAT_SensorFA, ECT_Sensor_DefaultDetected, MAF_SensorFA. VIMC OAT: P0072, P0073, EngModeNotRunTmErr, VehicleSpeedSensor_FA, ECT_Sensor_DefaultDetected. IAT-Based OAT: VehicleSpeedSensor_FA, IAT_SensorFA, MAF_SensorFA. All other cases: EngModeNotRunTmErr, VehicleSpeedSensor_FA, IAT_SensorFA, ECT_Sensor_DefaultDetected.
Bundle Name: OAT_PtEstRawFA
ECM OAT: P0071, P0072, P0073, P0074. VIMC OAT: P0071, P0072, P0073, EngModeNotRunTmErr, VehicleSpeedSensor_FA, ECT_Sensor_DefaultDetected. IAT-Based OAT: IAT_SensorFA. All other cases: IAT_SensorFA, ECT_Sensor_DefaultDetected.
Bundle Name: OilPmpCktFA
P06DA, P06DB, P06DC
OilPmpCktFA - Other Definitions: Output Driver Codes
Bundle Name: OilPmpFA
P06DA, P06DB, P06DC, P06DD, P06DE
OilPmpFA - Other Definitions: FA only for Output Driver and rationality
Bundle Name: OilPmpStuckHigh
P06DA, P06DB, P06DD
OilPmpStuckHigh - Other Definitions: TFTKO and FA
Bundle Name: OilPmpStuckLow
P06DC, P06DE
OilPmpStuckLow - Other Definitions: TFTKO and FA
Bundle Name: OilPmpTFTKO
P06DA, P06DB, P06DC, P06DD, P06DE
OilPmpTFTKO - Other Definitions: TFTKO only for Output Driver and rationality
Bundle Name: PostCatFuelTrimHiB1
P2097
Bundle Name: PostCatFuelTrimHiB2
P2099
Bundle Name: PostCatFuelTrimLoB1
P2096
Bundle Name: PostCatFuelTrimLoB2
P2098
Bundle Name: PowertrainRelayStateOn_FA
P0685, P0686, P0687
Bundle Name: PPS1_OutOfRange

Fault Bundle Definitions

P2122, P2123
Bundle Name: PPS1_OutOfRange_Composite
P2122, P2123, P06A3
Bundle Name: PPS2_OutOfRange
P2127, P2128
Bundle Name: PPS2_OutOfRange_Composite
P2127, P2128, P0697
Bundle Name: SCIAP_SensorCircuitFA
P012C, P012D
Bundle Name: SCIAP_SensorCircuitFP
P012C, P012D
Bundle Name: SCIAP_SensorFA
P012B, P012C, P012D
Bundle Name: SCIAP_SensorPerfFA
P012B
Bundle Name: SCIAP_SensorPerfTFTKO
P012B
Bundle Name: SCIAP_SensorTFTKO
P012B, P012C, P012D
Bundle Name: SuperchargerBypassValveFA
P2261
Bundle Name: SystemVoltageHigh_FA
P0563
Bundle Name: SystemVoltageLow_FA
P0562
Bundle Name: TCM_EngSpdReqCkt
P150C
Bundle Name: THMR_AHV_FA
P2681, P26A3, P26A6, P26A7, P26A9
Bundle Name: THMR_AWP_AuxPumpFA
B2920, B2923, B2922
Bundle Name: THMR_ECT_Sensor_Ckt_FA
P0116, P0117, P0118, P00B6
Bundle Name: THMR_Insuff_Flow_FA
P00B7
Bundle Name: THMR_RCT_Sensor_Ckt_FA
P00B3, P00B4
Bundle Name: THMR_SWP_Control_FA

Fault Bundle Definitions

P261D, P261A, P261C
Bundle Name: THMR_SWP_FlowStuckOn_FA
P261A, P261D, P261E
Bundle Name: THMR_SWP_NoFlow_FA
P261B, P261C
Bundle Name: THMR_Therm_Control_FA
P0597, P0598, P0599
Bundle Name: ThrotTempSensorFA
Turbocharged or Supercharged, with Humidity sensor: P112B, P112C, P112D, P112E. Turbocharged or Supercharged, without Humidity sensor: P0096, P0097, P0098, P0099. Naturally Aspirated: P0111, P0112, P0113, P0114.
Bundle Name: ThrotTempSensorTFTKO
Turbocharged or Supercharged, with Humidity sensor: P112B, P112C, P112D, P112E. Turbocharged or Supercharged, without Humidity sensor: P0096, P0097, P0098, P0099. Naturally Aspirated: P0111, P0112, P0113, P0114.
Bundle Name: ThrottlePositionSnsrPerfFA
P0121
Bundle Name: ThrottlePositionSnsrPerfTFTKO
P0121
Bundle Name: TIAP_SensorPerfFA
P0236
Bundle Name: TPS_FA
P0122, P0123, P0222, P0223, P2135
Bundle Name: TPS_FaultPending
P0122, P0123, P0222, P0223, P2135
Bundle Name: TPS_Performance_FA
P0068, P0121, P1104, P2100, P2101, P2102, P2103
Bundle Name: TPS_Performance_TFTKO
P0068, P0121, P1104, P2100, P2101, P2102, P2103
Bundle Name: TPS_TFTKO
P0122, P0123, P0222, P0223, P2135
Bundle Name: TPS_ThrottleAuthorityDefaulted
P0068, P0122, P0123, P0222, P0223, P16F3, P1104, P2100, P2101, P2102, P2103, P2135
Bundle Name: TPS1_OutOfRange_Composite
P0122, P0123, P06A3
Bundle Name: TPS2_OutOfRange_Composite
P0222, P0223, P06A3
Bundle Name: Trans Output Rotations Rolling Count Validity
P0722, P0723, P077C, P077D
Bundle Name: TransActualGearValidity

Fault Bundle Definitions

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

Fault Bundle Definitions

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

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)	not active not active not active not active not active	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 A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					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 (PPEI $3FB) 11. Fuel pump control 12. Fuel pump control state 13. Engine fuel flow 14. ECM fuel control system failure (PPEI $1ED)	not active not active >=5 seconds not low enabled normal or FRP Rationality control > 0.047 g/s failure has not occurred		
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 A 1 trip
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 A 1 trip
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 OR Ignition	Run or Crank Accessory	72 test failures in 80 test samples if Fuel Pump Current <100A	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					OR Fuel Pump Control AND Ignition Run/Crank Voltage	 enabled 9V < voltage < 32V	1 sample/12.5 ms	
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 A 1 trip
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 OR Ignition 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 (PPEI (Powertrain Platform Electrical Interface) Fuel System Request ($1ED)	≠ Fuel Pump Control Module Enable Control Circuit	 Ignition AND PPEI Fuel System Request ($1ED)	 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 OR Ignition OR Fuel Pump Control	Run or Crank Accessory enabled	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 FSCM needs to be programmed	This DTC is set via calibration, when KeMEMD_b_NoStartCal	= TRUE	Ignition OR Ignition OR Fuel Pump Control	Run or Crank Accessory enabled	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 OR Ignition OR Fuel Pump Control	Run or Crank Accessory enabled	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	Run or Crank	1 failure if it occurs during the first RAM test of the ignition cycle, otherwise 5 failures	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					OR Ignition OR Fuel Pump Control	Accessory enabled	Frequency: Runs continuously in the background.	
Control Module Internal Performance 1. Main Processor Configuration Register Test 2. Processor clock test 3. External watchdog test	P0606	This DTC indicates the FSCM has detected an internal processor fault or external watchdog fault (PID 2032 discriminates the source of the fault)	1. For all I/O configuration register faults: •Register contents 2. For Processor Clock Fault: •EE latch flag in EEPROM. OR • RAM latch flag. 3. For External Watchdog Fault: • Software control of fuel pump driver	Incorrect value. 0x5A5A 0x5A Control Lost	Ignition OR Ignition OR Fuel Pump Control 1. For all I/O configuration register faults: •KeMEMD_b_ProcFltCfgRegEnbl 2. For Processor Clock Fault: •KeMEMD_b_ProcFltCLKDiagEnbl 3. For External Watchdog Fault: •KeFRPD_b_FPExtWDogDiagEnbl 3. For External Watchdog Fault: •Control Module ROM(P0601) 3. For External Watchdog Fault: •Control Module RAM(P0604)	Run or Crank Accessory enabled TRUE TRUE TRUE not active not active	Tests 1 and 2 1 failure Frequency: Continuously (12.5ms) Test 3 3 failures out of 15 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 Long Term Memory (EEPROM) Performance	P062F	Indicates that the NVM Error flag has not been cleared	Last EEPROM write	Did not complete	Ignition OR Ignition OR Fuel Pump Control	Run or Crank Accessory enabled	1 test failure Once on controller power-up	DTC Type A 1 trip
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	>= 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
			OR Reference voltage	> 105% nominal (i.e., 5.25V) OR <95% nominal (i.e., 4.75V)				
Fuel Pump Control Module - Driver Over-temperature 1	P064A	This DTC detects if an internal fuel pump driver overtemperature condition exists under normal operating	Pump Driver Temp	> 150C	Ignition OR Ignition OR Fuel Pump Control	Run or Crank Accessory enabled	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
		conditions			KeFRPD_b_FPOverTempDiagEnbl Ignition Run/Crank	TRUE 9V<voltage<32V		
Ignition 1 Switch Circuit Low Voltage	P2534	This DTC 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	This DTC detects degradation in the performance of the SIDI electronic return-less fuel system	Filtered fuel rail pressure error	<= Low Threshold (Function of desired fuel rail pressure and fuel flow rate. Margin is 15% of resultant target pressure except at flow <= 1.5g/s and target pressure <= 350kPa where the margin increases continuously at 66.6kPa/g/s as flow decreases) OR >= High Threshold (function of desired fuel rail pressure and fuel flow rate. 15% of resultant Target Pressure) **(See Supporting**	1. FRP Circuit Low DTC (P018C)	not active	Filtered fuel rail pressure error Time Constant = 12.5 seconds Frequency: Continuous 12.5 ms loop	DTC Type B 2 trips
					2. FRP Circuit High DTC (P018D)	not active .		
					3. Fuel Rail Pressure Sensor Performance DTC (P018B)	not active		
					4. FuelPump Circuit Low DTC (P0231)	not active		
					5. FuelPump Circuit High DTC (P0232)	not active		
					6. FuelPump Circuit Open DTC (P023F)	not active		
					7. Reference Voltage DTC (P0641)	not active		
					8. Fuel Pump Control Module Driver Over-temperature DTC's (P064A)	not active		
					9. Control Module Internal Performance DTC (P0606)	not active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					10. An ECM fuel control system failure (PPEI $1ED)	has not occurred		
					11. The Barometric pressure (PPEI $4C1) signal	valid (for absolute fuel pressure sensor)		
					12. Engine run time	>= 30 seconds		
					13. Emissions fuel level (PPEI $3FB)	not low		
					14. Fuel pump control	enabled		
					15. Fuel pump control state	normal		
					16. Battery Voltage	11V<=voltage=<32V		
					17. Fuel flow rate **(See Supporting Tables tab)**	> 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	Is not responding to an over-pressurization due to pressure build during DFCO or a decreasing desired pressure command.		
Control Module Communication Bus “A” Off	U0073	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Bus Status	Off	Power mode	Run/Crank	5 failures out of 5 samples (5 seconds)	DTC Type B 2 trips

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)	not active not active not active not active not active	<u>Frequency:</u> 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 A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					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 (PPEI $3FB) 11. Fuel pump control 12. Fuel pump control state 13. Engine fuel flow 14. ECM fuel control system failure (PPEI $1ED)	not active not active >=5 seconds not low enabled normal or FRP Rationality control > 0.047 g/s failure has not occurred		
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 A 1 trip
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 A 1 trip
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 OR Ignition	Run or Crank Accessory	72 test failures in 80 test samples if Fuel Pump Current <100A	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					OR Fuel Pump Control AND Ignition Run/Crank Voltage	 enabled 9V < voltage < 32V	1 sample/12.5 ms	
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 A 1 trip
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 OR Ignition 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 (PPEI (Powertrain Platform Electrical Interface) Fuel System Request ($1ED)	≠ Fuel Pump Control Module Enable Control Circuit	 Ignition AND PPEI Fuel System Request ($1ED)	 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
Mechanical Actuator Performance (Functionality)	P059F	Compare commanded shutter position to sensed position	Failure to achieve commanded position	Two (2) consecutive intrusive tests fail to achieve commanded position. Intrusive tests are triggered immediately following any failure to achieve a commanded position.	1. Power mode 2. Shutter Control 3. Ignition Run/Crank Voltage	Run/Crank Enabled 11V < voltage < 32V	Frequency: 1 sample after every shutter movement. Intrusive test requested if shutter movement is commanded and position feedback differs after 19.5 seconds; otherwise report pass. Duration of intrusive test is shutter movement related (40 to 120 seconds)	DTC Type B 2 trips
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 OR Ignition OR Fuel Pump Control	Run or Crank Accessory enabled	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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Control Module Not Programmed	P0602	Indicates that the FSCM needs to be programmed	This DTC is set via calibration, when KeMEMD_b_NoStartCal	= TRUE	Ignition OR Ignition OR Fuel Pump Control	Run or Crank Accessory enabled	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 OR Ignition OR Fuel Pump Control	Run or Crank Accessory enabled	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 OR Ignition OR Fuel Pump Control	Run or Crank Accessory enabled	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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Control Module Internal Performance 1. Main Processor Configuration Register Test 2. Processor clock test 3. External watchdog test	P0606	This DTC indicates the FSCM has detected an internal processor fault or external watchdog fault (PID 2032 discriminates the source of the fault)	1. For all I/O configuration register faults: •Register contents 2. For Processor Clock Fault: •EE latch flag in EEPROM. OR • RAM latch flag. 3. For External Watchdog Fault: • Software control of fuel pump driver	 Incorrect value. 0x5A5A 0x5A Control Lost	 Ignition OR Ignition OR Fuel Pump Control 1. For all I/O configuration register faults: •KeMEMD_b_ProcFltCfgRegEnbl 2. For Processor Clock Fault: •KeMEMD_b_ProcFltCLKDiagEnbl 3. For External Watchdog Fault: •KeFRPD_b_FPExtWDogDiagEnbl 3. For External Watchdog Fault: •Control Module ROM(P0601) 3. For External Watchdog Fault: •Control Module RAM(P0604)	 Run or Crank Accessory enabled TRUE TRUE TRUE not active not active	Tests 1 and 2 1 failure Frequency: Continuously (12.5ms) Test 3 3 failures out of 15 samples 1 sample/12.5 ms	DTC Type A 1 trip
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 OR Ignition OR	Run or Crank Accessory	1 test failure Once on controller power-up	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					Fuel Pump Control	enabled		
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	>= 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
			OR Reference voltage	> 105% nominal (i.e., 5.25V) OR <95% nominal (i.e., 4.75V)				
Fuel Pump Control Module - Driver Over-temperature 1	P064A	This DTC detects if an internal fuel pump driver overtemperature condition exists under normal operating	Pump Driver Temp	> 150C	Ignition OR Ignition OR Fuel Pump Control	Run or Crank Accessory enabled	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
		conditions			KeFRPD_b_FPOverTempDiagEnbl Ignition Run/Crank	TRUE 9V<voltage<32V		
Ignition 1 Switch Circuit Low Voltage	P2534	This DTC 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	This DTC detects degradation in the performance of the SIDI electronic return-less fuel system	Filtered fuel rail pressure error	<= Low Threshold (Function of desired fuel rail pressure and fuel flow rate. Margin is 15% of resultant target pressure except at flow <= 1.5g/s and target pressure <= 350kPa where the margin increases continuously at 66.6kPa/g/s as flow decreases) OR >= High Threshold (function of desired fuel rail pressure and fuel flow rate. 15% of resultant Target Pressure) **(See Supporting**	1. FRP Circuit Low DTC (P018C)	not active	Filtered fuel rail pressure error Time Constant = 12.5 seconds Frequency: Continuous 12.5 ms loop	DTC Type B 2 trips
					2. FRP Circuit High DTC (P018D)	not active .		
					3. Fuel Rail Pressure Sensor Performance DTC (P018B)	not active		
					4. FuelPump Circuit Low DTC (P0231)	not active		
					5. FuelPump Circuit High DTC (P0232)	not active		
					6. FuelPump Circuit Open DTC (P023F)	not active		
					7. Reference Voltage DTC (P0641)	not active		
					8. Fuel Pump Control Module Driver Over-temperature DTC's (P064A)	not active		
					9. Control Module Internal Performance DTC (P0606)	not active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					10. An ECM fuel control system failure (PPEI $1ED)	has not occurred		
					11. The Barometric pressure (PPEI $4C1) signal	valid (for absolute fuel pressure sensor)		
					12. Engine run time	>= 30 seconds		
					13. Emissions fuel level (PPEI $3FB)	not low		
					14. Fuel pump control	enabled		
					15. Fuel pump control state	normal		
					16. Battery Voltage	11V<=voltage=<32V		
					17. Fuel flow rate **(See Supporting Tables tab)**	> 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	Is not responding to an over-pressurization due to pressure build during DFCO or a decreasing desired pressure command.		
Control Module Communication Bus “A” Off	U0073	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Bus Status	Off	Power mode	Run/Crank	5 failures out of 5 samples (5 seconds)	DTC Type B 2 trips

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
Lost Communication With "Actuator"	U0284	Detects loss of communication condition has occurred between ECU and device Active Grill Air Shutter "A" actuator	PWM Message	Undetected	1. Power mode 2. Ignition Run/Crank Voltage	Run/Crank 11V < voltage < 32V	Frequency: 100ms 150 failures out of 167 samples	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Mechanical Actuator Performance (Functionality)	P059F	Compare commanded shutter position to sensed position	Failure to achieve commanded position	Two (2) consecutive intrusive tests fail to achieve commanded position. Intrusive tests are triggered immediately following any failure to achieve a commanded position.	1. Power mode 2. Shutter Control 3. Ignition Run/Crank Voltage	Run/Crank Enabled 11V < voltage < 32V	Frequency: 1 sample after every shutter movement. Intrusive test requested if shutter movement is commanded and position feedback differs after 19.5 seconds; otherwise report pass. Duration of intrusive test is shutter movement related (40 to 120 seconds)	DTC Type B 2 trips
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 OR Ignition OR Fuel Pump Control	Run or Crank Accessory enabled	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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Control Module Not Programmed	P0602	Indicates that the FSCM needs to be programmed	This DTC is set via calibration, when KeMEMD_b_NoStartCal	= TRUE	Ignition OR Ignition OR Fuel Pump Control	Run or Crank Accessory enabled	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 OR Ignition OR Fuel Pump Control	Run or Crank Accessory enabled	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 OR Ignition OR Fuel Pump Control	Run or Crank Accessory enabled	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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Control Module Internal Performance 1. Main Processor Configuration Register Test 2. Processor clock test 3. External watchdog test	P0606	This DTC indicates the ECU has detected an internal processor fault or external watchdog fault (PID 2032 discriminates the source of the fault)	1. For all I/O configuration register faults: •Register contents 2. For Processor Clock Fault: •EE latch flag in EEPROM. OR • RAM latch flag. 3. For External Watchdog Fault: • Software control of fuel pump driver	 Incorrect value. 0x5A5A 0x5A Control Lost	 Ignition OR Ignition OR Fuel Pump Control 1. For all I/O configuration register faults: •KeMEMD_b_ProcFltCfgRegEnbl 2. For Processor Clock Fault: •KeMEMD_b_ProcFltCLKDiagEnbl 3. For External Watchdog Fault: •KeFRPD_b_FPExtWDogDiagEnbl 3. For External Watchdog Fault: •Control Module ROM(P0601) 3. For External Watchdog Fault: •Control Module RAM(P0604)	 Run or Crank Accessory enabled TRUE TRUE TRUE not active not active	Tests 1 and 2 1 failure Frequency: Continuously (12.5ms) Test 3 3 failures out of 15 samples 1 sample/12.5 ms	DTC Type A 1 trip
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 OR Ignition	Run or Crank Accessory	1 test failure Once on controller power-up	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					OR Fuel Pump Control	 enabled		
Ignition 1 Switch Circuit Low Voltage	P2534	This DTC 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-off state	Bus Status	Off	Power mode	Run/Crank	5 failures out of 5 samples (5 seconds)	DTC Type B 2 trips
Lost Communication With ECM/PCM “A”	U0100	Detects that CAN serial data communication has been lost with the ECM	Message $0C9	Undetected	1. Power mode 2. Ignition Run/Crank Voltage 3. U0073	Run/Crank 11V<voltage<32V not active	12 failures out of 12 samples (12 seconds)	DTC Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Lost Communication With "Actuator"	U0284	Detects loss of communication condition has occurred between ECU and device Active Grill Air Shutter "A" actuator	PWM Message	Undetected	1. Power mode 2. Ignition Run/Crank Voltage	Run/Crank 11V < voltage < 32V	Frequency: 100ms 150 failures out of 167 samples	DTC Type B 2 trips

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
MCP Phase Current Diagnostics								
Current Sensor Remedial Operation Mode: When a current sensor Ckt Hi, Ckt Lo, or prerformance fault (P0BE6, P0BE7, P0BE8, P0BEE, P0BEF, P0BF0, P0BFD) is present current control strategy enters an alternate control mode. This alternate control does not use the current sensors. The worst case to enter this altenate control is: 187.2 ms (worst case based on P0BFD time criteria)								
Drive Motor "A" Phase U-V-W Correlation	P0BFD	RationalitySum	Sum of Motor DC current and APM input current and battery pack current	>40 A	No Active Current Sensor DTC's	P0BE6, P0BE7, P0BE8, P0BEE, P0BEF, P0BF0	X: 90 ct Y: 96 ct R: 2.08 ms T: 187.2 ms	Two Trip, Type B
Drive Motor "A" Phase U-V-W Current Sensor Overcurrent	P0C01	To detect fast, repeated 3 Phase over currents and to protect IGBT.	U or W Phase current sensor	> 396 A	No Active Current Sensor DTC's PWM Output Enable	P0BE6, P0BE7, P0BE8, P0BEE, P0BEF, P0BF0, P0BFD TRUE	X: 4 ct Y: 50 ct R: 2.08 ms T: 8.3 ms	Two Trip, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
		Retry description: Phase currents are monitored at the fastest loop rate (.083 - 0.5 ms). If fail threshold is exceeded, PWM is disabled for 1 2.08 ms loop and 1 fail count is recorded in the 2.08 ms loop. PWM is then re-enabled. DTC sets after 3rd unsuccessful retry.						
Drive Motor "A" Phase U-V-W Circuit/Open	P0C05	Checks for minimum current in each phase when rotor position is near that peak's phase axis. Each phase is checked individually as rotor turns.	ABS(Peak Phase Axis Current)	< 9 A	Inverter State	ON	X: 200 ct Y: N/A R: 0.11 - 0.5 ms T: 22 - 100 ms	Two Trip, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
					No Active Current Sensor DTC's High Voltage Rotor Position Current Commanded	P0BE6, P0BE7, P0BE8, P0BEE, P0BEF, P0BF0, P0BFD > 35V -30 deg < Phase Axis < +30 deg >= 25 A		
Drive Motor "A" Phase U Current Sensor Circuit Low	P0BE7	Circuit Low monitor to detect the failure of U-phase current sensor circuit below valid range	U Phase current sensor output at highside	< -440 A	PWM Output Enable	FALSE	X: 4 ct Y: 6 ct R: 10.4 ms T: 41.6 ms	Two Trip, Type B
Drive Motor "A" Phase U Current Sensor Circuit High	P0BE8	Circuit High monitor to detect the failure of U-phase current sensor circuit above valid range	U Phase current sensor output at highside	> 440 A	PWM Output Enable	FALSE	X: 4 ct Y: 6 ct R: 10.4 ms T: 41.6 ms	Two Trip, Type B
Drive Motor "A" Phase U Current Sensor Offset Out-of Range	P0BE6	Offset Circuit monitor to detect the failure of U-phase offset current above valid range	U Phase offset current output at highside	>30 A	PWM Output Enable	FALSE	X: 1 to 8 ct Y: N/A R: 10.4 ms T: 10.4 to 83 ms	Two Trip, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
		Offset Learn description: Offset learn is an 8 loop procedure that updates previous learned value using a first order lag filter on the new value. If filtered offset exceeds fail threshold for one loop the DTC sets			No Active DTCs:	P0BE7/P0BE8		
Drive Motor "A" Phase W Current Sensor Circuit Low	P0BEF	Circuit Low monitor to detect the failure of W-phase current sensor circuit below valid range	W Phase current sensor output at highside	< -440 A	PWM Output Enable	FALSE	X: 4 ct Y: 6 ct R: 10.4 ms T: 41.6 ms	Two Trip, Type B
Drive Motor "A" Phase W Current Sensor Circuit High	P0BF0	Circuit High monitor to detect the failure of W-phase current sensor circuit above valid range	W Phase current sensor output at highside	> 440 A	PWM Output Enable	FALSE	X: 4 ct Y: 6 ct R: 10.4 ms T: 41.6 ms	Two Trip, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
Drive Motor "A" Phase W Current Sensor Offset Out-of Range	P0BEE	Offset Circuit monitor to detect the failure of U-phase offset current above valid range Offset Learn description: Offset learn is an 8 loop procedure that updates previous learned value using a first order lag filter on the new value. If filtered offset exceeds fail threshold for one loop the DTC sets	W Phase offset current output at highside	>30 A	PWM Output Enable No Active DTCs:	FALSE P0BEF/P0BF0	X: 1 to 8 ct Y: N/A R: 10.4 ms T: 10.4 to 83 ms	Two Trip, Type B
MCP IGBT Diagnostics								
Drive Motor "A" Inverter Performance	P0A78	Detects IGBT Desaturation Faults	Phase A, B, or C High or Low Side Devices	OVERDRIVEN (Status Fault Bit)	Gate Drive Power Supply Ready Flag PWM Output Enable	TRUE TRUE	X: 1 ct Y: N/A R: 2.08 ms T: 2.08 ms	Two Trip, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
		Monitors hw status line to detect internal overcurrent or undervoltage faults, or loss of switching control events	internal hw detection circuits: Desat: > ~2000A across switch Under voltage: HV < 50V Overcurrent: AC > 432A		High Voltage	> 70V		
Drive Motor "A" Inverter Power Supply Circuit/Open	P0C0B	Detects IGBT Bias Faults Monitors hw status line to detect loss of power supply to gate drive board	Phase A, B, or C Power Supply internal hw detection circuits: 5V power supply monitor: 5V < 3.5 - 4.3V 15V power supply monitor: 15V < 10.4 - 12.6V	FAILED (Status Fault Bit)	Gate Drive Power Supply Ready Flag RunCrank Voltage	TRUE > 7V	X: 10 ct Y: 12 ct R: 2.08 ms T: 20.8 ms	One Trip, Type A
MCP High Voltage (HV) Diagnostics								
Drive Motor "A" Hybrid Battery System Voltage High	P1AEE	To detect over voltage and to protect TPIM HV Circuit	HV Sensor Voltage or	> 150	RunCrank Voltage	> 7V	X: 9 cts R: 0.1 ms T: 0.9 ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
			Hardware overvoltage Flag =	TRUE				
Drive Motor "A" Control Module Hybrid Battery Voltage Sense Circuit Low Voltage	P1AE8	Circuit Low monitor of HV output voltage sensor	HV Sensor Voltage	<30V	Run/Crank Status AND Contactor Status	= ACTIVE =Closed	X: 15 cts Y: 20 cts R: 10.4ms T: 156ms	Two Trips, Type B
Drive Motor "A" Control Module Hybrid Battery Voltage Sense Circuit High Voltage	P1AE9	Circuit High monitor of HV output voltage sensor	High Voltage Sensor Voltage or High Voltage Positive mid-pack voltage or High Voltage Negative mid-pack voltage	>190 V >190V - negative mid-pack voltage >190V - positive mid-pack voltage	Run/Crank Status AND Contactor Status	= ACTIVE =Closed	X: 15 cts Y: 20 cts R: 10.4ms T: 156ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
Drive Motor "A" Control Module Hybrid Battery System Voltage	P1AEC	To rationalize the MCP Bus Voltage with Battery Pack Voltage and the sum of the mid-pack voltages	ABS(MCP Bus Voltage - Battery Pack Voltage)	>= 39V	HV circuit fault (P1AE8 and P1AE9) AND Battery Pack Voltage AND Run/Crank Status AND Contactor Status	NOT ACTIVE Available and Valid = ACTIVE = Closed	X: 240 cts Y: 250 cts R: 10.4 ms T: 2496 ms	Two Trips, Type B
			OR ABS(MCP Bus Voltage - sum of mid-pack voltages)	>= 39V	HV circuit fault(P1AE8 and P1AE9) AND Battery Pack Voltage AND Run/Crank Status AND Contactor Status	NOT ACTIVE Not Available or Not Valid = ACTIVE = Closed		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
Drive Motor "A" Control Module Hybrid Battery Voltage Isolation Sensor 1 Circuit Low	P1AF4	Circuit 1 Low monitor of Pos mid-pack voltage sensor	Positive mid-pack voltage	<5V	Run/Crank Status AND Contactor Status	= Active =Closed	X: 70 cts Y: 100 cts R: 10.4ms T: 728ms	Two Trips, Type B
Drive Motor "A" Control Module Hybrid Battery Voltage Isolation Sensor 1 Circuit High	P1AF5	Circuit 1 High monitor of Pos mid-pack voltage sensor	Positive mid-pack voltage - MCP bus voltage or Positive mid-pack voltage - HV Battery Voltage	>10 V > 10V	No active DTCs RunCrank	P1AE8, P1AE9, P1AEC Active	X: 70 cts Y: 100 cts R: 10.4ms T: 728ms	Two Trips, Type B
Drive Motor "A" Control Module Hybrid Battery Voltage Isolation Sensor 2 Circuit Low	P1B0B	Circuit 2 Low monitor of Neg mid-pack voltage sensor	Negative mid-pack voltage	<5V	Run/Crank Status AND Contactor Status	= ACTIVE =Closed	X: 70 cts Y: 100 cts R: 10.4ms T: 728ms	Two Trip, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
Drive Motor "A" Control Module Hybrid Battery Voltage Isolation Sensor 2 Circuit High	P1B0C	Circuit 2 High monitor of Neg mid-pack voltage sensor	Negative mid-pack voltage - MCP bus voltage or Negative mid-pack voltage - HV Battery Voltage	>10 V > 10V	No active DTCs RunCrank	P1AE8, P1AE9, P1AEC Active	X: 70 cts Y: 100 cts R: 10.4ms T: 728ms	Two Trip, Type B
Drive Motor "A" Control Module Hybrid Battery Voltage Isolation Sensing Performance	P1B41	To check correlation of sum of mid-pack voltages against MCP bus voltage and Battery Pack Voltage	ABS(MCP HV bus - HV_Battery) and ABS(HV_Battery - Negative mid-pack - Positive mid-pack) OR	>= 39V >= 39V	Run/Crank Status AND Battery Pack Voltage AND MCP bus voltage circuit fault(P1AE8, P1AE9, P1AEC) AND Isolation Sense Circuit Faults(P1AF4, P1AF5, P1B0B, P1B0C)	= ACTIVE Available and Valid NOT ACTIVE NOT ACTIVE	X: 100 cts Y: 150 cts R: 10.4ms T: 1040ms	Two Trip, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
			ABS(MCP HV bus - Negative mid-pack - Positive mid-pack) and ABS(HV_Bat - Negative mid-pack - Positive mid-pack)	>= 39 V >= 39 V	Run/Crank Status AND Battery Pack Voltage AND MCP bus voltage circuit fault(P1AE8, P1AE9, P1AEC) AND Isolation Sense Circuit Faults(P1AF4, P1AF5, P1B0B, P1B0C)	= ACTIVE Not Available OR Not Valid NOT ACTIVE NOT ACTIVE		
Drive Motor A Control Module Hybrid AC Voltage System Isolation Fault	P1B11	Detects an AC voltage short to chassis	AC component of Negative to Chassis voltage	>10V			X: 64 ct Y: 96 ct R: 2.08 ms T: 133.2 ms	One Trip, Type A
Motor A Temp Sensor Diagnostics								

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
Drive Motor "A" Control Module Temperature Sensor Circuit Out of Range High	P0A2D	To detect temperature sensor voltage Out of Range high.	Motor Temp	< -50 deg C	Motor Torque FOR Warm Up Time	>10Nm 90s	X: 100 cts Y: 150cts R: 10.4ms T: 1040ms	Two Trip, Type B
Drive Motor "A" Control Module Temperature Sensor Circuit Out of Range Low	P0A2C	To detect temperature sensor voltage Out of Range low.	Motor Temp	> 236 degC			X: 100 cts Y: 150cts R: 10.4ms T: 1040ms	Two Trip, Type B
Drive Motor "A" Over Temperature	P0A2F	To detect a sustained motor overtemperature condition	Motor Temperature exceeds inital fault threshold	> 165 deg C	Circuit Faults and Temp Performance Fault; P0A2B, P0A2D, P0A2C	NOT ACTIVE	X: 500cts Y: 1500cts R: 10.4ms T: 5200ms	Two Trip, Type B, Linear Torque Derate (100% to 0%)from 155C
Motor Control Processor Voltage Diagnostics								

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
Sensor Power Supply "A" Circuit Low	P06B1	Detects Sensor Power Supply (15V) below an acceptable threshold.	Scaled 15V Supply Voltage	< 9.7V			X: 40 ct Y: 50 ct R: 10.4 ms T: 416 ms OR continuous fail time > 300 ms	Two Trip, Type B
Sensor Power Supply "A" Circuit High	P06B2	Detects Sensor Power Supply (15V) above an acceptable threshold.	Scaled 15V Supply Voltage	> 18.0V			X: 40 ct Y: 50 ct R: 10.4 ms T: 416 ms OR continuous fail time > 300 ms	Two Trip, Type B
System Voltage Low	P1ADE	*This is the 12V system voltage low diagnostic*						Special Type C

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
		DTC Fail case 1: Sets when the ignition voltage is below a threshold	Ignition Voltage	<= 10 Volts	Enable Cal RunCrankActive Engine Speed	= true = true >= 0 RPM	5 fail counts out of 6 sample counts Executes in a 1000ms loop Detects in 6 sec	
Motor A Inverter Temp Sensor Diagnostics								
Drive Motor Inverter Temperature Sensor A Circuit High	P0AF0	To detect Inverter A Temperature Sensor #1 voltage Out of Range high	PIM Temp A	< -70 deg C			X: 250 cts Y: 350 cts R: 10.4 ms T: 2600 ms	Two Trip, Type B
Drive Motor Inverter Temperature Sensor A Circuit Low	P0AEF	To detect Inverter A Temperature Sensor #1 Out of Range low (voltage)	PIM Temp A	> 150 degC			X: 250 cts Y: 350 cts R: 10.4 ms T: 2600 ms	Two Trip, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
Drive Motor "A" Inverter Over Temperature	P0C11	To detect an in-range overtemperature condition that can potentially damage inverter	PIM Temp A Temperature	> 118.2 deg C	Circuit Faults and Temp Performance Fault; P0AEE, P0AF0, P0AEF	NOT ACTIVE	X: 500 cts Y: 1500 cts	Two Trip, Type B
Motor A Resolver Sensors - Discrete Diagnostics								
The Resolver Discrete Diagnostics are a part of a Retry Strategy that allows for recovery from intermittent faults. There is a fast and slow fail to set a light based on DTC Type to warn the customer that the problem is regular and could get worse. The Fast fail is ~5 seconds of down time (5000 fail counts) out of a ~10 second period (10000 sample counts). The slow fail will allow 10 seconds (10000 counts) of fail time over a 30 minute period (900000 cnts)								
Drive Motor "A" Position Sensor Circuit	P0A3F	To detect Loss of Signal or converter error (line open, short) in the Motor Resolver circuit	Sin or Cos Signal	<2.3V	Resolver Initialization Delay	2ms	X: 70 Y: 100 R: 2 ms T: 140 ms	Two Trip, Type B
Drive Motor "A" Position Sensor Circuit Range/Performance	P0A40	To detect a Degradation of Signal fault in the angle data read by the Motor Resolver circuit.	Sin or Cos Signal	>4.0V	Resolver Initialization Delay	2ms	X: 70 Y: 100 R: 2 ms T: 140 ms	Two Trip, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
Drive Motor "A" Position Sensor Circuit Loss of Tracking	P1B03	To detect a Loss of Tracking fault in the Motor Resolver circuit.	Internal Tracking Error	> 5 deg	Resolver Initialization Delay	2ms	X: 70 Y: 100 R: 2 ms T: 140 ms	Two Trip, Type B
Drive Motor "A" Position Sensor Circuit Overspeed	P1B0D	To detect when Motor A has exceeded operational maximum speed	ABS(Motor speed)	>18000 rpm			X: 10 Y: 15 R: 10.4 ms T: 104 ms	Two Trip, Type B
Motor A Resolver Sensors - Circuit Diagnostics								
The Resolver Circuit Diagnostics are a part of a Retry Strategy that allows for recovery from intermittent faults. There is a fast and slow fail to set a light based on DTC Type to warn the customer that the problem is regular and could get worse. The Fast fail is ~5 seconds of down time (5000 fail counts) out of a ~10 second period (10000 sample counts). The slow fail will allow 10 seconds (10000 counts) of fail time over a 30 minute period (900000 cnts)								
Drive Motor "A" Position Sensor Circuit "A" Low	P0C52	To detect Resolver Circuit S1/3 Out of Range Low	Resolver S13 Circuit Reference Voltage	< 0.5 v			X: 20 cts Y: 30 cts R: 10.4ms T: 208ms	Two Trip, Type B
Drive Motor "A" Position Sensor Circuit "A" High	P0C53	To detect Resolver Circuit S1/3 Out of Range High	Resolver S13 Circuit Reference Voltage	> 4.5 v			X: 20 cts Y: 30 cts R: 10.4ms T: 208ms	Two Trip, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
Drive Motor "A" Position Sensor Circuit "B" Low	P0C5C	To detect Resolver Circuit S2/4 Out of Range Low	Resolver S24 Circuit Reference Voltage	< 0.5 v			X: 20 cts Y: 30 cts R: 10.4ms T: 208ms	Two Trip, Type B
Drive Motor "A" Position Sensor Circuit "B" High	P0C5D	To detect Resolver Circuit S2/4 Out of Range High	Resolver S24 Circuit Reference Voltage	> 4.5 v			X: 20 cts Y: 30 cts R: 10.4ms T: 208ms	Two Trip, Type B
MCPA Controller Fault Diagnostics								
Control Module Read Only Memory (ROM)	P1A51	*This Diagnostic tests the checksum on ROM (flash) memory* DTC Fail case 1: This DTC will be stored if any check sum in the boot is incorrect					1 failure if it occurs during the first ROM test of the ignition cycle or	One Trip, Type A

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
		DTC Fail case 2: This DTC will be stored if any check sum in the calibration is incorrect	Calculated Checksum does not match stored checksum				5 failures during background check Frequency: Runs continuously in the background after initial check	
		DTC Fail case 3: This DTC will be stored if any check sum in the software is incorrect						

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
		DTC Fail Case 4: This DTC will be stored if any chechsum in the Torque Security calibration is incorrect.	Calculated Checksum does not match calibrated checksum				1 failure if it occurs during the first ROM test of the ignition cycle or 5 failures during 12.5 msec loop Frequency: Runs continuously in the 12.5msec loop after initial check	
		DTC Fail case 5: This DTC will be stored if ECC fault was detected in Flash Memory	HWIO detect fault	= true			5 failures Frequency: Once at powerup	
Control Module	P1A50	*This Diagnostic tests the checksum on RAM memory*						One

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
Random Access Memory (RAM) Failure		DTC Fail case 1: The primary Ye variable does not match the redundant Ya variable Dual Store RAM	Ye variable	≠ Ya Variable			Detects in 125ms	Trip, Type A
		DTC Fail case 2:This is a background latency diagnostics to detect attempted write over locked memory location.	HWIO reports function trying to write to locked memory location	= TRUE			65534 failure counts Frequency: runs in background loop.	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
		DTC Fail case 3: This case checks to see if fault flag ReMEMD_y_MainSOH_RAM_FltLtchd was previously retained from previous key cycle.	ReMEMD_y_MainSOH_RAM_FltLtchd	not = 0			Runs once at Initalization	
		DTC Fail case 4: Indicates that BCP is unable to correctly write and read data to and from System RAM	HWIO detects Fault	= true			1 failures Freqeuncy: Once at Power Up	
		DTC Fail case 5: Indicates that BCP is unable to correctly write and read data to and from Cache RAM	HWIO detects Fault	= true			1 failures Freqeuncy: Once at Power Up	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
		DTC Fail case 6: Indicates that BCP is unable to correctly write and read data to and from eTPU RAM	HWIO detects Fault	= true			1 failure Freqeuncy: Once at Power Up	
Drive Motor A Control Module Long Term Memory Reset	P1EB6	*This Diagnostic tests for non-volatile memory errors*						One Trip, Type A
		DTC Fail case 1: Non-volatile memory (Static) checksum error at controller power-up	Checksum at power-up does not match checksum at power-down				1 failure Frequency: Once at powerup	
		DTC Fail case 2: Non-volatile memory (Preserved) checksum error at controller power-up						
		DTC Fail case 3: Non-volatile memory (BINVDM) checksum error at controller power-up						

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
		DTC Fail case 4: Non-volatile memory (ShutdownFinished) checksum error at controller power-up						
Control Module Internal Performance	P0A1B	*This Diagnostic tests all the internal processor integrity subsystems*						One Trip, Type A
		DTC Fail case 1: Indicates that the BCP has detected an internal processor integrity fault CePISR_e_MainDtctdSPI_Flt	HWIO detects Fault	= true (in SPI Hardware)	Run/Crank Voltage OR Powertrain Relay Voltage Powermoding	> 9.5 Volts = Accesory or Off	28 fail counts out of 32 sample counts Executes in a 6.25ms loop Detects in 200ms	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
		DTC Fail case 2: Indicates that the BCP has detected an internal processor integrity fault CePISR_e_2ndNotRunningSeedKyTst	Key Value	is not an expected Key Value	SRAR shutdowns SPI Fault RunCrank Active RAM or ROM fault 12V battery Seed received in wrong order fault Vehicle Speed Seed/Key Timeout Powermode	= False = False (No Active P0606) = False = false (no Active P0601, P0604, P1A50 or P1A51) >11V = false (No active P0606) <= 0 KPH = False = off for less than 5 seconds	Detects in 150ms	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
		DTC Fail case 3: Indicates that the BCP has detected an internal processor integrity fault CePISR_e_2ndFailsToTakeRmdlActn	IPT Detects faulty harware in Inhibit path IPT feedback	≠ expected feedback Value	HV Bat contactor Staus Available Inverter State HV Battery Contactors Motor Faults	= True = Off >= 80 V = Closed = False (No Active DTCs: P0A1B, P0A3F, P0A40, P0A78, P0C01. P0C05, P0C0B, P0C19, P0C52, P0C53, P0C5C, P1A50, P1A51, P1ADE, P1AE9, P1AEC, P1AEE, P1B03, P1B0D, P1B11, P1E0A)	IPT Fail counter >= 3	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
					Motor Speed SRAR shutdowns SPI Fault RunCrank Active Ram or ROM fault	<= 5 RPM = False =False (No Active P0606) = False = false (No Active DTCs: P0601, P0604, P1A51 or P1A50)		
					12V battery Seed received in wrong order fault Vehicle Speed Seed/Key Timeout Powermode	>11V = false <= 0 MPH = False = off for less than 5 seconds		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
		DTC Fail case 4: Indicates that the BCP has detected an internal processor integrity fault CePISR_e_2ndRxIncorrectKeys	Key Value	≠ expected key Value	1. Number Of Main processors to be monitored 2. IPT status 3. SPI Fault 4. Run /Crank Voltage	1. > 0 2. = Not running 3. = False (No Active P0606) 4. > 9.5V	Detects in 150ms or two consecutive faulty keys	
		DTC Fail case 5: Indicates that the BCP has detected an internal processor integrity fault CePISR_e_MainDtctdSdKeyTimeout	seed does not update	in 500 msec	1. Number Of Main processors to be monitored 2. SPI faults 3. Seed/Key Init Delay 4.Run/Crank Voltage	1. > 0 2. = FALSE (No Active P0606) 3. > 1s 4. > 9.5	Detects in 500msec	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
		DTC Fail case 6: Indicates that the BCP has detected an internal processor integrity fault CePISR_e_MainDtctdSdRxWrongOrdr	Seed sequence	≠ expected order	1. Number Of Main processors to be monitored 2. SPI faults 3.Run/Crank Voltage	1. > 0 2. = FALSE (No Active P0606) 3. > 9.5	12 fail counts out of 16 sample counts Executes in a 12.5ms loop Detects in 200ms	
		DTC Fail case 7: Indicates that the BCP has detected an internal processor integrity fault CePISR_e_MainSequenceFlt	Seed timeout PSW Fault	> 200 ms = True	1. Seed Update Key StoreFault Enable OR 2. Program Sequence Watch Enable	1. = True 2. = True	3 fail counts out of 4 sample counts Executes in a 50ms loop Detects in 200ms	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
		DTC Fail case 8: Indicates that the BCP has detected an internal processor integrity fault CePISR_e_MainALU_Flt	HWIO detects Fault	=2 (times in the same key cycle)	1. ALU Test Enabled 2. PMDR Run Crank Ignition Low Voltage P2534	1. = TRUE 2. = False	runs continuously in 12.5ms loop Detects in 12.5ms	
		DTC Fail case 9: Indicates that the BCP has detected an internal processor integrity fault CePISR_e_MainCfgRegFlt	HWIO detects Fault	=2 (times in the same key cycle)	1. Configuration Register Test Enabled 2. PMDR Run Crank Ignition Low Voltage P2534	1. = TRUE 2. = False	runs continuously in 12.5ms loop Detects in 12.5ms	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
		DTC Fail case 10: Indicates that the BCP has detected an internal processor integrity fault CePISR_e_MainStackFlt	HWIO detects Fault	= 2 (Since Powerup)	Stack Test Enabled	= True	Runs Continuously in 100ms loop Detects in 200ms	
		DTC Fail case 11: Indicates that the BCP has detected an internal processor integrity fault CePISR_e_MainADC_Flt	Continuous Fault	> 200ms	1. A2D Converter Test Enabled 2. Run Crank Voltage	1. = TRUE 2. > 7	3 fail counts out of 4 sample counts Executes in a 50ms loop Detects in 200ms	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
		DTC Fail case 12: Indicates that the BCP has detected an internal processor integrity fault CePISR_e_FlashECC_CktTest	HWIO detects Fault	= 3 /10 (Action: Turn On Mil) = 5/10 (Action: Shutdown controller)	1. Flash ECC Circuit Test Enable 2. Power-Up Reset	1. = True 2. = True	3 fail counts out of 10 sample counts (turns on MIL) 5 fail counts out of 10 sample counts (shutdown vehicle) Executes once at every power up reset	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
		DTC Fail case 13: Indicates that the BCP has detected an internal processor integrity fault CePISR_e_RAM_ECC_CktTest	HWIO detects Fault	= 3 /10 (Action: Turn On Mil) = 5/10 (Action: Shutdown controller)	1. RAM ECC Circuit Test Enable 2. Power-Up Reset	1. = True 2. = True	3 fail counts out of 10 sample counts (turns on MIL) 5 fail counts out of 10 sample counts (shutdown vehicle) Executes once at every power up reset	
		DTC Fail case 14: Indicates that the BCP has detected an internal processor integrity fault CePISR_e_DMA_XferTest	HWIO detects Fault or Memory Copy Error	= True or =True	DMA Transfer Test Enabled	= TRUE		
MCPA Torque Security Diagnostics								
Control Module Long Term Memory	P1ADC	*This Diagnostic tests for unuseable BINVDM (flash) memory only*						One Trip,

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
Performance		DTC Fail case 1: Indicates that the NVM Error flag HWIO Bat Write will not succeed set	Last EEPROM write did not complete		Ignition voltage	≥ 5 volts	1 failure Frequency: Once at power-up	Type A
		DTC Fail case 2: Indicates that the NVM Error flag HWIO Assembly Cal set						
Drive Motor A Torque Delivered Performance	P0C19	*This Diagnostic tests that the difference between the motor A torque command slew and the motor torque achieved is greater than a threshold.*						Two Trip, Type B
		Detects Motor torque command vs. torque achieved errors	ABS(filtered motor torque command)-calc motor torque achieved)	> 36 Nm	Inverter State	Run	X: 30 ct Y: 32 ct R: 2.08 ms T: 62.4 ms	
					No Active Current Sensor DTC's	P0BFD, P0BE6, P0BE7, P0BE8, P0BEE, P0BEF, P0BF0		
					No Active HV Sensor DTC's	P1AE8, P1AE9, P1AEC		
					No Active Motor Speed DTC's	P1B0D		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
					No Active Motor Position Sensor DTC's	P0C52, P0C53, P0C5C, P0C5D, P0A3F, P1B03, P0A40		
Drive Motor A Control Module Internal Control Module Torque Calculation Performance	P1E0A	*This diagnostic detects the torque command path calculation errors*						One Trip, Type A
		DTC Fail case 1: If the difference between the Torque achieved primary path signal and the redundant path signal is greater than a threshold (MTOR)	Difference between Primary and Redundant signals	> 36Nm	Inverter State	On	30 fail counts out of 32 sample counts Executes in a 6.25 ms Loop Detects in 187.5ms	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
		DTC Fail case 2: If the difference between the Torque Commanded primary path signal and the redundant path signal is greater than a threshold (MTDR)	Difference between Primary and Redundant signals	> 36Nm	Inverter State	On		
		DTC Fail case 3: Compares the ISSD primary path calculated signal in task 0 rate with redundant signal calculated in 6.25ms and fails if it is different than a threshold (MCUR)	Difference between Primary and Redundant signals	> 120A	Inverter State	On		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
		DTC Fail case 4: Compares the ISSQ primary path calculated signal in task 0 rate with redundant signal calculated in 6.25ms and fails if it is different than a threshold (MCUR)	Difference between Primary and Redundant signals	> 121A	Inverter State	On		
		DTC Fail case 5: Compares the ISSCmd primary path calculated signal in task 0 rate with redundant signal calculated in 6.25ms and fails if it is different than a threshold (MCDR)	Difference between Primary and Redundant signals	> 50A	Inverter State	On		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
		DTC Fail case 6: Compares the BEMF Dec primary path calculated signal in task 0 rate with redundant signal calculated in 6.25ms and fails if it is different than a threshold (MCDR)	Difference between Primary and Redundant signals	> .0065210Nm	Inverter State	On		
		DTC Fail case 7: Compares the Usdq Limited primary path calculated signal in task 0 rate with redundant signal calculated in 6.25ms and fails if it is different than a threshold (MCCR)	Difference between Primary and Redundant signals	> .5V	Inverter State	On		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
		DTC Fail case 8: Compares the Primary Path calculated Duty Cycle for three phase circuit signal in task 0 rate with the redundant signal calculated in 6.25ms and fails if it is greater than a threshold (SVMR)	For Modulate Control: Mod Index Square: or Perfect Square: For Linear Control: Mod Index Square: or Perfect Square:	 > 0.7 % > 0.3 % > 1.0 % > 0.1 % > 0.1 % > 1.0 %	Inverter State	On		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
		DTC Fail case 9: Compares the Power Input Watts primary path calculated signal in task 0 rate with redundant signal calculated in 6.25ms and fails if it is different than a threshold (HVTR)	Difference between Primary and Redundant signals	>3403 W	Inverter State	On		
		DTC Fail case 10: Compares the VDC Adapt primary path calculated signal in task 0 rate with redundant signal calculated in 6.25ms and fails if it is different than a threshold (HVTR)	Difference between Primary and Redundant signals	> .217V	Inverter State	On		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
		DTC Fail case 11: Compares the Reactive Power primary path calculated signal in task 0 rate with redundant signal calculated in 6.25ms and fails if it is different than a threshold (HVTR)	Difference between Primary and Redundant signals	> 10000000 W	Inverter State	On		
		DTC Fail case 12: Compares the Motor Speed primary path calculated signal in task 0 rate with redundant signal calculated in 6.25ms and fails if it is different than a threshold (MSPR)	Difference between Primary and Redundant signals	>140RadPerSec	Inverter State	On		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
		DTC Fail case 13: Compares the Slip Frequency primary path calculated signal in task 0 rate with redundant signal calculated in 6.25ms and fails if it is different than a threshold (MCDR)	Difference between Primary and Redundant signals	>100RadPerSec	Inverter State Active Current Sensor DTC's	On P0BFD, P0BE6, P0BE7, P0BE8, P0BEE, P0BEF, or P0BF0		
Communication Diagnostics								
Lost Comm'n With ECM/PCM on Bus A	U1876	*This diagnostic indicates a lost communication between the MCPA and the ECM on Bus A*						Two Trip, Type B
		DTC Fail case 1: Detects that CAN serial data communication has been lost with the ECM on Bus A	Missed ECM Messages		Run/Crank Voltage PowerMode Normal Communication Normal Message Transmission	> 9.5 Volts =RUN =TRUE =TRUE	Executes in a 6.25ms loop Detects in 500 ms	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
					Diagnostic Enable Timer	>=3 sec		
Drive Motor Control Module A Lost Communication with Battery Energy Control Module on Bus B	U1847	*This diagnostic indicates a lost communication between the MCPA and the BECM on Bus B*						Two Trip, Type B
		DTC Fail case 1: Detects that CAN serial data communication has been lost with the Battery Energy Control Module on Bus B	Missed BECM Messages		Run/Crank Voltage	> 9.5 Volts	Executes in a 6.25ms loop	
							Detects in 500 ms	
					PowerMode	=RUN		
					Normal Communication Enabled	=TRUE		
					Normal Message Transmission	=TRUE		
					Diagnostic Enable Timer	>=3 sec		
Drive Motor Control	U1831	*This diagnostic indicates a lost communication between the MCPA and the HPCM on Bus B*						Two

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
Module A Lost Communication with Hybrid Powertrain Control Module on Bus B		DTC Fail case 1: Detects that CAN serial data communication has been lost with the HPCM on Bus B	Missed ECM Messages		Run/Crank Voltage PowerMode Normal Communication Enabled Normal Message Transmission Diagnostic Enable Timer	> 9.5 Volts =RUN =TRUE =TRUE >=3 sec	Executes in a 6.25ms loop Detects in 500 ms	Trip, Type B
Drive Motor Control Module A Lost Communication with Hybrid Powertrain Control Module	U1845	*This diagnostic indicates a lost communication between the MCPA and the BCP*						Two Trip, Type B
		Detects that CAN serial data communication has been lost with the BCP	Missed BCP Messages		Run/Crank Voltage	> 9.5 Volts	Executes in a 6.25ms loop Detects in 500 ms	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	BAS+
					PowerMode Normal Communication Enabled Normal Message Transmission Diagnostic Enable Timer	=RUN =TRUE =TRUE >=3 sec		

APPENDIX

ALU= Arithmetic Logic Unit
BPCM= Batt Pack Ctrl Module
HWIO= Hardware Input/Output
IGBT= Insulated Gate Bipolar Transistors (Phase Current Controllers)
OOR= Out of Range

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Power Moding Diagnostics								
System Voltage Low	P0562	Sets when the low voltage system voltage is below a threshold	Ignition Voltage	Ignition Voltage <= 10 Volts	Ignition Key Status Engine Speed	RUN/CRANK >= 0 RPM	5 seconds in a 6 second window	Special Type C
Ignition Switch Run/Start Position Circuit Low	P2534	Detects a run crank relay open circuit	Runk Crank Line voltage	Ignition Run Crank line voltage <= 2 Volts	CAN Communication ECM run crank active data U0100, U0073	enabled available and active NOT Fault Active	10 seconds (400 counts @ 25ms) in a 12.5 second window (500 counts @ 25ms)	One Trip, Type A
		DTC Pass	Run Crank Line Voltage	> 5 Volts			12.5 seconds (500 counts @ 25ms)	
Ignition Switch Run/Start Position Circuit High	P2535	Detects a run crank relay short to power	Runk Crank Line voltage	> 5 Volts	CAN Communication ECM run crank active data U0100, U0073	enabled available and false NOT Fault Active	10 seconds (400 counts @ 25ms) in a 12.5 second window (500 counts @ 25ms)	One Trip, Type A

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Pass	Run Crank Line Voltage	Ignition Run Crank line voltage < 2V				
Transm'n Auxilary Oil Pump Diagnostics								
Auxiliary Transmission Fluid Pump Performance	P2797	This diagnostic monitors the aux pump performance based on turbine speed profile to detect a malfunction with auxiliary pump. Tests entire hydraulic system. Will run every auto-stop/start.	During auto-start, monitors turbine flare If flare > cal and ratio is achieved	Turbine Speed Slip > 150 rpm	Auto-Stop	TRUE	7 counts	Two Trips, Type B
Transmission Auxillary pump circuit	P0B09	This DTC detects a open circuit on the Auxillary Pump circuit	The HWIO reports an invalid voltage (out of range) error flag	TRUE	Ignition Voltage	> 9 volts	>= 0.375s fail time out of 1.2s sample time	Type B Code two trips
					Ignition Voltage	< 31 volts		
Brake Pedal Position Sensor Diagnostics								

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Brake Pedal Position Sensor Circuit Range/Performance	P057B	This diagnostic monitors the Brake Pedal Position Sensor for a stuck in range failure	Calculated brake pedal position difference is calculated, and a score is calculated from the table below x y 0.00 0.00 0.05 0.50 0.08 1.00 0.25 1.00 0.35 1.00 0.45 1.00 0.55 1.00 0.75 1.00 1.00 1.00		Run/Crank Voltage	> 10V	Each calculated difference test is a minimum of 12.5 seconds (1000 counts @ 12.5ms)	One Trip, Type A
			This score is then applied to a total score, but is only allowed to affect the total score by a factor of 0.3		Brake Pedal Position Learn Active	FALSE	2 Full tests must be completed before a FAIL can be reported	
			Total score	≤ 0.40				
					12V Starter Motor	NOT engaged		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					P057C, P057D, P057E	NOT Fault Active		
					Complete Test Enable Criteria			
					Shift lever position	In PARK at least once this key on		
					Shift lever position	≠ PARK		
					P182E, P1915	NOT Fault Active		
					Vehicle Speed	≥ 5kph		
					P0722, P0723, P077C, P077D, U0101, U0073	NOT Fault Active		
					Accelerator Pedal Position	< 5%		
					P2122, P2123, P2127, P2128, P2138	NOT Fault Active		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Pass	Calculated brake pedal position difference is calculated, and a score is calculated from the table below x y 0.00 0.20 0.05 0.50 0.08 1.00 0.25 1.00 0.35 1.00 0.45 1.00 0.55 1.00 0.75 1.00 1.00 1.00				Each calculated difference test is a minimum of .625 seconds (50 counts @ 12.5ms)	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			This score is then applied to a total score, but is only allowed to affect the total score by a factor of 0.3				20 tests must be completed before a PASS can be reported	
			Total score	≥ 0.80				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Brake Pedal Position Sensor Circuit Low Voltage	P057C	This diagnostic monitors the Brake Pedal Position Sensor for a voltage stuck low failure	Brake Pedal Position Measured	< 6%	Run/Crank Voltage Brake Pedal Position Learn Active 12V Starter Motor	> 10V FALSE NOT engaged	62.5ms (5 counts @ 12.5ms) out of a 200ms window (16 counts @ 12.5ms)	Two Trips, Type B
Brake Pedal Position Sensor Circuit High Voltage	P057D	This diagnostic monitors the Brake Pedal Position Sensor for a voltage stuck high failure	Brake Pedal Position Measured	> 95%	Run/Crank Voltage	> 10V	125ms (10 counts @ 12.5ms) out of a 200ms window (16 counts @ 12.5ms)	Two Trips, Type B
					Brake Pedal Position Learn Active	FALSE		
Brake Pedal Position Sensor Circuit Erratic	P057E	This diagnostic monitors the Brake Pedal Position Sensor for a noisy/erratic failure	Brake Pedal Position Measured Delta Over 12.5ms (Loop to Loop)	> 6.5%	Run/Crank Voltage	> 10V	62.5 ms (5 counts @ 12.5ms) out of a 250ms window (20 counts @ 12.5ms)	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					12V Starter Motor	NOT engaged		
					Brake Pedal Position Learn Active	FALSE		
5V Reference Diagnostics								
5V Reference 1Circuit	P0641	This diagnostic monitors the buffered 5V supply circuit 1	5V supply circuit measured percentage	X < 87.75% OR X > 92.25%	Run/Crank Voltage	> 10 volts	4 seconds	Two Trips, Type B
		DTC Pass	5V supply circuit measured percentage	87.75% < X < 92.25%			1 second	
5V Reference 2 Circuit	P0651	This diagnostic monitors the buffered 5V supply circuit 2	5V supply circuit measured percentage	X < 87.75% OR X > 92.25%	Run/Crank Voltage	> 10 volts	4 seconds	Two Trips, Type B
		DTC Pass	5V supply circuit measured percentage	87.75% < X < 92.25%			1 second	
5V Reference 3 Circuit	P0697	This diagnostic monitors the buffered 5V supply circuit 3	5V supply circuit measured percentage	X < 87.75% OR X > 92.25%	Run/Crank Voltage	> 10 volts	4 seconds	Two Trips, Type B
		DTC Pass	5V supply circuit measured percentage	87.75% < X < 92.25%			1 second	
Motor Generator System Diagnostics								

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Failed AutoStart	P1A6F	This diagnostic indicates that the MGU was unable to start the ICE and the 12V conventional starter was used.	12V starter motor used for auto-start	TRUE			1 time	Two Trips, Type B
Drive Motor Performance	P0A90	This DTC detects a performance condition in the MGU to engine belt connection	Difference between MGU measured speed and ECM measured engine speed	> 1000 RPM	ECM Crank Sensor	NOT Fault Active	1.5 seconds (60 counts @ 25ms) out of a 2 second window (80 counts @ 25ms)	One Trip, Type A
					ECM Crank Sensor Measured Value	> 200rpm		
			OR		MGU Motor Speed	NOT Fault Active		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			Difference between MGU measured speed and ECM measured engine speed	> 500 RPM	P0C19, P1E0A, P0A3F, P0A40, P0B03, P0B0D, P0335, P0336	NOT Fault Active	1 count (@ 25ms) seen 10 separate times (7 seconds needed between counts). 10 counts must be seen on two successive key cycles with 1800 second soak time in between successive key cycles	
					Engine Speed CAN status	VALID		
					Hybrid Start State	Engine Starting State OR Engine Running State		
		DTC Pass	MGU calculated torque	≥ 20 NM OR ≤ -35 NM			1 second	
			AND					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			Difference between MGU measured speed and ECM measured engine speed	≤ 500 RPM				
Controller Diagnostics								
Control Module Read Only Memory (ROM)	P0601	*This Diagnostic tests the checksum on ROM (flash) memory*						One Trip, Type A
		DTC Fail case 1: This DTC will be stored if any check sum in the boot is incorrect					1 failure if it occurs during the first ROM test of the ignition cycle or 5 failures during background check Frequency: Runs continuously in the background after initial check	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 2: This DTC will be stored if any check sum in the calibration is incorrect	Calculated Checksum does not match stored checksum				1 failure if it occurs during the first ROM test of the ignition cycle or 5 failures during background check Frequency: Runs continuously in the background after initial check	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 3: This DTC will be stored if any check sum in the software is incorrect					1 failure if it occurs during the first ROM test of the ignition cycle or 5 failures during background check Frequency: Runs continuously in the background after initial check	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail Case 4: This DTC will be stored if any chechsum in the Torque Security calibration is incorrect.	Calculated Checksum does not match calibrated checksum				1 failure if it occurs during the first ROM test of the ignition cycle or 5 failures during 12.5 msec loop Frequency: Runs continuously in the 12.5msec loop after initial check	
		DTC Fail case 5: This DTC will be stored if ECC fault was detected in Flash Memory	HWIO detect fault	= true			1 failure Frequency: Once at powerup	
Control Module	P0602	*This Diagnostic tests for whether a controller has been programmed*						One

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Not Programmed		DTC Fail case 1: Indicates that the BCP needs to be programmed	Fails if No Start Calibration is set to true which is only available on a new un-programmed BCP				Runs once at power up and excutes at every 1000ms	Trip, Type A
Control Module Long Term Memory Reset	P0603	*This Diagnostic tests for non-volatile memory errors*						One Trip, Type A
		DTC Fail case 1: Non-volatile memory (Static) checksum error at controller power-up						
		DTC Fail case 2: Non-volatile memory (Preserved) checksum error at controller power-up	Checksum at power-up does not match checksum at power-down				1 failure Frequency: Once at powerup	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 3: Non-volatile memory (BINVDM) checksum error at controller power-up						
		DTC Fail case 4: Non-volatile memory (ShutdownFinished) checksum error at controller power-up						
Control Module Random Access Memory (RAM) Failure	P0604	*This Diagnostic tests that the RAM is functioning correctly*						One Trip, Type A
		DTC Fail case 1: The primary Ye variable does not match the redundant Ya variable Dual Store RAM	Ye variable	≠ Ya Variable	Ignition Status	= Run or Crank	Detects in 125ms	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 2:This is a background latency diagnostics to detect attempted write over locked	HWIO reports function trying to write to locked memory location	= TRUE			65534 failure counts Frequency: runs in background loop.	
		DTC Fail case 3: This case checks to see if fault flag ReMEMD_y_Main SOH_RAM_FltLtc hd was previously retained from previous key cycle.	ReMEMD_y_MainS OH_RAM_FltLtchd	not = 0			Runs once at Initalization	
		DTC Fail case 4: Indicates that BCP is unable to correctly write and read data to and from System RAM	HWIO detects Fault	= true			1 failure Freqeuncy: Once at Power Up	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 5: Indicates that BCP is unable to correctly write and read data to and from Cache RAM	HWIO detects Fault	= true			1 failure Freqeuncy: Once at Power Up	
		DTC Fail case 6: Indicates that BCP is unable to correctly write and read data to and from eTPU RAM	HWIO detects Fault	= true			1 failure Freqeuncy: Once at Power Up	
Control Module Internal Performance	P0606	*This Diagnostic tests all the internal processor integrity subsystems*						One Trip, Type A
		DTC Fail case 1: Indicates that the BCP has detected an internal processor integrity fault CePISR_e_MainDtctdSPI_Flt	HWIO detects Fault	= true (in SPI Hardware)	Run/Crank Voltage OR Powertrain Relay Voltage Powermoding	> 9.5 Volts = Accesory	28 fail counts out of 32 sample counts Executes in a 6.25ms loop Detects within 200ms	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 2: Indicates that the BCP has detected an internal processor integrity fault CePISR_e_2ndNotRunningSeedKyTst	Key Value	is not an expected Key Value	SRAR shutdowns SPI Fault (P0606) RunCrank Active RAM or ROM fault 12V battery Seed received in wrong order fault Vehicle Speed Seed/Key Timeout Powermode	= False =False = False = false >11V = false <= 0 KPH = False = off for less than 5 seconds	Detects in 150ms	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 3: Indicates that the BCP has detected an internal processor integrity fault CePISR_e_2ndFailsToTakeRmdlActn	IPT Detects faulty harware in Inhibit path IPT feedback	≠ expected feedback Value	HV Bat contactor Staus Available Inverter State HV Battery Contactors Motor Faults	= True = OFF >= 80 V = Closed = False (No Active DTCs: P0A1B, P0A3F, P0A40, P0A78, P0C01. P0C05, P0C0B, P0C19, P0C52, P0C53, P0C5C, P1A50, P1A51, P1ADE, P1AE9, P1AEC, P1AEE, P1B03, P1B0D, P1B11, P1E0A)	IPT Up down counter = 3	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Motor Speed SRAR shutdowns SPI Fault RunCrank Active Ram or ROM fault 12V battery	<= 5 RPM = False =False (No Active P0606) = False = False (No Active DTCs: P0601, P0604, P1A51 or P1A50)		
		DTC Fail case 4: Indicates that the BCP has detected an internal processor integrity fault CePISR_e_2ndRxIncorrectKeys	Key Value	≠ expected key Value	1, Number Of Secondary Processors to be Monitored 2. IPT status	1. > 0 2. = Not running for > 0.075s	Detects in 150ms or two consecutive faulty keys	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 5: Indicates that the BCP has detected an internal processor integrity fault CePISR_e_MainDtctdSdKeyTimeout	seed does not update	in 500 msec	1. Number Of Secondary Processors to be Monitored 2. SPI faults 3. Seed/Key Init Delay 4.Run/Crank Voltage	1. > 0 2. = FALSE(No Active P0606) 3. > 1s 4. > 9.5	Detects in 500 msec	
		DTC Fail case 6: Indicates that the BCP has detected an internal processor integrity fault CePISR_e_MainDtctdSdRxWrongOrdr	Seed sequence	≠ expected order	1. Number Of Secondary Processors to be Monitored 2. SPI faults 3.Run/Crank Voltage	1. > 0 2. = FALSE(No Active P0606) 3. > 9.5	12 fail counts out of 16 sample counts Executes in a 12.5ms loop Detects in 200ms	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 7: Indicates that the BCP has detected an internal processor integrity fault CePISR_e_MainSequenceFlt	Seed timeout PSW Fault	> 200 ms = True	1. Seed Update Key StoreFault Enable OR 2. Program Sequence Watch Enable	1. = True 2. = True	3 fail counts out of 4 sample counts Executes in a 50ms loop Detects in 200ms	
		DTC Fail case 8: Indicates that the BCP has detected an internal processor integrity fault CePISR_e_MainALU_Flt	HWIO detects Fault	=2 (times in the same key cycle)	1. ALU Test Enabled 2. Code clear active 3. PMDR Run Crank Ignition Voltage	1. = TRUE 2. >= 0.15s 3. = False (No Active P2534)	runs continuously in 12.5ms loop Detects in 12.5ms	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 9: Indicates that the BCP has detected an internal processor integrity fault CePISR_e_MainCfgRegFlt	HWIO detects Fault	=2 (times in the same key cycle)	1. Diagnostic Test Enabled 2. Code clear active 3. PMDR Run Crank Ignition Voltage	1. = TRUE 2. >= 0.15s 3. = False (No Active P2534)	runs continuously in 12.5ms loop Detects in 12.5ms	
		DTC Fail case 10: Indicates that the BCP has detected an internal processor integrity fault CePISR_e_MainStackFlt	HWIO detects Fault	= 2 (Since Powerup)	Diagnostic Test Enabled	= True	Runs Continuously in 100ms loop Detects in 500ms	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 11: Indicates that the BCP has detected an internal processor integrity fault CePISR_e_FlashECC_CktTest	HWIO detects Fault	= 3 /10 (Action: Turn On Mil) 5/10 (Action: Shutdown controller)	1. Flash ECC Circuit Test Enable 2. Power-Up Reset	1. = True 2. = True	3 fail counts out of 10 sample counts (turns on MIL) 5 fail counts out of 10 sample counts (shutdown vehicle) Executes once at every power up reset	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 12: Indicates that the BCP has detected an internal processor integrity fault CePISR_e_RAM_ECC_CktTest	HWIO detects Fault	= 3 /10 (Action: Turn On Mil) 5/10 (Action: Shutdown controller)	1. RAM ECC Circuit Test Enable 2. Power-Up Reset	1. = True 2. = True	3 fail counts out of 10 sample counts (turns on MIL) 5 fail counts out of 10 sample counts (shutdown vehicle) Executes once at every power up reset	
		DTC Fail case 13: Indicates that the BCP has detected an internal processor integrity fault CePISR_e_DMA_XferTest	HWIO detects Fault or Memory Copy Error	= True or =True	DMA Transfer Test Enabled	= TRUE	1 failure Executes Once at Power Up	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
ECU off timer diagnostic	P262B	This DTC detects an error in the ECU off timer IC chip reported time	Difference between timer reported time and previous reported time time	> 1.5 seconds	Run/Crank Active	FALSE	8 seconds (8 counts @ 1000ms) out of a 20 second window (20 counts @ 1000ms)	Two Trips, Type B
			OR					
			Timer calculated module off time outside of expected range	25% of expected module off time calculation				
Torque Security Diagnostics								
Internal Control Module Torque Calculation Performance	P061B	*This Diagnostic tests if the hybrid torque command can create an unintended acceleration/decelerration or wrong*						One Trip, Type A
		DTC Fail case 1: The Estimated output torque Commanded exceeds the upper torque limit To Max Fault	The Estimated output torque Commanded	> Maximum of either the drivers output torque request or zero plus .2g (87Nm)				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 2: The Estimated output torque Commanded exceeds the lower torque limit To Min Fault	The Estimated output torque Commanded	< Minimum of either the drivers output torque request or zero minus .2g (132Nm)		Runs continuously when a torque source is present	30 fail counts out of 32 sample counts Executes in a 6.25ms loop Detects in 200ms	
		DTC Fail case 3: The motor torque command exceeds the motor torque capacity Tm Cmd Fault	The Motor Torque command	>Maximum motor torque capacity plus .2g (36Nm) or less than the minimum torque capacity minus .2g (55Nm)				
Control Module Long Term Memory Performance	P062F	*This Diagnostic tests for unuseable BINVDM (flash) memory only*						One Trip, Type A
		DTC Fail case 1: Indicates that the NVM Error flag HWIO Bat Write will not succeed set	Last EEPROM write did not complete		Ignition voltage	≥ 5 volts	1 failure Frequency: Once at power	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 2: Indicates that the NVM Error flag HWIO Assembly Cal set	did not complete		Enable Cal	= True	Once at power-up	
Torque Management System – Forced Engine Shutdown	P06AF	*This Diagnostic checks that the ECM is still functioning correctly*						One Trip, Type A
		DTC Fail case 1: The main processor monitor ring compares the ECM 2nd pattern (nibble pattern) to known good pattern to determine ECM state of health.	The nibble pattern is incorrect	The pattern does not match (F, 5, B, D, A, 6, 3, 0)	Run/Crank Voltage	> 9.5 Volts	8 fail counts out of 12 sample counts Executes in a 12.5 ms Loop Detects in 200ms	
Alive Rolling Count Diagnostics								
Alive Rolling Count / Protection Value	P15F0	*This Diagnostic checks for corruption in signals sent over CAN for the Engine Actual Torque Steady State*						One Trip,

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
fault for the Engine Actual Torque Steady State		DTC Fail case 1: Detect the ARC (Alive Rolling Count) or Protection Value fault by checking the ARC and Protection Value of the Engine Actual Torque Steady State	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1	Current ARC ≠ Previous ARC +1	Run Crank Active Run/Crank Voltage	True for > 0.5 seconds > 9.5V	10 fail counts out of 16 sample counts Executes in a 12.5 ms Loop Detects in 200ms	Type A
			OR					
			The primary signal value does not equal the protection value	Primary Value ≠ Protection Value	Run Crank Active Run/Crank Voltage	True for > 0.5 seconds > 9.5V		
Alive Rolling Count / Protection Value fault for the Engine	P15F5	*This Diagnostic checks for corruption in signals sent over CAN for the Engine Crankshaft Torque Command*						One Trip, Type A

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
fault for the Engine Actual Torque Steady State		DTC Fail case 1: Detect the ARC (Alive Rolling Count) or Protection Value fault by checking the ARC and Protection Value of the Engine Crankshaft Predicted Torque Command	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1	Current ARC ≠ Previous ARC +1	Run Crank Active	True for > 0.5 seconds	10 fail counts out of 16 sample counts Executes in a 12.5 ms Loop Detects in 200ms	Type A
		DTC Fail case 2: Detect the ARC (Alive Rolling Count) or Protection Value fault by checking the ARC and Protection Value of the Engine Crankshaft ImmediateTorque Command	The current alive rolling count value does not equal the previous alive rolling count value incremented by 1	Current ARC ≠ Previous ARC +1	Run Crank Active	True for > 0.5 seconds	10 fail counts out of 16 sample counts Executes in a 12.5 ms Loop Detects in 200ms	
			OR					
			The primary signal value does not equal the protection value	Primary Value ≠ Protection Value				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Internal Control Module Redundant Memory Performance	P16F3	*Detect the dual store memory fault by comparing the primary value and the dual store value of the individual*						One Trip, Type A
		DTC Fail case 1: Detect the dual store memory fault by comparing the primary Ve signals and the We redundant signals	The primary value and the dual store value are not equal				10 Fail counts out of 16 Smpl counts, with a frequency of 12.5ms	
Communication Diagnostics								
Control Module Comm'n Bus A Off	U0073	*This diagnostic indicates a bus off condition on HSGMLAN (Bus A)*						Two Trips, Type B
		DTC Fail case 1: Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state.	CAN device driver	= bus-off state.	Run/Crank Voltage Power Mode	> 9.5 Volts =RUN	4 fail counts out of 5 samples counts requires 112.5ms for each fail count to mature Detects in 450 ms	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Bus Off Fault Active	=FALSE		
					Normal Communication Enabled	=TRUE		
					Normal Message Transmission	=TRUE		
					Diagnostic Stablization Timer	>=3 sec		
Control Module Comm'n Bus B Off	U0074	*This diagnostic indicates a bus off condition on the PTE (Bus B)*						Two Trips, Type B
		DTC Fail case 1: Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state.	CAN device driver	= bus-off state.	Run/Crank Voltage	> 9.5 Volts	4 fail counts out of 5 samples counts requires 112.5ms for each fail count to mature Detects in 450 ms	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Power Mode Bus Off Fault Active Normal Communication Enabled Normal Message Transmission Diagnostic Stablization Timer	=RUN =FALSE =TRUE =TRUE >=3 sec		
Lost Comm'n With ECM/PCM on Bus A	U0100	*This diagnostic indicates a lost communication between the BCP and the ECM on Bus A*						Two Trips, Type B
		DTC Fail case 1: Detects that CAN serial data communication has been lost with the ECM on Bus A	Missed ECM Messages		Run/Crank Voltage Power Mode Bus Off Fault Active Normal Communication Enabled Normal Message Transmission	> 9.5 Volts =RUN =FALSE =TRUE =TRUE	Executes in a 6.25ms loop Detects in 500 ms	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Diagnostic Stablization Timer	>=3 sec		
Lost Comm'n With TCM	U0101	*This diagnostic indicates a lost communication between the BCP and the TCM on Bus A*						Two Trips, Type B
		DTC Fail case 1: Detects that CAN serial data communication has been lost with the TCM on Bus A	Missed TCM Messages		Run/Crank Voltage	> 9.5 Volts	Executes in a 6.25ms loop	
							Detects in 500 ms	
					Power Mode	=RUN		
					Bus Off Fault Active	=FALSE		
					Normal Communication Enabled	=TRUE		
					Normal Message Transmission	=TRUE		
					Diagnostic Stablization Timer	>=3 sec		
Lost Comm'n With	U1818	*This diagnostic indicates a lost communication between the BCP and the ECM on Bus B*						Two

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
ECM/PCM on Bus B		DTC Fail case 1: Detects that CAN serial data communication has been lost with the ECM on Bus B	Missed ECM Messages		Run/Crank Voltage Power Mode Bus Off Fault Active Normal Communication Enabled Normal Message Transmission Diagnostic Stablization Timer	> 9.5 Volts =RUN =FALSE =TRUE =TRUE >=3 sec	Executes in a 6.25ms loop Detects in 500 ms	Trips, Type B
Lost com with Battery Energy Control Module on Bus B	U182A	*This diagnostic indicates a lost communication between the BCP and the BECM on Bus B*						Two Trips, Type B
		DTC Fail case 1: Lost Communication with Battery Energy Contorl Module on Bus B (BECM)	Missed BECM Messages		Run/Crank Voltage Power Mode	> 9.5 Volts =RUN	Executes in a 6.25ms loop Detects in 500 ms	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Bus Off Fault Active	=FALSE		
					Normal Communication Enabled	=TRUE		
					Normal Message Transmission	=TRUE		
					Diagnostic Stablization Timer	>=3 sec		
Motor Generator Coolant Pump								
Drive Motor "A" Coolant Pump Control Circuit/Open	P0CC1	*This diagnostic detects open circuit failures on the Drive Motor "A" coolant pump control*						Two Trips, Type B
		Detects open circuit faults on control circuit of "Motor A" coolant pump	Drive Motor "A" Control HWIO Open Circuit Status Flag	= FaultPresent	RunCrank	=TRUE	20 fails / 25 samples at 250ms loop rate	
					Drive Motor "A" Pump Control Enable	=FALSE		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Drive Motor "A" Control HWIO Open Circuit Status Flag	≠ INDETERMINATE		
Drive Motor "A" Coolant Pump Control Circuit Range/Performance	P0CC2	*The purpose of this function is to detect and report a failure of the Drive Motor "A" Cooling System.*						Two Trips, Type B
		This diagnostic determines if the Drive Motor "A" cooling system is functioning as expected.	Rate of change of coolant temperature	< 0.15 deg C / sec	Propulsion system active	=TRUE	20 sec after pump commanded on.	
					12V System Voltage	> 10V		
					Drive Motor "A" Pump Control Enable	=TRUE		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Predicted delta between coolant temperature within Drive Motor "A" cooling jacket and the coolant at the Drive Motor "A" Coolant Temperature Sensor	> 29°C		
					DTCs are not ACTIVE	P0CC1 P0CC3 P0CC4 P0CBF POCBE P0CBD P0A2B P0A2C P0A2D		
Drive Motor "A" Coolant Pump Control Circuit Low	P0CC3	*This diagnostic detects short to ground circuit failure on the Drive Motor "A" coolant pump control output*						Two Trips, Type B
		Detects short to	Drive Motor "A"	= FaultPresent	RunCrank	=TRUE	20 fails / 25 samples at 250ms loop rate	
					Drive Motor "A" Pump Control Enable	=FALSE		
					Drive Motor "A" Control HWIO Circuit Low Status Flag	≠ INDETERMINATE		
Drive Motor "A" Coolant Pump	P0CC4	*This diagnostic detects short to voltage circuit failure on the Drive Motor "A" coolant pump control output.*						Two Trips,

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Control Circuit High		Detects short to power fault on control circuit of "Motor A" coolant pump	Drive Motor "A" Control HWIO Circuit High Status Flag	= FaultPresent	RunCrank	=TRUE	20 fails / 25 samples at 250ms loop rate	Type B
					Drive Motor "A" Pump Control Enable	=TRUE		
					Drive Motor "A" Control HWIO Circuit High Status Flag	≠ INDETERMINATE		
Motor Generator Coolant Temperature Sensor								
Drive Motor "A" Coolant Temperature Sensor Circuit High	P0CBF	*This diagnostic detects Out-of-Range High circuit failures of the coolant temperature sensor input.*						Two Trips, Type B
		This diagnostic detects Out-of-Range HIGH circuit failures of the Drive Motor "A" coolant temperature sensor input.	Raw temperature sensor input	> 176962 Ohms (-40 Deg C)	RunCrank	=TRUE	50 fails / 62 samples at 100ms loop rate	
					Raw temperature sensor input	> 100.9 Ohms (120 Deg C)		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Drive Motor "A" Coolant Temperature Sensor Circuit Low	P0CBE	*This diagnostic detects Out-of-Range Low circuit failures of the coolant temperature sensor input.*						Two Trips, Type B
		This diagnostic detects Out-of-Range Low circuit failures of the Drive Motor "A" coolant temperature sensor input.	Raw temperature sensor input	< 100.9 Ohms (120 Deg C)	RunCrank	=TRUE	50 fails / 62 samples at 100ms loop rate	
					Raw temperature sensor input	< 176962 Ohms (-40 Deg C)		
Drive Motor "A" Coolant Temperature Sensor Performance	P0CBD	*The purpose of this diagnostic is to detect an irrational output signal from the Drive Motor "A" Cooling Loop temperature sensor.*						Two Trips, Type B
		Drive Motor "A" Coolant Loop Temperature Sensor is not functioning as intended	Absolute difference between Drive Motor "A" Coolant Loop Temperature Sensor and average of Drive Motor "A" Stator, Engine Intake Air, and Transmission Oil temperatures	> 25°C	RunCrank	=TRUE	50 fails / 62 samples at 100ms loop rate	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					DTCs are not ACTIVE	P0A2B P0A2C P0A2D P0CBF POCBE P0111 P0112 P0113 P0114 P0711 P0712 P0713 U0100 U0101		
					Diagnostic has not run this key cycle	=TRUE		
					Engine off Time	> 21600 sec		
Hood Switch Diagnostics								
Engine Hood Switch Performance	P257D	Rationality Check for the Vehicle Hood Switch	Hood Switch Position Sensor reading within an invalid range	Within the following ranges: 43.4% - 45.7%	Diagnostic Enabled	= TRUE	6 failed samples within 8 samples 1 sample every 12.5ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Propulsion System Active	=TRUE		
Engine Hood Switch Circuit Low Voltage	P257E	Detects if the Vehicle Hood Switch is Shorted to Ground	Hood Switch Position Sensor reading below a threshold	<17.2%	Diagnostic Enabled System Active	=TRUE =TRUE	6 failed samples within 8 samples 1 sample every	Two Trips, Type B
Engine Hood Switch Circuit High Voltage	P257F	Detects if the Vehicle Hood Switch is Shorted to Battery	Hood Switch Position Sensor reading above a threshold	>67.8%	Diagnostic Enabled Propulsion System Active	=TRUE =TRUE	6 failed samples within 8 samples 1 sample every 12.5ms	Two Trips, Type B
Air Inlet Temperature Sensor (circuit is done in VITM)								
Hybrid Battery Pack Air Temperature Sensor Performance	P0AAD	*The purpose of this diagnostic is to detect an irrational output signal from the battery system inlet air temperature sensor.*						Two Trips, Type B
		Power Pack Inlet Air Temperature Sensor is not functioning as intended	Absolute difference between Hybrid Battery Pack Air Temperature Sensor and average battery core temperature	> 10°C	RunCrank	=TRUE	50 fails / 62 samples at 100ms loop rate	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					DTCs are not ACTIVE	U182A U0100 P262B P0AAF P0AAE P1A5D P0A9D P0AC7 P0ACC P0AEA P0BC4 P0C35 P0A9E P0AC8 P0ACD P0AEB P0BC5 P0C36 P0A9C P0AC6 P0ACB P0AE9 P0BC3 P0C34		
					Diagnostic has not run this key cycle	=TRUE		
					Engine off Time	> 21600 sec		
BPIM FAN								
Hybrid Battery Pack Cooling System Performance	P0C32	*This diagnostic uses a thermal model to predict the high voltage APM temperature and compares it to the actual*						Two Trips, Type B
		This diagnostic determines if the power pack cooling system is functioning properly	Absolute difference between 14V Power Module Temperature Sensor 1 and Modeled value of 14V Power Module Temperature Sensor 1	>15°C	RunCrank	=TRUE	1000 fails / 3000 samples at 100ms loop rate	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					DTCs are not ACTIVE	P0AAD P0AAE P0AAF U182A P0A84 P0A85 P0D65 P0D66 P1A90 P1A91 P1A92 P1AE8, P1AE9 P1AEC, P0A88 P0A89, P0CC5		
					14V Power Module Temperature Sensor 1	>-10°C		
					Hybrid Battery Pack Air Temperature Sensor	>-10°C		
					Hybrid Battery Pack Surface Temperature	>-10°C		
					14V Power Module Power	>0.1KW		
					Number of non-faulted battery cell temperatures	>=4		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Propulsion system active time	>150s		
					14V Power Module Power has not changed more than over a time window of within the last	> 0.6 kW 30s 180s		
Power Pack Fan Control Output High Circuit	P0A85	*This diagnostic detects short to voltage circuit fault to the fan control output.*						Two Trips, Type B
		Detects short to power fault on control circuit of Power Pack Fan	Power Pack Fan Control Output High Circuit HWIO Status Flag	= FaultPresent	RunCrank	=TRUE	20 fails / 25 samples at 250ms loop rate	
					Power Pack Fan Percent Speed Command	>4.99% AND <90.01%		
					Power Pack Fan Control Output High Circuit HWIO Status Flag	≠Indeterminate		
Power Pack Fan	P0A84	*This diagnostic detects short to ground circuit fault to the fan control output.*						Two

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Control Output Low Circuit		Detects short to ground fault on control circuit of Power Pack Fan	Power Pack Fan Control Output Low Circuit HWIO Status Flag	= FaultPresent	RunCrank	=TRUE	20 fails / 25 samples at 250ms loop rate	Trips, Type B
					Power Pack Fan Percent Speed Command	>4.99% AND <90.01%		
					Power Pack Fan Control Output Low Circuit HWIO Status Flag	≠Indeterminate		
Power pack Fan Enable High Circuit	P0D66	*This diagnostic detects short to voltage circuit fault to the fan device enable.*						Two Trips, Type B
		Detects short to power fault on Enable circuit of Power Pack Fan	Power pack Fan Enable High Circuit HWIO Status Flag	= FaultPresent	RunCrank	=TRUE	20 fails / 25 samples at 250ms loop rate	
					Power Pack Fan Enable	=FALSE		
					Power pack Fan Enable High Circuit HWIO Status Flag	≠Indeterminate		
Power pack Fan	P0D65	*This diagnostic detects short to ground circuit fault to the fan device enable.*						Two

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Enable Low Circuit		Detects short to ground fault on Enable circuit of Power Pack Fan	Power pack Fan Enable Low Circuit HWIO Status Flag	= FaultPresent	RunCrank	=TRUE	20 fails / 25 samples at 250ms loop rate	Trips, Type B
					Power Pack Fan Enable	=TRUE		
					Power pack Fan Enable Low Circuit HWIO Status Flag	≠Indeterminate		
Hybrid Battery Pack Cooling Fan Sense Circuit Range/Performance	P0BC8	*This diagnostic detects an irrational fan feedback signal*						Two Trips, Type B
		This diagnostic determines if the power pack fan is performing correctly	Absolute difference between Fan Command and Fan Feedback	'Absolute Difference >= Power pack Fan Feedback Performance Thresh (see BCP Supporting Table)	Propulsion System Active	=TRUE	845 fails / 1260 samples at 100ms loop rate	
					Power Pack Fan Enable	=TRUE		
					12V System Voltage	> 10V		
					Power pack Fan Command in range	>=11% AND <=90%		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Enable Delay Timer	> 9 sec		
					DTCs are not ACTIVE	P0BC9 P0BCA P0C32 P0D66 P0D65 P0A84 P0A85		
Hybrid Battery Pack Cooling Fan Sense Circuit Low	P0BC9	*This diagnostic detects if the power pack fan is operating out of range low*						Two Trips, Type B
		This diagnostic determines if the power pack fan is operating out of range low	Power pack Fan Feedback out of range Low	<8 Hz	Propulsion System Active	=TRUE	430 fails / 645 samples at 100ms loop rate	
					Power Pack Fan Enable	=TRUE		
					12V System Voltage	> 10V		
					Power pack Fan Command in range	>=11% AND <=90%		
					Enable Delay Timer	> 9 sec		
Hybrid Battery Pack	P0BCA	*This diagnostic detects if the power pack fan is operating out of range high*						Two

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Cooling Fan Sense Circuit High		This diagnostic determines if the power pack fan is operating out of range high	Power pack Fan Feedback out of range High	>280 Hz	Propulsion System Active	=TRUE	430 fails / 645 samples at 100ms loop rate	Trips, Type B
					Power Pack Fan Enable	=TRUE		
					12V System Voltage	> 10V		
					Power pack Fan Command in Range	>=11% AND <=90%		
					Enable Delay Timer	> 9 sec		
Hybrid Battery Temperature Sensors								
Hybrid Battery Pack Over temperature	P0A7E	Battery temp. too high (Maximum of non-faulted temp sensors)	Max Battery Module Temperature	> 72.3 ºC	Temp Rationality FA (see BCP Fault Bundle Page)	= FALSE	50 Failures out of 60 Samples Frequency: 100ms	Two Trips, Type B
Hybrid Battery Temperature Sensor Range/Performance	P0A9C	Rationality compares temperature with the other sensor values read	Temperature input deviates from the average battery temperature of other Module_Groups	> 20 ºC	Temp Circuit FA (see BCP Fault Bundle Page)	= FALSE	50 Failures out of 67 Samples	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
							Frequency: 100ms	
Hybrid Battery 2 Temperature Sensor Performance	P0AC6	Rationality compares temperature with the other sensor values read	Temperature input deviates from the average battery temperature of other Module Groups	> 20 ºC	Temp Circuit FA (see BCP Fault Bundle Page)	= FALSE	50 Failures out of 67 Samples Frequency: 100ms	Two Trips, Type B
Hybrid Battery 3 Temperature Sensor Performance	P0ACB	Rationality compares temperature with the other sensor values read	Temperature input deviates from the average battery temperature of other Module Groups	> 20 ºC	Temp Circuit FA (see BCP Fault Bundle Page)	= FALSE	50 Failures out of 67 Samples Frequency: 100ms	Two Trips, Type B
Hybrid Battery 4 Temperature Sensor Performance	P0AE9	Rationality compares temperature with the other sensor values read	Temperature input deviates from the average battery temperature of other Module Groups	> 20 ºC	Temp Circuit FA (see BCP Fault Bundle Page)	= FALSE	50 Failures out of 67 Samples Frequency: 100ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Temperature Sensor E Circuit Range/Performance	P0BC3	Rationality compares temperature with the other sensor values read	Temperature input deviates from the average battery temperature of other Module_Groups	> 20 ºC	Temp Circuit FA (see BCP Fault Bundle Page)	= FALSE	50 Failures out of 67 Samples Frequency: 100ms	Two Trips, Type B
Hybrid Battery Temperature Sensor F Range/Performance	P0C34	Rationality compares temperature with the other sensor values read	Temperature input deviates from the average battery temperature of other Module Groups	> 20 ºC	Temp Circuit FA (see BCP Fault Bundle Page)	= FALSE	50 Failures out of 67 Samples Frequency: 100ms	Two Trips, Type B
Hybrid Battery System Diagnostics								
Battery Module – resistance High EOL	P0A80	High Pack Resistance	Pack Resistance	> End Of Life Battery Resistance (ohm) (see BCP Supporting Tables)	Average Battery Temperature (Average of non-faulted temp sensors) Data sufficiently dispersed and symmetric	> -10 ºC = TRUE	600 Failures out of 750 Samples Frequency: 100ms	One Trip, Type A

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Battery State of Charge (SOC = Availabe Usable Energy / Total Usable Energy)	> 10 % < 90 %		
					Temp Rationality FA (see BCP Fault Bundle Page)	= FALSE		
Hybrid Battery Voltage Diagnostics								

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid/EV Battery Voltage Balance Processor Multiplexer Performance	P1EAA	Cell Balance Resistor - Resistor Test. Function to rationalize that the circuit is not faulted	Circuit Key Off Test checks that when a cell's balancing resistor is activated that the cell's voltage moves more than: MUX Test expected Movment. Less than this cal will fail the diagnostic	< 0.1 V	RUN/CRANK Transitions to Contactor Status Test Active Bit Transitions to Low Parasitic Mode (see BCP Fault Bundle Page)	= OFF = Open = 1 = False	1 Failures out of 1 Samples, across key cycles Frequency: 25ms	Two Trips, Type B
			OR					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		Test Active Stuck On	Test active Bit (CAN signal that indicates when circuit is being tested)	= 1	RUN/CRANK Low Parasitic Mode (see BCP Fault Bundle Page)	= TRUE for > 1200 samples = False	240 Failures out of 320 Samples Frequency: 25ms	
			OR					
		Test Active Stuck Off	Test active Bit (CAN signal that indicates when circuit is being tested)	= 0 (for 400 samples)	RUN/CRANK Transitions to Low Parasitic Mode (see BCP Fault Bundle Page)	= OFF for < 400 samples = False	1 Failures out of 1 Samples, across key cycles Frequency: 25ms	
Battery Energy Control Module Hybrid/EV Battery Cell Overvoltage	P1EAB	Voltage too high	Cell Voltage	> 4.35 V	No active DTC's:	P1EAC	100 Failures out of 125 Samples	One Trip, Type A

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
						U182A	Frequency: 25ms	
Hybrid/EV Battery Cell Overvoltage Signal/Circuit Performance	P1EAC	Over voltage circuit 2nd protection - Fault Flag Test Function to rationalize that the circuit is not faulted	Circuit Key Off Test counts (Hardware line is pulled down for 6 pulses from VITM and the BCP counts the rising and falling edges to determine the circuit key off test counts)	≠ 12	RUN/CRANK Transitions to	= OFF	1 Failures out of 1 Samples, across key cycles	Two Trips, Type B
					Test Active Bit Low Parasitic Mode (see BCP Fault Bundle Page)	= 1 = False	Frequency:	
			OR					

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		Test Active Stuck On	Test active Bit (CAN signal that indicates when circuit is being tested)	= 1	RUN/CRANK Low Parasitic Mode (see BCP Fault Bundle Page)	= TRUE for > 480 samples = False	240 Failures out of 320 Samples Frequency: 25ms	
			OR					
		Test Active Stuck Off	Test active Bit (CAN signal that indicates when circuit is being tested)	= 0 (for 400 samples)	RUN/CRANK Transitions to Low Parasitic Mode (see BCP Fault Bundle Page)	= OFF for < 400 samples = False	1 Failures out of 1 Samples, across key cycles Frequency: 25ms	
			OR					
		Enumeration Test	Enumerated Counter	≠ Expect Sequence	Low Parasitic Mode (see BCP Fault Bundle Page)	= False	6 Failures out of 12 Samples Frequency: 25ms	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense A Circuit Range/Performance	P0B3C	Rationality compares cell voltage to movement of other cell voltages. The cell under test must move at least 50% as much as the other cells	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	Cell Voltage Circuit FA (see BCP Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.045V	20 Failures out of 40 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense B Circuit Range/Performance	P0B41	Rationality compares cell voltage to movement of other cell voltages. The cell under test must move at least 50% as much as the other cells	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	Cell Voltage Circuit FA (see BCP Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.045V	20 Failures out of 40 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense C Circuit Range/Performance	P0B46	Rationality compares cell voltage to movement of other cell voltages. The cell under test must move at least 50% as much as the other cells	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	Cell Voltage Circuit FA (see BCP Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.045V	20 Failures out of 40 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense D Circuit Range/Performance	P0B4B	Rationality compares cell voltage to movement of other cell voltages. The cell under test must move at least 50% as much as the other cells	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	Cell Voltage Circuit FA (see BCP Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.045V	20 Failures out of 40 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense E Circuit Range/Performance	P0B50	Rationality compares cell voltage to movement of other cell voltages. The cell under test must move at least 50% as much as the other cells	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	Cell Voltage Circuit FA (see BCP Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.045V	20 Failures out of 40 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense F Circuit Range/Performance	P0B55	Rationality compares cell voltage to movement of other cell voltages. The cell under test must move at least 50% as much as the other cells	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	Cell Voltage Circuit FA (see BCP Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.045V	20 Failures out of 40 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense G Circuit Range/Performance	P0B5A	Rationality compares cell voltage to movement of other cell voltages. The cell under test must move at least 50% as much as the other cells	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	Cell Voltage Circuit FA (see BCP Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.045V	20 Failures out of 40 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense H Circuit Range/Performance	P0B5F	Rationality compares cell voltage to movement of other cell voltages. The cell under test must move at least 50% as much as the other cells	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	Cell Voltage Circuit FA (see BCP Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.045V	20 Failures out of 40 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense I Circuit Range/Performance	P0B64	Rationality compares cell voltage to movement of other cell voltages. The cell under test must move at least 50% as much as the other cells	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	Cell Voltage Circuit FA (see BCP Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.045V	20 Failures out of 40 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense J Circuit Range/Performance	P0B69	Rationality compares cell voltage to movement of other cell voltages. The cell under test must move at least 50% as much as the other cells	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	Cell Voltage Circuit FA (see BCP Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.045V	20 Failures out of 40 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense K Circuit Range/Performance	P0B6E	Rationality compares cell voltage to movement of other cell voltages. The cell under test must move at least 50% as much as the other cells	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	Cell Voltage Circuit FA (see BCP Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.045V	20 Failures out of 40 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense L Circuit Range/Performance	P0B73	Rationality compares cell voltage to movement of other cell voltages. The cell under test must move at least 50% as much as the other cells	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	Cell Voltage Circuit FA (see BCP Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.045V	20 Failures out of 40 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense M Circuit Range/Performance	P0B78	Rationality compares cell voltage to movement of other cell voltages. The cell under test must move at least 50% as much as the other cells	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	Cell Voltage Circuit FA (see BCP Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.045V	20 Failures out of 40 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense N Circuit Range/Performance	P0B7D	Rationality compares cell voltage to movement of other cell voltages. The cell under test must move at least 50% as much as the other cells	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	Cell Voltage Circuit FA (see BCP Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.045V	20 Failures out of 40 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense O Circuit Range/Performance	P0B82	Rationality compares cell voltage to movement of other cell voltages. The cell under test must move at least 50% as much as the other cells	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	Cell Voltage Circuit FA (see BCP Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.045V	20 Failures out of 40 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense P Circuit Range/Performance	P0B87	Rationality compares cell voltage to movement of other cell voltages. The cell under test must move at least 50% as much as the other cells	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	Cell Voltage Circuit FA (see BCP Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.045V	20 Failures out of 40 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense Q Circuit Range/Performance	P0B8C	Rationality compares cell voltage to movement of other cell voltages. The cell under test must move at least 50% as much as the other cells	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	Cell Voltage Circuit FA (see BCP Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.045V	20 Failures out of 40 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense R Circuit Range/Performance	P0B91	Rationality compares cell voltage to movement of other cell voltages. The cell under test must move at least 50% as much as the other cells	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	Cell Voltage Circuit FA (see BCP Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.045V	20 Failures out of 40 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense S Circuit Range/Performance	P0B96	Rationality compares cell voltage to movement of other cell voltages. The cell under test must move at least 50% as much as the other cells	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	Cell Voltage Circuit FA (see BCP Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.045V	20 Failures out of 40 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense T Circuit Range/Performance	P0B9B	Rationality compares cell voltage to movement of other cell voltages. The cell under test must move at least 50% as much as the other cells	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	Cell Voltage Circuit FA (see BCP Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.045V	20 Failures out of 40 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense U Circuit Range/Performance	P0BA0	Rationality compares cell voltage to movement of other cell voltages. The cell under test must move at least 50% as much as the other cells	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	Cell Voltage Circuit FA (see BCP Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.045V	20 Failures out of 40 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense V Circuit Range/Performance	P0BA5	Rationality compares cell voltage to movement of other cell voltages. The cell under test must move at least 50% as much as the other cells	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	Cell Voltage Circuit FA (see BCP Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.045V	20 Failures out of 40 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense W Circuit Range/Performance	P0BAA	Rationality compares cell voltage to movement of other cell voltages. The cell under test must move at least 50% as much as the other cells	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	Cell Voltage Circuit FA (see BCP Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.045V	20 Failures out of 40 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense X Circuit Range/Performance	P0BAF	Rationality compares cell voltage to movement of other cell voltages. The cell under test must move at least 50% as much as the other cells	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	Cell Voltage Circuit FA (see BCP Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.045V	20 Failures out of 40 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense Y Circuit Range/Performance	P0BB4	Rationality compares cell voltage to movement of other cell voltages. The cell under test must move at least 50% as much as the other cells	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	Cell Voltage Circuit FA (see BCP Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.045V	20 Failures out of 40 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense Z Circuit Range/Performance	P0BB9	Rationality compares cell voltage to movement of other cell voltages. The cell under test must move at least 50% as much as the other cells	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	Cell Voltage Circuit FA (see BCP Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.045V	20 Failures out of 40 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense AA Circuit Range/Performance	P1B16	Rationality compares cell voltage to movement of other cell voltages. The cell under test must move at least 50% as much as the other cells	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	Cell Voltage Circuit FA (see BCP Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.045V	20 Failures out of 40 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense AB Circuit Range/Performance	P1B19	Rationality compares cell voltage to movement of other cell voltages. The cell under test must move at least 50% as much as the other cells	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	Cell Voltage Circuit FA (see BCP Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.045V	20 Failures out of 40 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense AC Circuit Range/Performance	P1B1C	Rationality compares cell voltage to movement of other cell voltages. The cell under test must move at least 50% as much as the other cells	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	Cell Voltage Circuit FA (see BCP Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.045V	20 Failures out of 40 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense AD Circuit Range/Performance	P1B1F	Rationality compares cell voltage to movement of other cell voltages. The cell under test must move at least 50% as much as the other cells	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	Cell Voltage Circuit FA (see BCP Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.045V	20 Failures out of 40 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense AE Circuit Range/Performance	P1B22	Rationality compares cell voltage to movement of other cell voltages. The cell under test must move at least 50% as much as the other cells	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	Cell Voltage Circuit FA (see BCP Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.045V	20 Failures out of 40 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense AF Circuit Range/Performance	P1B25	Rationality compares cell voltage to movement of other cell voltages. The cell under test must move at least 50% as much as the other cells	Individual Cell voltage movement	Not in same direction as the Average Cell Voltage Movement	Cell Voltage Circuit FA (see BCP Fault Bundle Page) Average Cell Voltage Movement	= FALSE > 0.045V	20 Failures out of 40 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Battery Module – Over Voltage	P0AFB	Voltage too high	High Voltage Battery Pack Voltage	> Pack Over Voltage Thresh (V) (See BCP Supporting Tables)	No active DTCs:	P0ABC P0ABD P0AF8 P0ABB P1A5D U182A	320 Failures out of 1595 Samples Frequency: 25ms	One Trip, Type A
			OR					
			Any Cell Voltage	> Cell Over Voltage Thresh (V) (See BCP Supporting Tables)	Cell Voltage Rationality FA (see BCP Fault Bundle Page)	= FALSE	40 Failures out of 195 Samples Frequency: 25ms	
Battery Module – Under Voltage	P0AFA	Voltage too low	High Voltage Battery Pack Voltage	< Pack Under Voltage Thresh (V) (See BCP Supporting Tables)	No active DTCs:	P0ABC P0ABD	320 Failures out of 1595 Samples	One Trip, Type A

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
						P0AF8 P0ABB P1A5D U182A	Frequency: 25ms	
			OR					
			Any Cell Voltage	< Cell Under Voltage Thresh (V) (See BCP Supporting Tables)	Cell Voltage Rationality FA (see BCP Fault Bundle Page)	= FALSE	40 Failures out of 195 Samples Frequency: 25ms	
Hybrid Battery Pack Voltage Sense Circuit Rationality	P0ABB	Rationality compares pack voltage sensor to average cell voltage * 32	|Average cell voltage * 32 - Battery Pack voltage|	> 5.49 V	BCP Voltage FA (see BCP Fault Bundle Page)	= FALSE	11 Failures out of 15 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Pack Voltage Sense Circuit Correlation	P0AF8	Correlation compares pack voltage sensor to MCP Bus Voltage	|Battery Pack voltage - MCP Bus Voltage |	> 5.77 V	Main Contactor Status No active DTCs: MCP Bus Voltage FA	= Closed P0ABC P0ABD P0ABB P1A5D U182A = False	400 Failures out of 1995 Samples Frequency: 25ms	Two Trips, Type B
Hybrid Battery Positive Contactor								
High Voltage System Interlock Circuit Low	P0A0C	DTC monitors the sensed voltage when the commanded voltage is high to determine if the circuit is faulty	HVIL Sensed % of Reference Voltage	<10%	HVIL Source Status 12V Battery Voltage	Sourced (5V) > 6V	2 failures out of 3 samples 12.5 ms /sample	Two Trip, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
High Voltage System Interlock Circuit High	P0A0D	DTC monitors the sensed voltage when the commanded voltage is high to determine if the circuit is faulty	HVIL Sensed % of Reference Voltage	>90%	HVIL Source Status	Sourced (5V)	2 failures out of 3 samples 12.5 ms /sample	Two Trip, Type B
					12V Battery Voltage	>6V		
Hybrid Battery Positive Contactor Control Circuit Low	P0ADB	Diagnoses the Positive Contactor 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 Open Circuit: ≥ 200 K Ω impedance between signal and controller ground			3 failures out of 5 samples 50 ms /sample Continuous	Two Trip, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Positive Contactor Control Circuit High	P0ADC	Diagnoses the Positive Contactor 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			3 failures out of 5 samples 50 ms /sample Continuous	Two Trip, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Precharge Contactor Control Circuit Low	P0AE6	Diagnoses the Precharge Contactor Control 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 Open Circuit: ≥ 200 K Ω impedance between signal and controller ground			3 failures out of 5 samples 50 ms /sample Continuous	Two Trip, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Precharge Contactor Control Circuit High	P0AE7	Diagnoses the Precharge Contactor 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			3 failures out of 5 samples 50 ms /sample Continuous	Two Trip, Type B
Hybrid Battery System Precharge Time Too Short	P0C77	This DTC sets if Bus Voltage gets too high too fast during contactor precharge.	Bus Voltage / Battery Voltage	> 95% in less than 75 ms from the start of precharge	Battery Voltage DTC not active Bus Voltage	P0ABC, P0ABD, P0ABB, P1A5D, or U182A < 45V before the start of precharge	75 ms Executed Once Per Precharge Event	Two Trip, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Bus Voltage DTC not active	P1AE8, P1AE9, or P1AEC		
Hybrid Battery System Precharge Time Too Long	P0C78	This DTC sets if either the Bus Voltage does not get high enough in 1000 ms or battery current remains too high for too long after the contactor status changes from open to precharge	Bus Voltage / Battery Voltage	has not reached 95% in less than 1000 ms from the start of contactor precharge			1000 ms Executed Once Per Precharge Event	Two Trip, Type B
			or					
					Battery Current DTC not active	P0AC1, P0AC2, P1EBA, P1A07, P0B13, P0B10, P0B11, P1EBB, U182A		
			Battery Current	> 5 Amp for longer than 100 msec during contactor precharge			100 msec Executed Once Per Precharge Event	
Accessory Power Module Diagnostics								

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Accessory Power Module Current Sensor Diagnostics								
14V Power Module Input Current Sensor Circuit Low Current	P0A88	This DTC detects a circuit low condition for the input current sensor on the Accessory Power Module	APM Input Current Sensor Measured Current	≤ 0.5A	Run/Crank Active	TRUE	1.5 seconds (60 counts @ 25ms) out of a 2 second window (80 counts @ 25ms)	Two Trips, Type B
					Run/Crank Voltage	9V ≤ X ≤ 32V		
					Calculated APM Output Power	0.25KW ≤ X ≤ 1.5KW		
14V Power Module Input Current Sensor Circuit High Current	P0A89	This DTC detects a circuit high condition for the input current sensor on the Accessory Power Module	APM Input Current Sensor Measured Current	≥ 22.5A	Run/Crank Active	TRUE	1.5 seconds (60 counts @ 25ms) out of a 2 second window (80 counts @ 25ms)	Two Trips, Type B
					Run/Crank Voltage	9V ≤ X ≤ 32V		
					Calculated APM Output Power	≤ 1.5KW		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
14V Power Module Output Current Sensor Circuit Low Current	P0C9E	This DTC detects a circuit low condition for the output current sensor on the Accessory Power Module	APM Output Current Sensor Measured Current	≤ 2A	Run/Crank Active	TRUE	1.5 seconds (60 counts @ 25ms) out of a 2 second window (80 counts @ 25ms)	Two Trips, Type B
					Run/Crank Voltage	9V ≤ X ≤ 32V		
					Calculated APM Input Power	0.25KW ≤ X ≤ 1.8KW		
14V Power Module Output Current Sensor Circuit High Current	P0C9F	This DTC detects a circuit high condition for the output current sensor on the Accessory Power Module	APM Output Current Sensor Measured Current	≥ 123A	Run/Crank Active	TRUE	1.5 seconds (60 counts @ 25ms) out of a 2 second window (80 counts @ 25ms)	Two Trips, Type B
					Run/Crank Voltage	9V ≤ X ≤ 32V		
					Calculated APM Input Power	≤ 1.25KW		
14 Volt Power Module Current Sensor AB Correlation	P0CC5	This DTC detects in range performance malfunctions of one or both APM current sensors	Difference between two calculated power signals below	> 0.4KW	Run/Crank Active	TRUE	3.75 seconds (15 counts @ 250ms) out of a 5 second window (20 counts @ 250ms)	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
			Calculated APM Input Power multiplied by below efficiency table: X Y 0 .99 5 .95 10 .94 15 .93 20 .92 25 .91 30 .90		Run/Crank Voltage	9V ≤ X ≤ 32V		
					P1AE8, P1AE9, P1AEC	NOT Fault Active		
					P0A88, P0A89, P0C9E, P0C9F	NOT Fault Active		
					APM Output Commanded	TRUE		
Accessory Power Module Output Voltage Sensor Diagnostics								
14 Volt Power Module Step Down Voltage Performance	P0CA2	This DTC detects a shoot through fault in the APM	Silicon based power switching device failure detected	TRUE			25ms (1 count @ 25ms)	One Trip, Type A
		DTC Pass	Silicon based power switching device failure detected	FALSE			5 seconds	

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
APM Voltage low	P0A8D	This DTC detects a circuit low voltage condition in the APM low voltage sensor	APM low voltage sensor sensed value	≤ 1V	Run/Crank Active	TRUE	1.5 seconds (60 counts @ 25ms) out of a 2 second window (80 counts @ 25ms)	Two Trips, Type B
					Run/Crank Voltage	9V ≤ X ≤ 32V		
		DTC Pass	APM low voltage sensor sensed value	> 1.5V				
APM Voltage high	P0A8E	This DTC detects a circuit high voltage condition in the APM low voltage sensor	APM low voltage sensor sensed value	≥ 20V	Run/Crank Active	TRUE	1.5 seconds (60 counts @ 25ms) out of a 2 second window (80 counts @ 25ms)	Two Trips, Type B
					Run/Crank Voltage	9V ≤ X ≤ 32V		
		DTC Pass	APM low voltage sensor sensed value	< 19.5V				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
APM Voltage performance	P0A8F	This DTC detects an in-range circuit performance condition in the APM low voltage sensor	Difference between APM low voltage sensor sensed value and Run/Crank low voltage sensed value	> 4.5V	Run/Crank Active	TRUE	3.75 seconds (15 counts @ 250ms) out of a 5 second window (20 counts @ 250ms)	Two Trips, Type B
					Run/Crank Voltage	9V ≤ X ≤ 32V		
					APM output commanded	TRUE		
Accessory Power Module Temperature Sensor Diagnostics								
14V Power Module Temperature Sensor 2 Performance	P1A71	This DTC detects an in-range circuit performance condition in the APM temperature sensor 2	Difference between APM Temperature Sensor 2 Measured Value and average of all three values below	≥ 20ºC	P1A90 Run This Key On	FALSE	3.75 seconds (15 counts @ 250ms) out of a 5 second window (20 counts @ 250ms)	Two Trips, Type B
			APM Temperature Sensor 1 Measured Value		P1A71 Run This Key On	FALSE		
			MGU Temperature Sensor Measured Value		P0A2B Run This Key On	FALSE		
			Inverter Temperature Sensor Measured Value		P0AEE Run This Key On	FALSE		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					P1A90, P1A91, P1A92, P1A71, P1A72, P1A73, P0A2B, P0A2C, P0A2D, P0A2F, P0AEE, P0AEF, P0AF0, P0C11, P262B/ECM	NOT FA		
					Run/Crank Active	TRUE		
					Run/Crank Voltage	9V ≤ X ≤ 32V		
					Propulsion System Inactive Time	≥ 28,800 seconds		
14V Power Module Temperature Sensor 2 Circuit Low Voltage	P1A72	This DTC detects a circuit low voltage condition in the APM Temperature Sensor 2 Circuit	APM Temperature Sensor 2 Measured Value	≥ 145º	Run/Crank Active	TRUE	3.75 seconds (15 counts @ 250ms) out of a 5 second window (20 counts @ 250ms)	Two Trips, Type B
					Run/Crank Voltage	9V ≤ X ≤ 32V		
		DTC Pass	APM Temperature Sensor 2 Measured Value	< 140º				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
14V Power Module Temperature Sensor 2 Circuit High Voltage	P1A73	This DTC detects a circuit high voltage condition in the APM Temperature Sensor 2 Circuit	APM Temperature Sensor 2 Measured Value	≤ -65ºC	Run/Crank Active	TRUE	3.75 seconds (15 counts @ 250ms) out of a 5 second window (20 counts @ 250ms)	Two Trips, Type B
					Run/Crank Voltage	9V ≤ X ≤ 32V		
		DTC Pass	APM Temperature Sensor 2 Measured Value	> -60ºC				
14V Power Module Temperature Sensor 1 Performance	P1A90	This DTC detects an in-range circuit performance condition in the APM temperature sensor 1	Difference between APM Temperature Sensor 1 Measured Value and average of all three values below	≥ 20ºC	P1A90 Run This Key On	FALSE	3.75 seconds (15 counts @ 250ms) out of a 5 second window (20 counts @ 250ms)	Two Trips, Type B
			APM Temperature Sensor 2 Measured Value		P1A71 Run This Key On	FALSE		
			MGU Temperature Sensor Measured Value		P0A2B Run This Key On	FALSE		
			Inverter Temperature Sensor Measured Value		P0AEE Run This Key On	FALSE		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					P1A90, P1A91, P1A92, P1A71, P1A72, P1A73, P0A2B, P0A2C, P0A2D, P0A2F, P0AEE, P0AEF, P0AF0, P0C11, P262B/ECM	NOT FA		
					Run/Crank Active	TRUE		
					Run/Crank Voltage	9V ≤ X ≤ 32V		
					Propulsion System Inactive Time	≥ 28,800 seconds		
14V Power Module Temperature Sensor 1 Circuit Low Voltage	P1A91	This DTC detects a circuit low voltage condition in the APM Temperature Sensor 1 Circuit	APM Temperature Sensor 2 Measured Value	≥ 145º	Run/Crank Active	TRUE	3.75 seconds (15 counts @ 250ms) out of a 5 second window (20 counts @ 250ms)	Two Trips, Type B
					Run/Crank Voltage	9V ≤ X ≤ 32V		
		DTC Pass	APM Temperature Sensor 2 Measured Value	< 140º				

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
14V Power Module Temperature Sensor 1 Circuit High Voltage	P1A92	This DTC detects a circuit high voltage condition in the APM Temperature Sensor 1 Circuit	APM Temperature Sensor 1 Measured Value	≤ -65ºC	Run/Crank Active	TRUE	3.75 seconds (15 counts @ 250ms) out of a 5 second window (20 counts @ 250ms)	Two Trips, Type B
					Run/Crank Voltage	9V ≤ X ≤ 32V		
		DTC Pass	APM Temperature Sensor 1 Measured Value	> -60ºC				
High Voltage Isolation								
High Voltage Isolation Low Resolution Circuit								
Hybrid Battery Voltage Isolation Sensing Performance	P0AA8	This DTC detects an in-range performance problem with either mid-pack voltage sensor circuits	Absolute value of difference between MCP high voltage sensor value and sum of positive mid-pack voltage sensor value and negative mid-pack voltage sensor value	> 15V	Run/Crank Active	TRUE	1.5 seconds (120 counts @ 12.5ms) out of a 2 second window (160 counts @ 12.5ms)	Two Trips, Type B
					P0AA9, P0AAA, P1E0D	NOT Fault Active		
					P1E0C	NOT Fault Active		
					P1AE8, P1AE9, P1AEC	NOT Fault Active		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Isolation Sensing Circuit 1 Low Voltage	P0AA9	This DTC detects a circuit low voltage condition in the positive mid-pack voltage sensor circuit	Negative mid-pack voltage measured value	< 5V	Run/Crank Active	TRUE	1.5 seconds (120 counts @ 12.5ms) out of a 2 second window (160 counts @ 12.5ms)	Two Trips, Type B
					High voltage contactor status	= CLOSED		
					Active Isolation	INACTIVE		
Hybrid Battery Voltage Isolation Sensing Circuit 1 High Voltage	P0AAA	This DTC detects a circuit high voltage condition in the positive mid-pack voltage sensor circuit	Difference between negative mid-pack voltage measured value and MCP high voltage value	> 15V	Run/Crank Active	TRUE	1.5 seconds (120 counts @ 12.5ms) out of a 2 second window (160 counts @ 12.5ms)	Two Trips, Type B
					P1AE8, P1AE9, P1AEC	NOT Fault Active		
Hybrid Battery Voltage Isolation Sensing Circuit 2 Low Voltage	P1E0C	This DTC detects a circuit low voltage condition in the negative mid-pack voltage sensor circuit	Negative mid-pack voltage measured value	< 5V	Run/Crank Active	TRUE	1.5 seconds (120 counts @ 12.5ms) out of a 2 second window (160 counts @ 12.5ms)	Two Trips, Type B
					Active Isolation	INACTIVE		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					High Voltage Contactor Status	CLOSED		
Hybrid Battery Voltage Isolation Sensing Circuit 2 High Voltage	P1E0D	This DTC detects a circuit high voltage condition in the negative mid-pack voltage sensor circuit	Difference between negative mid-pack voltage measured value and MCP high voltage value	> 15V	Run/Crank Active	TRUE	1.5 seconds (120 counts @ 12.5ms) out of a 2 second window (160 counts @ 12.5ms)	Two Trips, Type B
					P1AE8, P1AE9, P1AEC	NOT Fault Active		
Drive Motor "A" Control Module Hybrid Battery Voltage System Isolation Fault	P1AF0	This DTC detects an isolation problem in the high voltage DC system	HWIO calculated resistance between high voltage DC system and vehicle ground	< 225,600 ohms	P0AAA	NOT Fault Active	1.5 seconds (120 counts @ 12.5ms) out of a 2 second window (160 counts @ 12.5ms)	Two Trips, Type B
					P1E0D	NOT Fault Active		
					P0AA8	NOT Fault Active		
					P1E10	NOT Fault Active		
					P1E13	NOT Fault Active		
					P1E11	NOT Fault Active		
					P1E14	NOT Fault Active		
					P1AE8, P1AE9, P1AEC	NOT Fault Active		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					MCP High Voltage Sensor Value	> 100V		
					Active Isolation Status	INACTIVE for 10 seconds		
High Voltage Isolation High Resolution Circuit								
Hybrid Battery Voltage Isolation High Resolution Sensing Circuit 1 Low Voltage	P1E0F	This DTC detects a circuit low voltage condition in the positive mid-pack high resolution voltage sensor circuit	Positive mid-pack high resolution voltage measured value	< 3V	High Voltage Contactor Status	CLOSED	1.5 seconds (120 counts @ 12.5ms) out of a 2 second window (160 counts @ 12.5ms)	Two Trips, Type B
					Active Isolation	INACTIVE		
					High Voltage Contactor Status	CLOSED		
Hybrid Battery Voltage Isolation High Resolution Sensing Circuit 1 High Voltage	P1E10	This DTC detects a circuit high voltage condition in the positive mid-pack high resolution voltage sensor circuit	Difference between positive mid-pack high resolution voltage measured value and MCP high voltage measured value	> 5V	Run/Crank Active	TRUE	1.5 seconds (120 counts @ 12.5ms) out of a 2 second window (160 counts @ 12.5ms)	Two Trips, Type B
					P0AAA	NOT Fault Active		
					P1AE8, P1AE9, P1AEC,	NOT Fault Active		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Positive mid-pack voltage sensor value	< 7.5V		
Hybrid Battery Voltage Isolation High Resolution Sensing Circuit 1 Performance	P1E11	This DTC detects an in-range performance problem with the positive mid-pack high resolution voltage sensor circuit	Difference between positive mid-pack voltage sensor value and positive mid-pack high resolution voltage sensor value	> 3V			1.5 seconds (120 counts @ 12.5ms) out of a 2 second window (160 counts @ 12.5ms)	Two Trips, Type B
					P1E10, P1E0F	NOT Fault Active		
					Positive mid-pack voltage sensor value	< 7.5V		
					Active Isolation Status	INACTIVE		
Hybrid Battery Voltage Isolation High Resolution Sensing Circuit 2 Low Voltage	P1E12	This DTC detects a circuit low voltage condition in the negative mid-pack high resolution voltage sensor circuit	Negative mid-pack high resolution voltage sensor value	< 3V	High Voltage Contactor Status	CLOSED	1.5 seconds (120 counts @ 12.5ms) out of a 2 second window (160 counts @ 12.5ms)	Two Trips, Type B
					Active Isolation	INACTIVE		
					High Voltage Contactor Status	CLOSED		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Isolation High Resolution Sensing Circuit 2 High Voltage	P1E13	This DTC detects a circuit high voltage condition in the negative mid-pack high resolution voltage sensor circuit	Difference between negative mid-pack high resolution voltage measured value and MCP high voltage measured value	> 5V	Run/Crank Active	TRUE	75ms (6 counts @ 12.5ms) out of a 100ms window (8 counts @ 12.5ms)	Two Trips, Type B
					Negative mid-pack voltage sensor value	< 7.5V		
					P1E0D	NOT Fault Active		
					P1AE8, P1AE9, P1AEC	NOT Fault Active		
Hybrid Battery Voltage Isolation High Resolution Sensing Circuit 2 Performance	P1E14	This DTC detects an in-range performance problem with the negative mid-pack high resolution voltage sensor circuit	Difference between negative mid-pack voltage sensor value and negative mid-pack high resolution voltage sensor value	> 3V	P1E10	NOT Fault Active	75ms (6 counts @ 12.5ms) out of a 100ms window (8 counts @ 12.5ms)	Two Trips, Type B
					P1E12, P1E13	NOT Fault Active		
					Negative mid-pack voltage sensor value	< 7.5V		
					Active Isolation Status	INACTIVE		
Drive Motor Inverter Temperature Sensor (circuit diagnostics are done in MCP)								

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Drive Motor Inverter Temperature Sensor A Circuit Range/Performance	P0AEE	This DTC detects an in-range circuit performance condition in the Inverter temperature sensor	Difference between Inverter Temperature Sensor Measured Value and average of all three values below	≥ 20ºC	P1A90 Run This Key On	FALSE	3.75 seconds (15 counts @ 250ms) out of a 5 second window (20 counts @ 250ms)	Two Trips, Type B
			APM Temperature Sensor 2 Measured Value		P1A71 Run This Key On	FALSE		
			APM Temperature Sensor 1 Measured Value		P0A2B Run This Key On	FALSE		
			MGU Temperature Sensor Measured Value		P0AEE Run This Key On	FALSE		
					P1A90, P1A91, P1A92, P1A71, P1A72, P1A73, P0A2B, P0A2C, P0A2D, P0A2F, P0AEE, P0AEF, P0AF0, P0C11, P262B/ECM	NOT FA		
					Run/Crank Active	TRUE		
					Run/Crank Voltage	9V ≤ X ≤ 32V		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Propulsion System Inactive Time	≥ 28,800 seconds		
Drive Motor Temperature Sensor (circuit diagnostics are done in MCP)								
Drive Motor Temperature Sensor Performance	P0A2B	This DTC detects an in-range circuit performance condition in the MGU temperature sensor	Difference between MGU Temperature Sensor Measured Value and average of all three values below	≥ 25ºC	P1A90 Run This Key On	FALSE	3.75 seconds (15 counts @ 250ms) out of a 5 second window (20 counts @ 250ms)	Two Trips, Type B
			APM Temperature Sensor 2 Measured Value		P1A71 Run This Key On	FALSE		
			APM Temperature Sensor 1 Measured Value		P0A2B Run This Key On	FALSE		
			Inverter Temperature Sensor Measured Value		P0AEE Run This Key On	FALSE		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					P1A90, P1A91, P1A92, P1A71, P1A72, P1A73, P0A2B, P0A2C, P0A2D, P0A2F, P0AEE, P0AEF, P0AF0, P0C11, P262B/ECM	NOT FA		
					Run/Crank Active	TRUE		
					Run/Crank Voltage	9V ≤ X ≤ 32V		
					Propulsion System Inactive Time	≥ 28,800 seconds		
High Voltage System Interlock Circuit								
High Voltage System Interlock Circuit 2 Low Voltage	P1B3F	This DTC detects a low voltage condition in the high voltage interlock circuit 2 circuit	High voltage interlock circuit 2 measured percentage of reference voltage	> 95%	Controller Awake Time	> 250ms	400ms (32 counts @ 12.5ms) out of a 500ms window (40 counts @ 12.5ms)	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
High Voltage System Interlock Circuit 2 High Voltage	P1B40	This DTC detects a high voltage condition in the high voltage interlock circuit 2 circuit	High voltage interlock circuit 2 measured percentage of reference voltage	< 5%	Controller Awake Time	> 250ms	400ms (32 counts @ 12.5ms) out of a 500ms window (40 counts @ 12.5ms)	Two Trips, Type B
High Voltage Discharge Circuit								
Hybrid Battery System Discharge Time Too Long	P0C76	High voltage bus discharge time too long	High Voltage Inverter Rationalized Voltage	> 65V after 6.5 seconds	High voltage contactor status	= OPEN	2 Failures out of 2 Samples	One Trip, Type A
							Frequency: Runs Once per Key-Cycle	
Discharge Switch Circuit Open	P1A56	This circuit detects a failure in the active bus discharge circuit	High voltage bus delta 300ms after commanded discharge	< 18V	High voltage contactor status	= OPEN	1 failure	Two trips, Type B
			OR		High Voltage Bus Voltage	> 60V		
			Active bus discharge circuit status	= DISABLED			10 consecutive discharge attempts	

14 OBDG05 BCP Summary Tables

Cell Under Voltage Thresh		Temperature (°C)	-30	-20	-10	0	10	20	30	40	50			
		Voltage (V)	1.93	1.93	1.93	1.93	1.94	1.94	1.94	1.94	1.94			
Pack Under Voltage Thresh		Temperature (°C)	-30	-20	-10	0	10	20	30	40	50			
		Voltage (V)	61.91	61.91	61.91	61.91	61.91	61.91	61.91	61.91	61.91			
Cell Over Voltage Thresh		Temperature (°C)	-30	-20	-10	0	10	20	30	40	50			
		Voltage (V)	4.27	4.27	4.27	4.26	4.26	4.26	4.26	4.26	4.26			
Pack Over Voltage Thresh		Temperature (°C)	-30	-20	-10	0	10	20	30	40	50			
		Voltage (V)	136.49	136.49	136.49	136.49	136.49	136.49	136.49	136.49	136.49			
End of Life ResistanceThresh		Temperature(°C) / SOC (%)	10	20	30	40	50	60	70	80	90			
		-30	5.704	5.704	5.676	4.380	3.842	3.554	3.382	3.295	3.266			
		-20	4.351	3.808	3.670	2.950	2.599	2.398	2.302	2.258	2.210			
		-10	2.998	1.913	1.663	1.519	1.356	1.241	1.222	1.222	1.154			
		0	1.490	1.116	0.991	0.903	0.822	0.766	0.742	0.729	0.701			
		10	0.858	0.692	0.624	0.575	0.532	0.502	0.484	0.474	0.462			
		20	0.678	0.563	0.511	0.473	0.441	0.417	0.403	0.394	0.386			
		30	0.449	0.397	0.365	0.341	0.322	0.307	0.297	0.290	0.286			
		40	0.400	0.360	0.333	0.312	0.294	0.282	0.273	0.266	0.262			
		50	0.360	0.327	0.300	0.280	0.264	0.255	0.246	0.240	0.235			
Expect Sequence			3	5	13	11								
	or		0	6	14	8								
Power pack Fan Feedback Performance Thresh		Duty Cycle (%)	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	90.00	90.00	90.00
		Difference (Hz)	15.00	37.50	55.00	65.00	72.50	77.50	80.00	80.00	80.00	80.00	80.00	80.00

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
High Voltage Battery:								
Hybrid Battery Voltage Sense A Circuit Low	P0B3D	This DTC detects a circuit low voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	< 1.4 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B34 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense B Circuit Low	P0B42	This DTC detects a circuit low voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	< 1.4 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B34 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense C Circuit Low	P0B47	This DTC detects a circuit low voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	< 1.4 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B34 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense D Circuit Low	P0B4C	This DTC detects a circuit low voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	< 1.4 V	12V Battery Voltage No active DTCs: P1EAA	> 8.8 V P1B34 Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					P1EAC	Not Running		
Hybrid Battery Voltage Sense E Circuit Low	P0B51	This DTC detects a circuit low voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	< 1.4 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B35 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense F Circuit Low	P0B56	This DTC detects a circuit low voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	< 1.4 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B35 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense G Circuit Low	P0B5B	This DTC detects a circuit low voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	< 1.4 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B35 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense H Circuit Low	P0B60	This DTC detects a circuit low voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	< 1.4 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B35 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense I Circuit Low	P0B65	This DTC detects a circuit low voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	< 1.4 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B35 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense J Circuit Low	P0B6A	This DTC detects a circuit low voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	< 1.4 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B35 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense K Circuit Low	P0B6F	This DTC detects a circuit low voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	< 1.4 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B36 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense L Circuit Low	P0B74	This DTC detects a circuit low voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	< 1.4 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B36 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense M Circuit Low	P0B79	This DTC detects a circuit low voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	< 1.4 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B36 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense N Circuit Low	P0B7E	This DTC detects a circuit low voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	< 1.4 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B36 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense O Circuit Low	P0B83	This DTC detects a circuit low voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	< 1.4 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B36 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense P Circuit Low	P0B88	This DTC detects a circuit low voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	< 1.4 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B36 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense Q Circuit Low	P0B8D	This DTC detects a circuit low voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	< 1.4 V	12V Battery Voltage No active DTCs: P1EAA	> 8.8 V P1B37 Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					P1EAC	Not Running		
Hybrid Battery Voltage Sense R Circuit Low	P0B92	This DTC detects a circuit low voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	< 1.4 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B37 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense S Circuit Low	P0B97	This DTC detects a circuit low voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	< 1.4 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B37 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense T Circuit Low	P0B9C	This DTC detects a circuit low voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	< 1.4 V	12V Battery Voltage	> 8.8 V	7 Failures out of 10 Samples	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					No active DTCs: P1EAA P1EAC	P1B37 Not Running Not Running	Frequency: 200ms	
Hybrid Battery Voltage Sense U Circuit Low	P0BA1	This DTC detects a circuit low voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	< 1.4 V	12V Battery Voltage No active DTCs: P1EAA	> 8.8 V P1B38 Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					P1EAC	Not Running		
Hybrid Battery Voltage Sense V Circuit Low	P0BA6	This DTC detects a circuit low voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	< 1.4 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B38 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense W Circuit Low	P0BAB	This DTC detects a circuit low voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	< 1.4 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B38 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense X Circuit Low	P0BB0	This DTC detects a circuit low voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	< 1.4 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B38 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense Y Circuit Low	P0BB5	This DTC detects a circuit low voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	< 1.4 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B38 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense Z Circuit Low	P0BBA	This DTC detects a circuit low voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	< 1.4 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B38 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense AA Circuit Low	P1B17	This DTC detects a circuit low voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	< 1.4 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B39 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense AB Circuit Low	P1B1A	This DTC detects a circuit low voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	< 1.4 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B39 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense AC Circuit Low	P1B1D	This DTC detects a circuit low voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	< 1.4 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B39 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense AD Circuit Low	P1B20	This DTC detects a circuit low voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	< 1.4 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B39 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense AE Circuit Low	P1B23	This DTC detects a circuit low voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	< 1.4 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B39 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense AF Circuit Low	P1B26	This DTC detects a circuit low voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	< 1.4 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B39 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense A Circuit High	P0B3E	This DTC detects a circuit high voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	> 4.65 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B34 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense B Circuit High	P0B43	This DTC detects a circuit high voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	> 4.65 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B34 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense C Circuit High	P0B48	This DTC detects a circuit high voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	> 4.65 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B34 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense D Circuit High	P0B4D	This DTC detects a circuit high voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	> 4.65 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B34 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense E Circuit High	P0B52	This DTC detects a circuit high voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	> 4.65 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B35 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense F Circuit High	P0B57	This DTC detects a circuit high voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	> 4.65 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B35 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense G Circuit High	P0B5C	This DTC detects a circuit high voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	> 4.65 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B35 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense H Circuit High	P0B61	This DTC detects a circuit high voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	> 4.65 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B35 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense I Circuit High	P0B66	This DTC detects a circuit high voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	> 4.65 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B35 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense J Circuit High	P0B6B	This DTC detects a circuit high voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	> 4.65 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B35 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense K Circuit High	P0B70	This DTC detects a circuit high voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	> 4.65 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B36 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense L Circuit High	P0B75	This DTC detects a circuit high voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	> 4.65 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B36 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense M Circuit High	P0B7A	This DTC detects a circuit high voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	> 4.65 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B36 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense N Circuit High	P0B7F	This DTC detects a circuit high voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	> 4.65 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B36 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense O Circuit High	P0B84	This DTC detects a circuit high voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	> 4.65 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B36 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense P Circuit High	P0B89	This DTC detects a circuit high voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	> 4.65 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B36 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense Q Circuit High	P0B8E	This DTC detects a circuit high voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	> 4.65 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B37 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense R Circuit High	P0B93	This DTC detects a circuit high voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	> 4.65 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B37 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense S Circuit High	P0B98	This DTC detects a circuit high voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	> 4.65 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B37 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense T Circuit High	P0B9D	This DTC detects a circuit high voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	> 4.65 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B37 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense U Circuit High	P0BA2	This DTC detects a circuit high voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	> 4.65 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B38 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense V Circuit High	P0BA7	This DTC detects a circuit high voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	> 4.65 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B38 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense W Circuit High	P0BAC	This DTC detects a circuit high voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	> 4.65 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B38 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense X Circuit High	P0BB1	This DTC detects a circuit high voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	> 4.65 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B38 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense Y Circuit High	P0BB6	This DTC detects a circuit high voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	> 4.65 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B38 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense Z Circuit High	P0BBB	This DTC detects a circuit high voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	> 4.65 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B38 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense AA Circuit High	P1B18	This DTC detects a circuit high voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	> 4.65 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B39 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense AB Circuit High	P1B1B	This DTC detects a circuit high voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	> 4.65 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B39 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense AC Circuit High	P1B1E	This DTC detects a circuit high voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	> 4.65 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B39 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense AD Circuit High	P1B21	This DTC detects a circuit high voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	> 4.65 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B39 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense AE Circuit High	P1B24	This DTC detects a circuit high voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	> 4.65 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B39 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Voltage Sense AF Circuit High	P1B27	This DTC detects a circuit high voltage condition in the Cell Voltage Sensor N Circuit	Cell Sense Line Measured Value	> 4.65 V	12V Battery Voltage No active DTCs: P1EAA P1EAC	> 8.8 V P1B39 Not Running Not Running	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense A Circuit	P0B3B	This DTC detects a circuit open voltage condition in the Cell Voltage Sensor N Circuit by comparing the voltage of the adjacent cell and the rate of change of cell voltage	Cell Sense Line N Measured Value	< 1.4 V	No active DTC's	P1B34	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line N measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense B Circuit	P0B40	This DTC detects a circuit open voltage condition in the Cell Voltage Sensor N Circuit by comparing the voltage of the adjacent cell and the rate of change of cell voltage	Cell Sense Line N Measured Value AND Cell Sense Line N-1 Measured value	< 1.4 V	No active DTC's	P1B34	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line N measured value AND Cell Sense Line N-1 measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense C Circuit	P0B45	This DTC detects a circuit open voltage condition in the Cell Voltage Sensor N Circuit by comparing the voltage of the adjacent cell and the rate of change of cell voltage	Cell Sense Line N Measured Value AND Cell Sense Line N-1 Measured value	< 1.4 V	No active DTC's	P1B34	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line N measured value AND Cell Sense Line N-1 measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense D Circuit	P0B4A	This DTC detects a circuit open voltage condition in the Cell Voltage Sensor N Circuit by comparing the voltage of the adjacent cell and the rate of change of cell voltage	Cell Sense Line N Measured Value AND Cell Sense Line N-1 Measured value	< 1.4 V	No active DTC's	P1B34	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line N measured value AND Cell Sense Line N-1 measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense E Circuit	P0B4F	This DTC detects a circuit open voltage condition in the Cell Voltage Sensor N Circuit by comparing the voltage of the adjacent cell and the rate of change of cell voltage	Cell Sense Line N Measured Value AND Cell Sense Line N-1 Measured value	< 1.4 V	No active DTC's	P1B35	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line N measured value AND Cell Sense Line N-1 measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense F Circuit	P0B54	This DTC detects a circuit open voltage condition in the Cell Voltage Sensor N Circuit by comparing the voltage of the adjacent cell and the rate of change of cell voltage	Cell Sense Line N Measured Value AND Cell Sense Line N-1 Measured value	< 1.4 V	No active DTC's	P1B35	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line N measured value AND Cell Sense Line N-1 measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense G Circuit	P0B59	This DTC detects a circuit open voltage condition in the Cell Voltage Sensor N Circuit by comparing the voltage of the adjacent cell and the rate of change of cell voltage	Cell Sense Line N Measured Value AND Cell Sense Line N-1 Measured value	< 1.4 V	No active DTC's	P1B35	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line N measured value AND Cell Sense Line N-1 measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense H Circuit	P0B5E	This DTC detects a circuit open voltage condition in the Cell Voltage Sensor N Circuit by comparing the voltage of the adjacent cell and the rate of change of cell voltage	Cell Sense Line N Measured Value AND Cell Sense Line N-1 Measured value	< 1.4 V	No active DTC's	P1B35	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line N measured value AND Cell Sense Line N-1 measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense I Circuit	P0B63	This DTC detects a circuit open voltage condition in the Cell Voltage Sensor N Circuit by comparing the voltage of the adjacent cell and the rate of change of cell voltage	Cell Sense Line N Measured Value AND Cell Sense Line N-1 Measured value	< 1.4 V	No active DTC's	P1B35	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line N measured value AND Cell Sense Line N-1 measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense J Circuit	P0B68	This DTC detects a circuit open voltage condition in the Cell Voltage Sensor N Circuit by comparing the voltage of the adjacent cell and the rate of change of cell voltage	Cell Sense Line N Measured Value AND Cell Sense Line N-1 Measured value	< 1.4 V	No active DTC's	P1B35	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line N measured value AND Cell Sense Line N-1 measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense K Circuit	P0B6D	This DTC detects a circuit open voltage condition in the Cell Voltage Sensor N Circuit by comparing the voltage of the adjacent cell and the rate of change of cell voltage	Cell Sense Line N Measured Value AND Cell Sense Line N-1 Measured value	< 1.4 V	No active DTC's	P1B36	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line N measured value AND Cell Sense Line N-1 measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense L Circuit	P0B72	This DTC detects a circuit open voltage condition in the Cell Voltage Sensor N Circuit by comparing the voltage of the adjacent cell and the rate of change of cell voltage	Cell Sense Line N Measured Value AND Cell Sense Line N-1 Measured value	< 1.4 V	No active DTC's	P1B36	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line N measured value AND Cell Sense Line N-1 measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense M Circuit	P0B77	This DTC detects a circuit open voltage condition in the Cell Voltage Sensor N Circuit by comparing the voltage of the adjacent cell and the rate of change of cell voltage	Cell Sense Line N Measured Value AND Cell Sense Line N-1 Measured value	< 1.4 V	No active DTC's	P1B36	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line N measured value AND Cell Sense Line N-1 measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense N Circuit	P0B7C	This DTC detects a circuit open voltage condition in the Cell Voltage Sensor N Circuit by comparing the voltage of the adjacent cell and the rate of change of cell voltage	Cell Sense Line N Measured Value AND Cell Sense Line N-1 Measured value	< 1.4 V	No active DTC's	P1B36	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line N measured value AND Cell Sense Line N-1 measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense O Circuit	P0B81	This DTC detects a circuit open voltage condition in the Cell Voltage Sensor N Circuit by comparing the voltage of the adjacent cell and the rate of change of cell voltage	Cell Sense Line N Measured Value AND Cell Sense Line N-1 Measured value	< 1.4 V	No active DTC's	P1B36	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line N measured value AND Cell Sense Line N-1 measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense P Circuit	P0B86	This DTC detects a circuit open voltage condition in the Cell Voltage Sensor N Circuit by comparing the voltage of the adjacent cell and the rate of change of cell voltage	Cell Sense Line N Measured Value AND Cell Sense Line N-1 Measured value	< 1.4 V	No active DTC's	P1B36	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line N measured value AND Cell Sense Line N-1 measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense Q Circuit	P0B8B	This DTC detects a circuit open voltage condition in the Cell Voltage Sensor N Circuit by comparing the voltage of the adjacent cell and the rate of change of cell voltage	Cell Sense Line N Measured Value	< 1.4 V	No active DTC's	P1B37	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line N measured value AND Cell Sense Line N-1 measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense R Circuit	P0B90	This DTC detects a circuit open voltage condition in the Cell Voltage Sensor N Circuit by comparing the voltage of the adjacent cell and the rate of change of cell voltage	Cell Sense Line N Measured Value AND Cell Sense Line N-1 Measured value	< 1.4 V	No active DTC's	P1B37	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line N measured value AND Cell Sense Line N-1 measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense S Circuit	P0B95	This DTC detects a circuit open voltage condition in the Cell Voltage Sensor N Circuit by comparing the voltage of the adjacent cell and the rate of change of cell voltage	Cell Sense Line N Measured Value AND Cell Sense Line N-1 Measured value	< 1.4 V	No active DTC's	P1B37	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line N measured value AND Cell Sense Line N-1 measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense T Circuit	P0B9A	This DTC detects a circuit open voltage condition in the Cell Voltage Sensor N Circuit by comparing the voltage of the adjacent cell and the rate of change of cell voltage	Cell Sense Line N Measured Value AND Cell Sense Line N-1 Measured value	< 1.4 V	No active DTC's	P1B37	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line N measured value AND Cell Sense Line N-1 measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense U Circuit	P0B9F	This DTC detects a circuit open voltage condition in the Cell Voltage Sensor N Circuit by comparing the voltage of the adjacent cell and the rate of change of cell voltage	Cell Sense Line N Measured Value AND Cell Sense Line N-1 Measured value	< 1.4 V	No active DTC's	P1B38	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line N measured value AND Cell Sense Line N-1 measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense V Circuit	P0BA4	This DTC detects a circuit open voltage condition in the Cell Voltage Sensor N Circuit by comparing the voltage of the adjacent cell and the rate of change of cell voltage	Cell Sense Line N Measured Value AND Cell Sense Line N-1 Measured value	< 1.4 V	No active DTC's	P1B38	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line N measured value AND Cell Sense Line N-1 measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense W Circuit	P0BA9	This DTC detects a circuit open voltage condition in the Cell Voltage Sensor N Circuit by comparing the voltage of the adjacent cell and the rate of change of cell voltage	Cell Sense Line N Measured Value AND Cell Sense Line N-1 Measured value	< 1.4 V	No active DTC's	P1B38	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line N measured value AND Cell Sense Line N-1 measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense X Circuit	P0BAE	This DTC detects a circuit open voltage condition in the Cell Voltage Sensor N Circuit by comparing the voltage of the adjacent cell and the rate of change of cell voltage	Cell Sense Line N Measured Value AND Cell Sense Line N-1 Measured value	< 1.4 V	No active DTC's	P1B38	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line N measured value AND Cell Sense Line N-1 measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense Y Circuit	P0BB3	This DTC detects a circuit open voltage condition in the Cell Voltage Sensor N Circuit by comparing the voltage of the adjacent cell and the rate of change of cell voltage	Cell Sense Line N Measured Value AND Cell Sense Line N-1 Measured value	< 1.4 V	No active DTC's	P1B38	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line N measured value AND Cell Sense Line N-1 measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense Z Circuit	P0BB8	This DTC detects a circuit open voltage condition in the Cell Voltage Sensor N Circuit by comparing the voltage of the adjacent cell and the rate of change of cell voltage	Cell Sense Line N Measured Value AND Cell Sense Line N-1 Measured value	< 1.4 V	No active DTC's	P1B38	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line N measured value AND Cell Sense Line N-1 measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense AA Circuit	P1B28	This DTC detects a circuit open voltage condition in the Cell Voltage Sensor N Circuit by comparing the voltage of the adjacent cell and the rate of change of cell voltage	Cell Sense Line N Measured Value AND Cell Sense Line N-1 Measured value	< 1.4 V	No active DTC's	P1B39	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line N measured value AND Cell Sense Line N-1 measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense AB Circuit	P1B29	This DTC detects a circuit open voltage condition in the Cell Voltage Sensor N Circuit by comparing the voltage of the adjacent cell and the rate of change of cell voltage	Cell Sense Line N Measured Value AND Cell Sense Line N-1 Measured value	< 1.4 V	No active DTC's	P1B39	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line N measured value AND Cell Sense Line N-1 measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense AC Circuit	P1B2A	This DTC detects a circuit open voltage condition in the Cell Voltage Sensor N Circuit by comparing the voltage of the adjacent cell and the rate of change of cell voltage	Cell Sense Line N Measured Value AND Cell Sense Line N-1 Measured value	< 1.4 V	No active DTC's	P1B39	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line N measured value AND Cell Sense Line N-1 measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense AD Circuit	P1B2B	This DTC detects a circuit open voltage condition in the Cell Voltage Sensor N Circuit by comparing the voltage of the adjacent cell and the rate of change of cell voltage	Cell Sense Line N Measured Value AND Cell Sense Line N-1 Measured value	< 1.4 V	No active DTC's	P1B39	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line N measured value AND Cell Sense Line N-1 measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense AE Circuit	P1B2C	This DTC detects a circuit open voltage condition in the Cell Voltage Sensor N Circuit by comparing the voltage of the adjacent cell and the rate of change of cell voltage	Cell Sense Line N Measured Value AND Cell Sense Line N-1 Measured value	< 1.4 V	No active DTC's	P1B39	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line N measured value AND Cell Sense Line N-1 measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense AF Circuit	P1B2D	This DTC detects a circuit open voltage condition in the Cell Voltage Sensor N Circuit by comparing the voltage of the adjacent cell and the rate of change of cell voltage	Cell Sense Line N Measured Value AND Cell Sense Line N-1 Measured value	< 1.4 V	No active DTC's	P1B39	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line N measured value AND Cell Sense Line N-1 measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Voltage Sense Low Reference A Circuit	P1B3D	This DTC detects a circuit open condition in the Hybrid Battery Voltage Sense Low Reference A Circuit	Cell Sense Line Measured Value	< 1.4 V	No active DTC's	P1B34 P1B35 P1B36 P1B37 P1B38 P1B39	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line 16 measured value	> .5 V	12V Battery Voltage	> 8.8 V	Frequency: 200ms	
					P1EAA	Not Running		
					P1EAC	Not Running		
Hybrid Battery Voltage Sense Low Reference B Circuit	P1B3E	This DTC detects a circuit open condition in the Hybrid Battery Voltage Sense Low Reference B Circuit	Cell Sense Line Measured Value	< 1.4 V	No active DTC's	P1B34 P1B35 P1B36 P1B37 P1B38 P1B39	7 Failures out of 10 Samples	Two Trips, Type B
			Delta Voltage change in 200 ms of Cell Sense Line 32 measured value	> .5 V	12V Battery Voltage	> 8.8 V		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					P1EAA P1EAC	Not Running Not Running	Frequency: 200ms	
Hybrid Battery Temperature Sensor Circuit High	P0A9E	This DTC detects a circuit high voltage (low temperature) condition in the Cell Temperature Sensor N Circuit	Cell Temperature Sense Line Measured Value	> 4.63V (-45deg C)	12V Battery Voltage P1A5D	> 8.8 V Not Fault Active	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery 2 Temperature Sensor Circuit High Voltage	P0AC8	This DTC detects a circuit high voltage (low temperature) condition in the Cell Temperature Sensor N Circuit	Cell Temperature Sense Line Measured Value	> 4.63V (-45deg C)	12V Battery Voltage P1A5D	> 8.8 V Not Fault Active	7 Failures out of 10 Samples	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
							Frequency: 200ms	
Hybrid Battery 3 Temperature Sensor Circuit High Voltage	P0ACD	This DTC detects a circuit high voltage (low temperature) condition in the Cell Temperature Sensor N Circuit	Cell Temperature Sense Line Measured Value	> 4.63V (-45deg C)	12V Battery Voltage P1A5D	> 8.8 V Not Fault Active	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery 4 Temperature Sensor Circuit High Voltage	P0AEB	This DTC detects a circuit high voltage (low temperature) condition in the Cell Temperature Sensor N Circuit	Cell Temperature Sense Line Measured Value	> 4.63V (-45deg C)	12V Battery Voltage P1A5D	> 8.8 V Not Fault Active	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Temperature Sensor E Circuit High	P0BC5	This DTC detects a circuit high voltage (low temperature) condition in the Cell Temperature Sensor N Circuit	Cell Temperature Sense Line Measured Value	> 4.63V (-45deg C)	12V Battery Voltage P1A5D	> 8.8 V Not Fault Active	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Temperature Sensor F Circuit High	P0C36	This DTC detects a circuit high voltage (low temperature) condition in the Cell Temperature Sensor N Circuit	Cell Temperature Sense Line Measured Value	> 4.63V (-45deg C)	12V Battery Voltage P1A5D	> 8.8 V Not Fault Active	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Pack Air Temperature Sensor A Circuit High	P0AAF	This DTC detects a circuit high voltage (low temperature) condition in the Hybrid Battery Pack Air Temperature Sensor A Circuit High	Pack Air Temperature Sensor A Measured Value	> 4.63V (-45deg C)	12V Battery Voltage P1A5D	> 8.8 V Not Fault Active	7 Failures out of 10 Samples Frequency: 250ms	Two Trips, Type B
Hybrid Battery Temperature Sensor Circuit Low	P0A9D	This DTC detects a circuit low voltage (high temperature) condition in the Cell Temperature Sensor N Circuit	Cell Temperature Sense Line Measured Value	< 0.3V (90deg C)	12V Battery Voltage P1A5D	> 8.8 V Not Fault Active	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery 2 Temperature Sensor Circuit Low Voltage	P0AC7	This DTC detects a circuit low voltage (high temperature) condition in the Cell Temperature Sensor N Circuit	Cell Temperature Sense Line Measured Value	< 0.3V (90deg C)	12V Battery Voltage P1A5D	> 8.8 V Not Fault Active	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery 3 Temperature Sensor Circuit Low Voltage	P0ACC	This DTC detects a circuit low voltage (high temperature) condition in the Cell Temperature Sensor N Circuit	Cell Temperature Sense Line Measured Value	< 0.3V (90deg C)	12V Battery Voltage P1A5D	> 8.8 V Not Fault Active	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery 4 Temperature Sensor Circuit Low Voltage	P0AEA	This DTC detects a circuit low voltage (high temperature) condition in the Cell Temperature Sensor N Circuit	Cell Temperature Sense Line Measured Value	< 0.3V (90deg C)	12V Battery Voltage P1A5D	> 8.8 V Not Fault Active	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Temperature Sensor E Circuit Low	P0BC4	This DTC detects a circuit low voltage (high temperature) condition in the Cell Temperature Sensor N Circuit	Cell Temperature Sense Line Measured Value	< 0.3V (90deg C)	12V Battery Voltage P1A5D	> 8.8 V Not Fault Active	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Temperature Sensor F Circuit Low	P0C35	This DTC detects a circuit low voltage (high temperature) condition in the Cell Temperature Sensor N Circuit	Cell Temperature Sense Line Measured Value	< 0.3V (90deg C)	12V Battery Voltage P1A5D	> 8.8 V Not Fault Active	7 Failures out of 10 Samples Frequency: 200ms	Two Trips, Type B
Hybrid Battery Pack Air Temperature Sensor A Circuit Low	P0AAE	This DTC detects a circuit low voltage (high temperature) condition in the Hybrid Battery Pack Air Temperature Sensor A Circuit High	Pack Air Temperature Sensor A Measured Value	< 0.3V (90deg C)	12V Battery Voltage P1A5D	> 8.8 V Not Fault Active	7 Failures out of 10 Samples Frequency: 250ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Battery Energy Control Module 5 Volt Reference 2 Circuit	P1A5D	This diagnostic monitors the buffered 5V supply circuit 2	Battery Energy Control Module 5 Volt Reference 2 Circuit	X > 5.15V OR X < 4.85V	12V Battery Voltage	> 8.8 V	7 Failures out of 10 Samples Frequency: 25ms	Two Trips, Type B
Hybrid Battery Pack Voltage Sense Circuit Low	P0ABC	Circuit Low monitor of Hybrid Battery Pack Voltage Sense Circuit	Hybrid Battery Pack Voltage Sense Measurement	< 30V	12V Battery Voltage	> 8.8 V	7 Failures out of 10 Samples Frequency: 25ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid Battery Pack Voltage Sense Circuit High	P0ABD	Circuit High monitor of Hybrid Battery Pack Voltage Sense Circuit	Hybrid Battery Pack Voltage Sense Measurement	> 190.1V	12V Battery Voltage	> 8.8 V	7 Failures out of 10 Samples Frequency: 25ms	Two Trips, Type B
Hybrid Battery Pack Current Sensor Circuit Low	P0AC1	Circuit Low monitor of Hybrid Battery Pack Current Sensor Circuit	Hybrid Battery Pack Current Sensor Circuit	< 0.2V (-230A)	12V Battery Voltage P1A07	> 8.8 V Not Fault Active	7 Failures out of 10 Samples Frequency: 25ms	Two Trips, Type B
Hybrid Battery Pack Current Sensor Circuit High	P0AC2	Circuit High monitor of Hybrid Battery Pack Current Sensor Circuit	Hybrid Battery Pack Current Sensor Circuit	> 4.65V (215A)	12V Battery Voltage P1A07	> 8.8 V Not Fault Active	7 Failures out of 10 Samples Frequency: 25ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Hybrid/EV Battery Pack Current Sensor A Exceeded Learning Limit	P1EBA	Detects that the Current Sensor A Offset check is not out of range	Hybrid/EV Battery Pack Current Sensor	X < 2.57V (+7Amps) OR X > 2.43V (-7Amps)	12V Battery Voltage P1A07 Contactor Status	> 8.8 V Not Fault Active = Open	4 Failures out of 6 Samples Frequency: 10us	Two Trips, Type B
Battery Energy Control Module 5 Volt Reference Circuit	P1A07	This diagnostic monitors the buffered 5V supply circuit	Battery Energy Control Module 5 Volt Reference Circuit	X < 5.15V OR X > 4.85V	12V Battery Voltage	> 8.8 V	7 Failures out of 10 Samples Frequency: 250ms	Two Trips, Type B
Battery Energy Control Module Ignition Switch Run/Start Position Circuit Low	P1A5E	This monitor rationalizes the Run/Start Position line from the ECM master as Stuck Low	Hardwire Run/Crank AND Engine Controller Run Crank Terminal Status	= Low = High	12V Battery Voltage	> 8.8 V	350 Failures out of 400 Samples	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
					Comm signal from ECM with Engine Controller Run Crank Terminal Status	=High	Frequency: 25ms	
					U180B	Not Faut Active		
Battery Energy Control Module Ignition Switch Run/Start Position Circuit High	P1A5F	This monitor rationalizes the Run/Start Position line from the ECM master as Stuck High	Hardwire Run/Crank AND Engine Controller Run Crank Terminal Status	= High = Low	12V Battery Voltage	> 8.8 V	350 Failures out of 400 Samples	Two Trips, Type B
					Comm signal from ECM with Engine Controller Run Crank Terminal Status	=High	Frequency: 25ms	
					U180B	Not Faut Active		

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Battery Energy Control Module Communication Bus A Off	U180B	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state on BUS A	CAN device driver for Bus A	= bus-off state.	12V Battery Voltage	> 8.8 V	4 Failures out of 5 Samples Frequency: 500ms	Two Trips, Type B
Battery Energy Control Module Communication Bus B Off	U1811	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state on BUS B	CAN device driver for Bus B	= bus-off state.	12V Battery Voltage	> 8.8 V	4 Failures out of 5 Samples Frequency: 500ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Battery Energy Control Module Lost Communication with Hybrid Powertrain Control Module on Bus B	U1844	Detects that CAN serial data communication has been lost with the Hybrid Powertrain Control Module on Bus B	Missed Hybrid Powertrain Control Module Messages		12V Battery Voltage U1811	> 8.8 V Not Fault Active	400 Failures out of 480 Samples Frequency: 25ms	Two Trips, Type B
Battery Energy Control Module Lost Communication With Hybrid Powertrain Control Module	U1885	Detects that CAN serial data communication has been lost with the Hybrid Powertrain Control Module on Bus A	Missed Hybrid Powertrain Control Module Messages		12V Battery Voltage U180B	> 8.8 V Not Fault Active	400 Failures out of 480 Samples Frequency: 25ms	Two Trips, Type B

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
Battery Energy Control Module Lost Communication With Engine Control Module (ECM)	U1886	Detects that CAN serial data communication has been lost with the Engine Control Module (ECM) on Bus A	Missed Engine Control Module (ECM) Messages		12V Battery Voltage U180B	> 8.8 V Not Fault Active	400 Failures out of 480 Samples Frequency: 25ms	Two Trips, Type B
Battery Energy Control Module Main Processor Performance	P0A1F	DTC Fail case 1: Indicates that the BECM has detected an internal processor integrity fault Stack Overflow / Underflow	Microcontroller detects Stack Overflow / underflow		12V Battery Voltage	> 8.8 V	1 Failures out of 1 Samples Frequency: 25ms	One Trip, Type A
		OR						

Component / System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
		DTC Fail case 2: Indicates that the BECM has detected an internal processor integrity fault External Clock Failure	Microcontroller detects External Clock Failure		12V Battery Voltage	> 8.8 V	1 Failures out of 1 Samples Frequency: 25ms	
		OR						
		DTC Fail case 3: Indicates that the BECM has detected an internal processor integrity fault Address Error	Microcontroller detects an illegal address request		12V Battery Voltage	> 8.8 V	1 Failures out of 1 Samples Frequency: 25ms	