

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 > 3.50 deg. <b>(CamPosErrorLimlc1)</b>	DTC's are NOT active: P0010, IntakeCamSensorTFTKO CrankSensorTFTKO CrankIntakeCamCorrelati onFA.	System Voltage > 11 Volts, Engine is running VVT is enabled Desired cam position > 0 Power Take Off (PTO) not active  Both Desired & Measured cam positions cannot be < 3.50 <b>(CamPosErrorLimlc1)</b> or have both > 25.50 deg. <b>(PerfMaxlc1)</b> .  Desired cam position cannot vary more than 3.00 Cam Deg for at least 3.00 sec. <b>(StablePositionTimeIc1)</b>	135.00 failures out of 150.00 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 > 3.50 deg. ( <b>CamPosErrorLimEc1</b> )	DTC's are NOT active: P0013, ExhaustCamSensorTFTKO CrankSensorTFTKO CrankExhaustCamCorrelationFA	System Voltage > 11 Volts, Engine is running VVT is enabled Desired cam position > 0 Power Take Off (PTO) not active  Both Desired & Measured cam positions cannot be < 3.50 deg. ( <b>CamPosErrorLimEc1</b> ) or have both > ( 20.00 ) ( <b>PerfMaxEc1</b> ).  Desired cam position cannot vary more than 3.00 Cam Deg for at least 3.00 sec. ( <b>StablePositionTimeEc1</b> )	135.00 failures out of 150.00 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 -10.0 crank degrees before or 10.0 crank degrees after nominal position in one cam revolution.		Crankshaft and camshaft position signals are synchronized  Engine is Spinning  Cam phaser is in "parked" position  No Active DTCs:  Time since last execution of diagnostic	P0335, P0336 P0340,P0341 5VoltReferenceA_FA 5VoltReferenceB_FA  < 1.0 seconds	2 failures out of 3 tests.  A failed test is 4 failures out of 5 samples.  There is a delay after the first failed test to allow the camshaft position to return to the park position.  This time is defined by the table "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 -10.0 crank degrees before or 10.0 crank degrees after nominal position in one cam revolution.		Crankshaft and camshaft position signals are synchronized  Engine is Spinning  Cam phaser is in "parked" position  No Active DTCs:  Time since last execution of diagnostic	P0335, P0336 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

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

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

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 low during driver on state (indicates short to power).	Short to power: ≤ 0.5 Ω impedance between signal and controller power.	Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples  250 ms / sample  Continuous	Type B, 2 Trips

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



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

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 low 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	$7.0 < \Omega < 13.0$	No Active DTC's  Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P2610 IAT_SensorFA < 8.0 °C > 28,800 seconds -30.0 < °C < 45.0 < 32.0 volts < 0.27 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	P0054	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Heater Resistance outside of the expected range of	$7.0 < \Omega < 13.0$	No Active DTC's  Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P2610 IAT_SensorFA < 8.0 °C > 28,800 seconds -30.0 < °C < 45.0 < 32.0 volts < 0.27 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.
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 (@ 150°C)	< 34 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

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 (@ -60°C)	> 260,000 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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Radiator Coolant Temp - Engine Coolant Temp (ECT) Correlation	P00B6	This DTC detects a difference between ECT and RCT after a soak condition.	<p>A failure will be reported if any of the following occur:</p> <p>1) Absolute difference between ECT at power up &amp; RCT at power up is <math>\geq</math> an IAT based threshold table lookup value(fast fail).</p> <p>2) Absolute difference between ECT at power up &amp; RCT at power up is <math>&gt;</math> by 20.0°C and a block heater has not been detected.</p> <p>3) ECT at power up <math>&gt;</math> IAT at power up by 20.0°C and the time spent cranking the engine without starting is greater than 0.0seconds with the LowFuelConditionDiag</p>	<p>See the table named: <b>Fail if power up ECT exceeds RCT by these values</b> in the Supporting tables section</p> <p>= False</p>	<p>No Active DTC's</p> <p>Engine Off Soak Time Propulsion Off Soak Time Non-volatile memory initialization</p> <p>Test complete this trip Test aborted this trip IAT LowFuelCondition Diag</p> <p>=====</p> <p>Block Heater detection is enabled when either of the following occurs:</p> <p>1) ECT at power up <math>&gt;</math> IAT at power up by 2) Cranking time</p> <p>=====</p> <p>Block Heater is detected and diagnostic is aborted when 1) or 2) occurs.</p> <p>1a) Vehicle drive time 1b) Vehicle speed 1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is</p>	<p>VehicleSpeedSensor_FA IAT_SensorCircuitFA THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA IgnitionOffTimeValid TimeSinceEngineRunningValid &gt; 28,800 seconds &gt; 28,800 seconds = Not occurred = False = False <math>\geq -7</math> °C = False</p> <p>=====</p> <p>&gt; 20.0°C &lt; 0.0 Seconds</p> <p>=====</p> <p>&gt; 0 Seconds with &gt; 0.0 MPH and 0.00 times the seconds with vehicle speed below</p>	<p>1 failure 500 msec/ sample Once per valid cold start</p>	<p>Type B, 2 Trips</p>

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					below 1b as follows:  1d) IAT drops from power up IAT  2a) ECT drops from power up ECT  2b) Engine run time  ===== Diagnostic is aborted when 3) or 4) occurs:  3) Engine run time with vehicle speed below 1b  4) Minimum IAT during test	1b  ≥ 255.0 °C  > 255 °C  Within > 65,535 Seconds  =====  > 1800 Seconds  ≤ -7.0 °C		



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 45Deg C. When above is present for more than 5 seconds, fail counts start.		No Active DTC's  Engine run time OR Engine Coolant Temp	THMR_RCT_Sensor_Ckt _FA THMR_ECT_Sensor_Ckt _FA > 45seconds  > 70.0 Deg C	30 failures out of 200 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.
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	<= 125 kPa*(g/s)  > 10 grams/sec  > 20.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 500 RPM <= 8,000 RPM >= -7 Deg C <= 125 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_F A MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA  EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP	Continuous  Calculation are performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow Sensor Circuit Low Frequency	P0102	Detects a continuous short to low or a open in either the signal circuit or the MAF sensor	MAF Output	<= 1,832 Hertz (~ 0.26 gm/sec)	Engine Run Time Engine Speed Ignition Voltage Above criteria present for a period of time	> 1.0 seconds >= 300 RPM >= 10.0 Volts  >= 1.0 seconds	200 failures out of 250 samples  1 sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow Sensor Circuit High Frequency	P0103	Detects a high frequency output from the MAF sensor	MAF Output	>= 14,500 Hertz (~ 209.0 gm/sec)	Engine Run Time Engine Speed Ignition Voltage Above criteria present for a period of time	> 1.0 seconds >= 300 RPM >= 10.0 Volts  >= 1.0 seconds	200 failures out of 250 samples  1 sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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	<= 125 kPa*(g/s)	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 500 RPM <= 8,000 RPM >= -7 Deg C <= 125 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.	Continuous  Calculations are performed every 12.5 msec	Type B, 2 Trips
			Manifold Pressure OR	< 50.0 kPa	Time between current ignition cycle and the last	4 failures out of 5 samples		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Manifold Pressure	> 115.0 kPa	time the engine was running  Engine is not rotating  No Active DTCs:  No Pending DTCs:	> 8.0 seconds  EngineModeNotRunTimer Error MAP_SensorFA AAP_SnsrFA  MAP_SensorCircuitFP AAP_SnsrCktFP	1 sample every 12.5 msec	

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Manifold Absolute Pressure Sensor Circuit High	P0108	Detects an open sensor ground or continuous short to high in either the signal circuit or the MAP sensor.	MAP Voltage	> 90.0 % of 5 Volt Range (This is equal to 4.50 Volts, or 115.0 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 (no humidity or manifold temperature sensors)	P0111	Detects an IAT sensor that has stuck in range by comparing to engine coolant temperature at startup	ABS(Power Up IAT - Power Up ECT)	> 40 deg C	Time between current ignition cycle and the last time the engine was running  Power Up ECT  No Active DTCs:	> 28,800 seconds  < 60 deg C  ECT_Sensor_Ckt_FA IAT_SensorCircuitFA MnfdTempSensorCktFA 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 Low	P0112	Detects a continuous short to ground in the IAT signal circuit or the IAT sensor	Raw IAT Input	< 62 Ohms (~150 deg C)	Engine Run Time	> 0.00 seconds	40 failures out of 50 samples  1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit High	P0113	Detects a continuous open circuit in the IAT signal circuit or the IAT sensor	Raw IAT Input	> 126,840 Ohms (~-60 deg C)	Engine Run Time	> 0.00 seconds	40 failures out of 50 samples  1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Intermittent In-Range	P0114	Detects a noisy or erratic IAT signal circuit or IAT sensor	String Length  Where: "String Length" = sum of "Diff" calculated over  And where: "Diff" = ABS(current IAT reading - IAT reading from 100 milliseconds previous)	> 125.00 DegC  10 consecutive IAT samples	Continuous		4 failures out of 5 samples  Each sample takes 1.0 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature (ECT) Sensor Performance	P0116	This DTC detects ECT temp sensor stuck in mid range.	<p>A failure will be reported if any of the following (1-3) occur after the following soak conditions, Engine off time &gt; 28,800 seconds Propulsion system off time &gt; 28,800 seconds</p> <p>1) ECT at power up &gt; IAT at power up by an IAT based table lookup value (fast fail).</p> <p>2) ECT at power up &gt; IAT at power up by 20.0 Deg C and a block heater has not been detected.</p> <p>3) ECT at power up &gt; IAT at power up by 20.0 Deg C and the time spent cranking the engine without starting is greater than 0.0 seconds with the LowFuelConditionDiag</p>	<p>See the table named: <b>Fail if power up ECT exceeds IAT by these values</b> in the Supporting tables section</p> <p>= False</p>	<p>No Active DTC's</p> <p>Non-volatile memory initialization</p> <p>Test complete this trip Test aborted this trip IAT LowFuelCondition Diag</p> <p>===== Block Heater detection is enabled when either of the following occurs:</p> <p>1) ECT at power up &gt; IAT at power up by</p> <p>2) Cranking time</p> <p>===== Block Heater is detected and diagnostic is aborted when 1) or 2) occurs:</p> <p>1a) Vehicle drive time</p> <p>1b) Vehicle speed</p> <p>1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is below 1b as follows:</p> <p>1d) IAT drops from power</p>	<p>VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA IgnitionOffTime Valid TimeSinceEngineRunning Valid</p> <p>= Not occurred</p> <p>= False = False ≥ -7 °C</p> <p>= False</p> <p>===== &gt; 20.0 °C</p> <p>&lt; 0.0 seconds</p> <p>===== &gt; 0 seconds</p> <p>&gt; 0.0 MPH</p> <p>0.00 times the seconds with vehicle speed below 1b</p>	<p>1 failure</p> <p>500 msec/ sample</p> <p>Once per valid cold start</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					up IAT  2a) ECT drops from power up ECT  2b) Engine run time  ===== Diagnostic is aborted when 3) or 4) occurs:  3) Engine run time with vehicle speed below 1b  4) Minimum IAT during test	$\geq 255.0\text{ }^{\circ}\text{C}$  $\geq 255\text{ }^{\circ}\text{C}$  Within $\leq 65,535$ seconds  =====  $> 1800$ seconds  $\leq -7\text{ }^{\circ}\text{C}$		

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 (@ 150°C)	< 34 Ohms			5 failures out of 6 samples  1 sec/ sample  Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temp Sensor Circuit High	P0118	Circuit Continuity This DTC detects a short to high or open in the ECT signal circuit or the ECT sensor.	ECT Resistance (@ -60°C)	> 260,000 Ohms	Engine run time OR IAT min	> 10.0 seconds  ≥ 0.0 °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) positive step change is greater than calculated high limit  OR  2) negative step change is lower than calculated low limit.  The calculated high and low limits 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 calculated 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.  *****	15.0 seconds -80.0 Deg C 200.0 Deg C	No Active DTC's	P0117 P0118	3 failures out of 4 samples  1 sec/ sample  Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	> 125 kPa*(g/s)  > 10 grams/sec  <= 20.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 500 RPM <= 8,000 RPM > -7 Deg C < 125 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.  No Active DTCs: MAP_SensorCircuitFA EGRValvePerformance_F A MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA  No Pending DTCs: 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)	639 / 1,279 counts; 153 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)	639 / 1,279 counts; 153 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	P0128	This DTC detects if the engine coolant temperature rises too slowly due to an ECT or Cooling system fault	<p>Energy is accumulated after the first combustion event using Range #1 or #2 below:</p> <p>Thermostat type is divided into normal (non-heated) and electrically heated.</p> <p>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 appropriate section below.</p> <p>***** Type cal above = 1 (Electrically heated t-stat) == == == == Range #1 (Primary) ECT reaches Commanded temperature minus 11 °C when Ambient min is &lt; 52 °C and ≥ 10 °C. Note: Warm up target for range #1 will be at least 74 °C == == == == Range #2 (Alternate) ECT reaches Commanded temperature minus 11 °C when Ambient min is &lt; 10 °C and ≥ -40 °C. Note: Warm up target for range #2 will be at least</p>	<p>See the two tables named: <b>Maximum Accumulated Energy for Start-up ECT conditions - Primary</b> and <b>Maximum Accumulated Energy for Start-up ECT conditions - Alternate</b> in the Supporting tables section.</p> <p>This diagnostic models the net energy into and out of the cooling</p>	<p>No Active DTC's</p> <p>Engine not run time (soaking time before current trip)</p> <p>Engine run time</p> <p>Fuel Condition</p> <p>***** If Engine RPM is continuously greater than for this time period</p> <p>The diagnostic test for this key cycle will abort *****</p> <p>***** If T-Stat Heater commanded duty cycle for this time period</p> <p>The diagnostic test for this key cycle will abort</p> <p>***** ECT at start run</p>	<p>ECT_Sensor_Ckt_FA VehicleSpeedSensor_FA OAT_PtEstFiltFA IAT_SensorCircuitFA MAF_SensorFA THMR_AWP_AuxPumpFA THMR_AHV_FA THMR_SWP_Control_FA ECT_Sensor_Perf_FA</p> <p>≥ 1,800 seconds</p> <p>10 ≤ Eng Run Tme ≤ 1,400 seconds</p> <p>Ethanol ≤ 87 %</p> <p>*****</p> <p>8,192 rpm 65,535 seconds</p> <p>*****</p> <p>&gt; 50.0 % duty cycle &gt; 5.0 seconds</p> <p>*****</p> <p>-10 ≤ ECT ≤ 59 °C</p>	<p>1 failure to set DTC</p> <p>1 sec/ sample</p> <p>Once per ignition key cycle</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>74 °C</p> <p>*****</p> <p>Type cal above = 0 (non - heated t-stat) == == == ==</p> <p>Range #1 (Primary) ECT reaches 64 °C when Ambient min is &lt; 52 °C and ≥ 10 °C. == == == ==</p> <p>Range #2 (Alternate) ECT reaches 64 °C when Ambient min is &lt; 10 °C and ≥ -40 °C.</p> <p>*****</p>	<p>system during the warm-up process.</p> <p>The five energy terms are: heat from combustion, heat from after-run, heat loss to enviroment, heat loss to cabin and heat loss to DFCCO.</p>				

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	< 50.0 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 LowFuelConditionDiagnostic 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 < 1.0400 50 < 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  LowFuelConditionDiagnostic Fuel Condition  Initial delay after Open Test Criteria met (cold start condition)  Initial delay after Open Test Criteria met (not cold start condition)  Equivalence Ratio Air Per Cylinder	===== TPS_ThrottleAuthorityDef aulted MAF_SensorFA EthanolCompositionSens or_FA 10.0 < Volts < 32.0 = All Cylinders active = Complete > 5 seconds > 150 seconds ≤ 87 % Ethanol ===== MAP_SensorFA EvapPurgeSolenoidCircuit _FA EvapFlowDuringNonPurg e_FA EvapVentSolenoidCircuit_ FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnrCkt _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 ≤ 1.0400 50 ≤ mgram ≤ 500	100 failures out of 125 samples  Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips



Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Fuel Control State All of the above met for	not = Power Enrichment > 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	P0133	This DTC determines if the O2 sensor response time is degraded.	The average response time is calculated over the test time, and compared to the threshold. Refer to <b>O2S Slow Response Bank 1 Sensor 1 "Pass/Fail Threshold table"</b> in the Supporting Tables tab.		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 LowFuelConditionDiagnostic Green O2S Condition	TPS_ThrottleAuthorityDefault MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnrCkt_FA FuelInjectorCircuit_FA AIR System FA 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 <b>Green Sensor Delay Criteria - Airflow</b> and <b>Green Sensor Delay Criteria - Limit</b> for the following locations: B1S1, B2S1 (if applicable) in Supporting Tables tab.	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.
					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	≥ 40 seconds = Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's" ) > 50 °C > -40 °C > 90 seconds  > 2.0 seconds > 2.0 seconds > 2.0 seconds  17 ≤ grams/second ≤ 40 1,000 ≤ RPM ≤ 3,500 < 87 % Ethanol > 70 kpa ≥ 150 mGrams  = Closed Loop = TRUE = Enabled ≤ 100.0 mgrams = Not Defaulted not = Power Enrichment DFCO not active  ≥ 0.0 %  ===== > 1.0 seconds		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Insufficient Activity Bank 1 Sensor 1	P0134	This DTC determines if the O2 sensor circuit is open.	Oxygen Sensor Signal	> 1,700 mvolts	No Active DTC's  System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Fuel Condition	TPS_ThrottleAuthorityDef aulted MAF_SensorFA EthanolCompositionSens or_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 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	P0137	This DTC determines if the O2 sensor circuit is shorted to low.	Oxygen Sensor Signal	< 50 mvolts	No Active DTC's  AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control LowFuelConditionDiagnostic 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 FuelTankPressureSnrCkt_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 ≤ 1.0400 50 ≤ mgrams ≤ 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 2	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  LowFuelConditionDiagnostic 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_ThrottleAuthorityDef aulted MAF_SensorFA EthanolCompositionSens or_FA 10.0 < Volts < 32.0 = All Cylinders active = Complete > 5 seconds ≤ 87 %Ethanol ===== MAP_SensorFA EvapPurgeSolenoidCircuit _FA EvapFlowDuringNonPurg e_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 ≤ 1.0400 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   > 74.0 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   Green O2S Condition   LowFuelConditionDiagnostic Post fuel cell  DTC's Passed	TPS_ThrottleAuthorityDefault 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, See definition of <b>Green Sensor Delay Criteria - Airflow</b> and <b>Green Sensor Delay Criteria - Limit</b> for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab.  = False  = enabled  P2270 (and P2272 if applicable) P013E (and P014A if	Frequency: Once per trip Note: if NaPOPD_b_Res etFastRespFunc = 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.
					<p>=====</p> <p>After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).</p>	<p>applicable)</p> <p>=====</p>		

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   > 120 grams (lower voltage threshold is 350 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   Green O2S Condition   Green Cat System Condition	TPS_ThrottleAuthorityDefault 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, See definition of <b>Green Sensor Delay Criteria - Airflow</b> and <b>Green Sensor Delay Criteria - Limit</b> for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab.  = Not Valid, System is not valid until accumulated airflow is greater than 360,000 grams. Airflow accumulation is only enabled when estimated	Frequency: Once per trip Note: if NaPOPD_b_Res etFastRespFunc = 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.
					<p>LowFuelConditionDiagnostic Post fuel cell</p> <p>DTC's Passed</p> <p>=====</p> <p>After above conditions are met: Fuel Enrich mode continued.</p> <p>=====</p> <p>During this test the following must stay TRUE or the test will abort: 0.95 ≤ Fuel EQR ≤ 1.10</p>	<p>Cat temperature is above 600 Deg C. (Note: This feature is only enabled when the vehicle is new and cannot be enabled in service).</p> <p>= False</p> <p>= enabled</p> <p>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)</p> <p>=====</p>		

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     > 33 grams   > 1 secs   > 2 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   DTC's Passed	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 <b>Green Sensor Delay Criteria - Airflow</b> and <b>Green Sensor Delay Criteria - Limit</b> for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab.  = False = enabled  P2270 (and P2272 if applicable)	Frequency: Once per trip Note: if NaPOPD_b_Res etFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_Rap idResponseActiv e = TRUE, multiple tests per trip are allowed.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Number of fueled cylinders ===== After above conditions are met: DFCO mode entered (wo driver initiated pedal input).	$\leq 3$ 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	< 350 mvolts    > 120 grams	No Active DTC's   B1S2 DTC's Not Active this key cycle  System Voltage Learned heater resistance   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, See definition of <b>Green Sensor Delay Criteria - Airflow</b> and <b>Green Sensor Delay Criteria - Limit</b> for the following locations: B1S2, B2S2 (if applicable) in Supporting Tables tab.  = Not Valid, System is not valid until accumulated airflow is greater than 360,000 grams. Airflow accumulation is only	Frequency: Once per trip Note: if NaPOPD_b_Res etFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_Rap idResponseActi ve = 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.
					LowFuelConditionDiagnos tic Post fuel cell  DTC's Passed  Number of fueled cylinders ===== After above conditions are met: Fuel Enrich mode entered. ===== During this test the following must stay TRUE or the test will abort: $0.95 \leq \text{Fuel EQR} \leq 1.10$	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).  = False  = enabled  P2270 (and P2272 if applicable) P013E (and P014A if applicable) P013A (and P013C if applicable) P2271 (and P2273 if applicable)  $\geq 1$ 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	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_ThrottleAuthorityDef aulted MAF_SensorFA EthanolCompositionSens or_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	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.
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 (a value < 0.95 effectively nullifies the short-term fuel trim criteria)	>= 1.295   >= 0.100	Engine speed BARO Coolant Temp MAP Inlet Air Temp MAF Fuel Level  Long Term Fuel Trim data accumulation:  Sometimes, certain Long-Term Fuel Trim Cells are not utilized for control and/or diagnosis  Closed Loop Long Term FT  Fuel Consumed  EGR Diag.	400 <rpm< 6,100 > 70 kPa -38 <°C< 130 15 <kPa< 255 -20 <°C< 150 1.0 <g/s< 512.0 > 10 % or if fuel sender is faulty  > 24.0 seconds of data must accumulate on each trip, with at least 15.0 seconds of data in the current fuel trim cell before a pass or fail decision can be made.  (Please see " <b>Long-Term Fuel Trim Cell Usage</b> " in Supporting Tables for a list of cells utilized for diagnosis)  Enabled Enabled (Please see " <b>Closed Loop Enable Criteria</b> " and " <b>Long Term FT Enable Criteria</b> " in Supporting Tables.)  > 65,535.0 liters of fuel consumed after a fuel fill event ("Virtual Flex Fuel Sensor applications only)  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.
					Catalyst Diag. Post O2 Diag. Device Control EVAP Diag.	Intrusive Test Not Active Not Active "tank pull down" Not Active		
					No active DTC:	IAC_SystemRPM_FA MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR System FA EvapExcessPrgePsb1_FA Ethanol Comp Snsr FA FuelInjectorCkt_FA EngMisfireDetected_FA EGRValvePerf_FA EGRValveCkt_FA MAP_EngVacuumStatus AmbPresDf1tdStatus 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	<p>Determines if the fuel control system is in a rich condition, based on the filtered long-term fuel trim metric.</p> <p>There are two methods to determine a Rich fault. They are Passive and Intrusive. A Passive Test decision cannot be made when Purge is enabled. The Intrusive test is described below: Intrusive Test: When the filtered Purge Long Term Fuel Trim metric is <math>\leq 0.760</math>, purge is ramped off to determine if excess purge vapor is the cause of the rich condition. If the filtered Purge Long Term Fuel Trim metric <math>&gt; 0.760</math>, the test passes without checking the filtered Non-Purge Long Term Fuel Trim metric.</p> <p>Performing intrusive tests too frequently may also affect EVAP and EPAIII emissions, and the execution frequency of other diagnostics.</p>	<p>Passive Test: The filtered Non-Purge Long Term Fuel Trim metric</p> <p>AND</p> <p>The filtered Short Term Fuel Trim metric (a value <math>&gt; 1.05</math> effectively nullifies the short-term fuel trim criteria)</p> <p>Intrusive Test: For 2 out of 3 intrusive segments, the filtered Purge Long Term Fuel Trim metric</p> <p>AND</p> <p>The filtered Non-Purge Long Term Fuel Trim metric</p> <p>AND</p> <p>The filtered Short Term Fuel Trim metric (a value <math>&gt; 1.05</math> effectively nullifies the short-term fuel trim criteria)</p> <p>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 purge 5 grams of vapor.</p>	<p><math>\leq 0.755</math></p> <p><math>\leq 2.000</math></p> <p><math>\leq 0.760</math></p> <p><math>\leq 0.755</math></p> <p><math>\leq 2.000</math></p>		<p>Secondary Parameters and Enable Conditions are identical to those for P0171, with the exception that fuel level is not considered.</p>	<p>Frequency: 100 ms Continuous Loop</p>	<p>Type B, 2 Trips</p>

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>A maximum of 3 completed segments or 25 attempts are allowed for each intrusive test. After an intrusive test report is completed, another intrusive test cannot occur for 299 seconds to allow sufficient time to purge excess vapors from the canister. During this period, fuel trim will pass if the filtered Purge-on Long Term fuel trim &gt; 0.760 for at least 150 seconds, indicating that the canister has been purged.</p>					

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 - (PFI)	P0201	This DTC checks the circuit for electrical integrity during operation.	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	Powertrain Relay Voltage within range for a duration  Engine Running	>= 11 Volts >= 5 Seconds  >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 - (PFI)	P0202	This DTC checks the circuit for electrical integrity during operation.	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	Powertrain Relay Voltage within range for a duration  Engine Running	>= 11 Volts >= 5 Seconds  >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips



Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 - (PFI)	P0203	This DTC checks the circuit for electrical integrity during operation.	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	Powertrain Relay Voltage within range for a duration  Engine Running	>= 11 Volts >= 5 Seconds  >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 4 - (PFI)	P0204	This DTC checks the circuit for electrical integrity during operation.	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	Powertrain Relay Voltage within range for a duration  Engine Running	>= 11 Volts >= 5 Seconds  >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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)	639 / 1,279 counts;  153 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)	639 / 1,279 counts;  153 counts continuous; 3.125 ms /count in the ECM main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 Low side circuit shorted to ground (PFI)	P0261	This DTC checks the circuit for electrical integrity during operation.	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	Powertrain Relay Voltage within range for a duration  Engine Running	>= 11 Volts >= 5 Seconds  >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 Low side circuit shorted to power (PFI)	P0262	This DTC checks the circuit for electrical integrity during operation.	Voltage high during driver on state indicates short to power	Short to power: ≤ 0.5 Ω impedance between signal and controller power	Powertrain Relay Voltage within range for a duration  Engine Running	>= 11 Volts >= 5 Seconds  >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 Low side circuit shorted to ground (PFI)	P0264	This DTC checks the circuit for electrical integrity during operation.	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	Powertrain Relay Voltage within range for a duration  Engine Running	>= 11 Volts >= 5 Seconds  >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 2 Low side circuit shorted to power (PFI)	P0265	This DTC checks the circuit for electrical integrity during operation.	Voltage high during driver on state indicates short to power	Short to power: ≤ 0.5 Ω impedance between signal and controller power	Powertrain Relay Voltage within range for a duration  Engine Running	>= 11 Volts >= 5 Seconds  >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips



Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 Low side circuit shorted to ground (PFI)	P0267	This DTC checks the circuit for electrical integrity during operation.	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	Powertrain Relay Voltage within range for a duration  Engine Running	>= 11 Volts >= 5 Seconds  >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 3 Low side circuit shorted to power (PFI)	P0268	This DTC checks the circuit for electrical integrity during operation.	Voltage high during driver on state indicates short to power	Short to power: ≤ 0.5 Ω impedance between signal and controller power	Powertrain Relay Voltage within range for a duration  Engine Running	>= 11 Volts >= 5 Seconds  >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 4 Low side circuit shorted to ground (PFI)	P0270	This DTC checks the circuit for electrical integrity during operation.	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	Powertrain Relay Voltage within range for a duration  Engine Running	>= 11 Volts >= 5 Seconds  >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 4 Low side circuit shorted to power (PFI)	P0271	This DTC checks the circuit for electrical integrity during operation.	Voltage high during driver on state indicates short to power	Short to power: ≤ 0.5 Ω impedance between signal and controller power	Powertrain Relay Voltage within range for a duration  Engine Running	>= 11 Volts >= 5 Seconds  >= 0 Seconds	50 failures out of 63 samples 100 ms /sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.	
Random Misfire Detected	P0300	These DTC's will determine if a random or a cylinder specific misfire is occurring by monitoring various terms derived from crankshaft velocity. The rate of misfire over an interval is compared to both emissions and catalyst damaging thresholds. The pattern of crankshaft acceleration after the misfire is checked to differentiate between real misfire and other sources of crank shaft noise.	Deceleration Value vs. Engine Speed and Engine load	[ (>IdleSCD_Decel AND > IdleSCD_Jerk) OR (>SCD_Decel AND > SCD_Jerk) OR (>IdleCylModeDecel AND > IdleCylModeJerk) OR (>CylMode_Decel AND > CylMode_Jerk) OR (>RevMode_Decel) OR WHILE in Cylinder Deactivation mode: (> AFM_Decel) ] - see details on Supporting Tables Tab (P0300 Section) ]	Engine Run Time	> 2 crankshaft revolution  -7 °C < ECT < 125 °C < -7 °C 21 °C < ECT < 125 °C  9.00 < volts < 32.00 < 100.00 % per 25 ms < 100.00 % per 25 ms  Not Enabled	Emission Exceedence = any ( 5 ) failed 200 rev blocks out of ( 16 ) 200 rev block tests	Type B, 2 Trips (Mil Flashes with Catalyst damage level of Misfire)	
Cylinder 1 Misfire Detected	P0301		The equation used to calculate deceleration value is tailored to specific vehicle operating conditions.		Engine Coolant Temp Or If ECT at startup Then ECT				
Cylinder 2 Misfire Detected	P0302		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 <b>Undetectable region</b> see Algorithm Description Document for additional details.		System Voltage + Throttle delta - Throttle delta				Failure reported for (1) Exceedence in 1st ( 16 ) 200 rev block tests, or ( 4 ) Exceedences thereafter.
Cylinder 3 Misfire Detected	P0303								
Cylinder 4 Misfire Detected	P0304				Early Termination option: (used on plug ins that may not have enough engine run time at end of trip for normal interval to complete.)				OR when Early Termination Reporting = Enabled and engine rev > 1,000 revs and < 3,200 revs at end of trip
			Misfire Percent Emission Failure Threshold	≥ 0.63 % P0300			any Catalyst Exceedence = ( 1 ) 200 rev block as data supports for catalyst damage.		
			Misfire Percent Catalyst Damage	> Catalyst_Damage_Misfire_Percentage in Supporting Tables	(at low speed/loads, one cylinder may not cause cat damage)		Failure reported with (1 or 3) Exceedences in FTP, or (1) Exceedence outside FTP.		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			When engine speed and load are less than the FTP calcs (3) catalyst damage exceedences are allowed.	whenever secondary conditions are met.  ≤ 0 FTP rpm AND ≤ 0 FTP % load	Engine Speed Engine Load Misfire counts	> 0 rpm AND > 0 % load AND < 180 counts on one cylinder	Continuous	
				disable conditions:	Engine Speed	1,250 < rpm < ((Engine Over Speed Limit) - 50  Engine speed limit is a function of inputs like Gear and temperature  see <b>EngineOverSpeedLimit</b> 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 O AnyCamPhaser_FA AnyCamPhaser_TFTKO AmbPresDfstdStatus	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	<b>Undetectable region</b> 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.)	< <b>ZeroTorqueEngLoad</b> in Supporting Tables	4 cycle delay	
					Below zero torque: TPS Vehicle Speed	≤ 2 % > 318 mph	4 cycle delay	
					EGR Intrusive test	Active	12 cycle delay	
					Manual Trans	Clutch shift	0 cycle delay	
					Accel Pedal Position AND Automatic transmission shift	> 100.00 %	0 cycle delay	
					Driveline Ring Filter active			

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.</p> <p>Filter Driveline ring:</p> <p>Stop filter early:</p> <p>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)</p> <p>TPS Engine Speed Veh Speed</p> <p>Consecutive decels while in SCD Mode Cyl Mode Rev Mode</p> <p>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</p>	<p>&gt; "Ring Filter" # of engine cycles after misfire in Supporting Tables</p> <p>&gt; "Number of Normals" # of engine cycles after misfire in Supporting Tables tab</p> <p>&gt; 1 % &gt; 1,000 rpm &gt; 0 mph</p> <p>&gt; <b>Abnormal SCD Mode</b> &gt; <b>Abnormal Cyl Mode</b> &gt; <b>Abnormal Rev Mode</b> in Supporting Tables</p>		



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: Engine Speed Veh Speed "misfire" unrecognized if: Crankshaft snap after: isolated "misfire" repetative "misfire" Ratio of Unrecog/Recog Rough Road: Non-Crankshaft based: Rough Road Source IF Rough Road Source = WheelSpeedInECM ABS/TCS Wheel speed noise VSES IF Rough Road Source = "FromABS" ABS/TCS RoughRoad VSES IF Rough Road Source = "TOSS"	Disabled 700 < rpm < 3,000 > 0.6 mph > <b>Min_PatternMultiplier</b> > <b>Max_PatternMultiplier</b> in Supporting Tables > 1.00 Disabled TOSS active > WSSRoughRoadThres active active detected active	discard test discard test discard test	

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 TransmissionEngagedStat e_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.	$\geq 2.0400$ OR $\leq 1.9960$	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?	Yes		Type B, 2 Trips	
			Specific Enable Criteria and Thresholds for 3 individual parts of the performance diag:		Engine Run Time	≥ 2.0 seconds			First Order Lag Filters with Weight Coefficients
			1. Excessive Knock Diag: Filtered Knock Intensity	> 4.00 (no units)	Engine Speed	≤ 8,500 RPM			
VaKNKD_k_PerfCylKnock IntFilt (where 'Knock Intensity' = 0 with no knock; and > 0 & proportional to knock magnitude with knock)		Cumulative Number of Engine Revs Above Min Eng Speed (per key cycle)	≥ 100 Revs						
2. Abnormal Noise Diag: Filtered FFT Intensity	< <b>AbnormalNoise_Threshold</b> (see Supporting Tables)	Individual Cylinders enabled for Abnormal Noise	See <b>AbnormalNoise_CylsEnabled</b> (Supporting Tables)			Abn Noise Weight Coefficient = 0.0100			
(where 'FFT Intensity' = Non-knocking, background noise)		Engine Speed	≥ 8,000 RPM			Updated each engine event			
		Cumulative Number of Engine Revs Above Min Eng Speed (per key	≥ 400 Revs						

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>-----</p> <p>3. Flat Signal Diag: Filtered Signal Delta (Current FFT Intensity - Ave_Intensity_No-Knock)</p> <p>VaKNKD_k_PerfCylFlatFil tInt</p>	<p>-----</p> <p>&lt; 0.008 (no units)</p>	<p>cycle)</p> <p>-----</p> <p>Engine Speed</p> <p>Cumulative Number of Engine Revs Above Min Eng Speed (per keycycle)</p>	<p>-----</p> <p>≥ 8,000 RPM</p> <p>≥ 400 Revs</p>	<p>-----</p> <p>Flat Signal Weight Coefficient = 0.010</p> <p>Updated each engine event</p>	

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	Filtered FFT Output	<p>&gt; <b>OpenCktThrshMin</b> and &lt; <b>OpenCktThrshMax</b></p> <p><b>See Supporting Tables</b></p> <p>Thresholds for OpenMethod = 20 kHz: <b>OpenCktThrshMin (20 kHz) &amp; OpenCktThrshMax (20 kHz)</b></p> <p>Thresholds for OpenMethod = NormalNoise: <b>OpenCktThrshMin (Normal Noise) &amp; OpenCktThrshMax (Normal Noise)</b></p>	<p>Diagnostic Enabled?</p> <p>Engine Run Time</p> <p>Engine Speed</p> <p>Cumulative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above)</p> <p>Engine Air Flow</p> <p>ECT</p> <p>IAT</p>	<p>Yes</p> <p>≥ 2.0 seconds</p> <p>≥ 600 RPM and ≤ 8,500 RPM</p> <p>≥ 100 revs</p> <p>≥ 40 mg/cylinder and ≤ 2,000 mg/cylinder</p> <p>≥ -40 deg's C</p> <p>≥ -40 deg's C</p>	<p>First Order Lag Filter with Weight Coefficient</p> <p>Weight Coefficient = 0.0100</p> <p>Updated each engine event</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor 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?	Yes		Type B, 2 Trips
			Specific Enable Criteria and Thresholds for 3 individual parts of the performance diag: -----		Engine Run Time	≥ 2.0 seconds		
			1. Excessive Knock Diag: Filtered Knock Intensity  (where 'Knock Intensity' = 0 with no knock; and > 0 & proportional to knock magnitude with knock)	> 2.41 (no units)	Engine Speed	≤ 8,500 RPM		
					Engine Air Flow	≥ 40 mg/cylinder and ≤ 2,000 mg/cylinder		
					ECT	≥ -40 deg's C		
					IAT	≥ -40 deg's C		
			-----				First Order Lag Filters with Weight Coefficients	
			2. Abnormal Noise Diag:  Filtered FFT Intensity: (where 'FFT Intensity' = Non-knocking, background noise)	< <b>AbnormalNoise_Threshold</b> (see Supporting Tables)	Engine Speed	≥ 600 RPM	Excessive Knk Weight Coefficient =	
					Cumulative Number of Engine Revs Above Min Eng Speed (per key cycle)	≥ 100 Revs	0.0100	Updated each engine event
					-----		Abnormal Noise Weight Coefficient =	
					Individual Cylinders enabled for Abnormal Noise	See <b>AbnormalNoise_CylsEnabled</b> (Supporting Tables)	0.0100	
					Engine Speed	≥ 2,000 RPM	Updated each engine event	
					Cumulative Number of Engine Revs Above Min Eng Speed (per key	≥ 100 Revs		

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 SpeedCumulative Number of Engine Revs Above Min Eng Speed (per keycycle)	----- ≥ 8,000 RPM  ≥ 100 Revs	----- Flat Signal  Weight Coefficient =  0.010  Updated each engine event	



Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Knock Sensor (KS) Circuit Low Bank 1	P0327	This diagnostic checks for an out of range low knock sensor signal	Sensor Input or Return Signal Line	< 8.0 Percent  (of 5 V reference)	Diagnostic Enabled?  Engine Speed	Yes  > 0 RPM and < 8,500 RPM	50 Failures out of 63 Samples  100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Knock Sensor (KS) Circuit High Bank 1	P0328	This diagnostic checks for an out of range high knock sensor signal	Sensor Input or Return Signal Line	> 39.0 Percent  (of 5 Volt Reference)	Diagnostic Enabled?  Engine Speed	Yes  > 0 RPM and < 8,500 RPM	50 Failures out of 63 Samples  100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP) Sensor A Circuit	P0335	Determines if a fault exists with the crank position sensor signal	Time since last crankshaft position sensor pulse received	>= 4.0 seconds	Starter engaged AND (cam pulses being received OR ( DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow	= FALSE  = FALSE  = FALSE  > 3.0 grams/second ) )	Continuous every 100 msec	Type B, 2 Trips
			No crankshaft pulses received	>= 0.7 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	>= 5.5 seconds	Starter engaged AND (cam pulses being received	= FALSE = FALSE = FALSE > 3.0 grams/second )	Continuous every 100 msec	Type B, 2 Trips
			OR					
			Time that starter has been engaged without a camshaft sensor pulse	>= 4.0 seconds	OR ( DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow			
			Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Engine is running  Starter is not engaged  No DTC Active:			
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 > 6	Crankshaft is synchronized  Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged  No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensorFA	Continuous every MEDRES event	Type B, 2 Trips
			The number of camshaft pulses received during 100 engine cycles OR	< 398 > 402	Crankshaft is synchronized  No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensorFA	8 failures out of 10 samples  Continuous every engine cycle	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #1 CIRCUIT	P0351	Diagnoses the Ignition Control (EST) low side driver circuit for circuit faults. Monitors EST for Cylinder 1 (Cylinders 1 and 4 for V6 with waste spark).	<p>The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.</p> <p>Voltage low during driver off state (indicates short-to-ground or open circuit)</p> <p>Voltage high during driver on state (indicates short-to-power)</p>	<p><u>Short to ground:</u> ≤ 0.5 Ω impedance between signal and controller ground</p> <p><u>Open Circuit:</u> ≥ 200 kΩ impedance between signal and controller ground</p> <p><u>Short to power:</u> ≤ 0.5 Ω impedance between signal and controller power</p>	<p>Engine running</p> <p>Ignition Voltage</p>	> 5.00 Volts	<p>50 Failures out of 63 Samples</p> <p>100 msec rate</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #2 CIRCUIT	P0352	Diagnoses the Ignition Control (EST) low side driver circuit for circuit faults. Monitors EST for Cylinder 2 (Cylinders 2 and 5 for V6 with waste spark).	<p>The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.</p> <p>Voltage low during driver off state (indicates short-to-ground or open circuit)</p> <p>Voltage high during driver on state (indicates short-to-power)</p>	<p><u>Short to ground:</u> ≤ 0.5 Ω impedance between signal and controller ground</p> <p><u>Open Circuit:</u> ≥ 200 kΩ impedance between signal and controller ground</p> <p><u>Short to power:</u> ≤ 0.5 Ω impedance between signal and controller power</p>	<p>Engine running</p> <p>Ignition Voltage</p>	> 5.00 Volts	<p>50 Failures out of 63 Samples</p> <p>100 msec rate</p>	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	P0353	Diagnoses the Ignition Control (EST) low side driver circuit for circuit faults. Monitors EST for Cylinder 3 (Cylinders 3 and 6 for V6 with waste spark).	<p>The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.</p> <p>Voltage low during driver off state (indicates short-to-ground or open circuit)</p> <p>Voltage high during driver on state (indicates short-to-power)</p>	<p><u>Short to ground:</u> ≤ 0.5 Ω impedance between signal and controller ground</p> <p><u>Open Circuit:</u> ≥ 200 kΩ impedance between signal and controller ground</p> <p><u>Short to power:</u> ≤ 0.5 Ω impedance between signal and controller power</p>	<p>Engine running</p> <p>Ignition Voltage</p>	> 5.00 Volts	<p>50 Failures out of 63 Samples</p> <p>100 msec rate</p>	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	P0354	Diagnoses the Ignition Control (EST) low side driver circuit for circuit faults. Monitors EST for Cylinder 4 (if applicable).	<p>The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.</p> <p>Voltage low during driver off state (indicates short-to-ground or open circuit)</p> <p>Voltage high during driver on state (indicates short-to-power)</p>	<p><u>Short to ground:</u> ≤ 0.5 Ω impedance between signal and controller ground</p> <p><u>Open Circuit:</u> ≥ 200 kΩ impedance between signal and controller ground</p> <p><u>Short to power:</u> ≤ 0.5 Ω impedance between signal and controller power</p>	<p>Engine running</p> <p>Ignition Voltage</p>	> 5.00 Volts	<p>50 Failures out of 63 Samples</p> <p>100 msec rate</p>	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	>= 5.5 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	Type B, 2 Trips
			OR  Time that starter has been engaged without a camshaft sensor pulse	>= 4.0 seconds				
			Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Engine is running  Starter is not engaged  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 > 6	Crankshaft is synchronized  Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged  No DTC Active:	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 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	> 8.0 kPa < -8.0 kPa   > 5.0 kPa < -1.0 kPa   < <b>SL Threshold Bank 1 Table</b>	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 > -10.0 deg C < 38.0 > 10.0 seconds > 10.0 Volts < 32.0 < 20 kPa for 2.0 sec < 3,000 RPM > 50 gm/s for 3.0 sec  > 4.0 seconds < 3,000 RPM > 3,600  AIRSystemPressureSens or FA AIRValveControlCircuit FA AIRPumpControlCircuit FA MAF_SensorFA AmbientAirDefault_NA IAT_SensorFA ECT_Sensor_FA EngineMisfireDetected_F A CatalystSysEfficiencyLoB 1_FA CatalystSysEfficiencyLoB 2_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: <b>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</b> (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	P0412	This DTC checks the AIR solenoid circuit for electrical integrity	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.	20 failures out of 25 samples	System Voltage	> 10.0 Volts < 32.0	25 samples (250 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 Pump Control Circuit	P0418	This DTC checks the AIR Pump circuit for electrical integrity	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.	20 failures out of 25 samples	System Voltage	> 10.0 Volts < 32.0	25 samples (250 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.
Catalyst System Low Efficiency Bank 1	P0420	<p>NOTE: The information below applies to applications that use the Decel Catalyst Monitor Algorithm</p> <p>Oxygen 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</p> <p>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</p>	Normalized Ratio OSC Value (EWMA filtered)	< 0.40	<p>All enable criteria associated with P0420 can be found under P2270 - (O2 Sensor Signal Stuck Lean Bank 1 Sensor 2)</p> <p>Rapid Step Response (RSR) feature will initiate multiple tests:</p> <p>If the difference between current EWMA value and the current OSC Normalized Ratio value is</p> <p>and the current OSC Normalized Ratio value is</p> <p>Maximum number of RSR tests to detect failure when RSR is enabled.</p> <p>General Enable Criteria</p> <p>In addition to the p-codes listed under P2270, the following DTC's shall also not be set:</p>	<p>&gt; 0.45</p> <p>&lt; 0.38</p> <p>18</p> <p>O2S_Bank_1_Sensor_1_FA O2S_Bank_1_Sensor_2_FA O2S_Bank_2_Sensor_1_FA O2S_Bank_2_Sensor_2_FA</p>	<p>1 test attempted per valid decel period</p> <p>Minimum of 1 test per trip</p> <p>Maximum of 6 tests per trip</p> <p>Frequency: Fueling Related : 12.5 ms</p> <p>OSC Measurements: 100 ms</p> <p>Temp Prediction: 12.5ms</p>	Type A, 1 Trips



Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		<p>table (based on temp and exhaust gas flow) 3. WorstPassing OSC value (based on temp and exhaust gas flow)</p> <p>Normalized Ratio Calculation = (1-2) / (3-2)</p> <p>A Normalized Ratio of 1 essentially represents a good part and a ratio of 0 essentially represents a very bad part.</p> <p>The Catalyst Monitoring Test is completed during a decel fuel cutoff event. This fuel cutoff event occurs following a rich intrusive fueling event initiated by the O2 Sensor Signal Stuck Lean Bank 1 Sensor 2 test (P2270). Several conditions must be met in order to execute this test.</p> <p>These conditions and their related values are listed in the "Secondary Parameters" and "Enable Conditions" section of this document for P2270 (O2 Sensor Signal Stuck Lean Bank 1 Sensor 2)</p>						

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Leak Detection Reference Orifice Low Flow  (Sealed Fuel System)	P043E	A plugged ELCP reference orifice is detected.	While performing 1st 0.020" reference orifice vacuum measurement for or 2nd 0.020" reference orifice vacuum measurement for  If the difference between the ELCP pressure sensor (absolute) reading taken before the end of the reference measurement and the final ELCP pressure sensor (absolute) reading is then a stabilized 0.020" reference orifice vacuum measurement could not be obtained and the DTC fails.  Or  If 1st 0.020" reference orifice vacuum measurement is after then a plugged ELCP reference orifice is detected and the DTC fails.  Or  If 2nd 0.020" reference orifice vacuum measurement is after then a plugged ELCP reference orifice is	360 seconds  30 seconds  10 seconds  > 220 Pa  > 4,000 Pa 360 seconds  > 4,510 Pa 30 seconds	Propulsion system not active time  Distance since assembly plant Drive distance Min baro Max baro Min fuel level Max fuel level ECT Min IAT Max IAT Time since last test when passing P0442/P0455  Time since last test when failing P0442/P0455  Voltage Vehicle speed Vehicle not in assembly plant (value must = 0)  Propulsion system not active time  Previous propulsion system active time  Abort Conditions: Min fuel level slosh Max fuel level slosh Key up during test Refueling request button pressed  Service bay test active Device control exceeds	4.3 ≤ time ≤ 5.8 hours or 6.0 ≤ time ≤ 8.1 hours or 8.2 ≤ time ≤ 11.0 hours  ≥ 9.9 miles  ≥ 0.1 miles ≥ 70 kPa ≤ 110 kPa ≥ 10 % ≤ 90 % ≤ 40 °C ≥ 4 °C ≤ 45 °C  ≥ 0 hours  ≥ 0 hours  ≥ 10 volts ≤ 3 MPH 0  ≥ 0 seconds  ≥ 0 seconds  ≥ 190 % ≤ 200 %  0.5 seconds	Up to twice per trip, for each required wake- up event  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.
			detected and the DTC fails.		No Active DTC's	FuelLevelDataFault IAT_SensorFA ECT_Sensor_FA VehicleSpeedSensor_FA AmbientAirDefault VentCircuit_FA ELCPcircuit_FA FTP_SensorCircuit_FA ELCP_PumpCircuit_FA ELCP_SwitchCircuit_FA VICM_WakeupDiag_FA VICM_WakeupDiag_TFT KO LostCommBCM_FA LostCommBusB_VICM_F A CommBusAOff_VICM_FA CommBusBOff_VICM_FA AccCktLo_FA ModuleOffTime_FA		
					No Active DTC's TFTKO	P0451 P1458 P145C P145D P145E P2421 P2422 P2450		



Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No Active DTC's	FuelLevelDataFault IAT_SensorFA ECT_Sensor_FA VehicleSpeedSensor_FA AmbientAirDefault VentCircuit_FA ELCPcircuit_FA FTP_SensorCircuit_FA ELCP_PumpCircuit_FA ELCP_SwitchCircuit_FA VICM_WakeupDiag_FA VICM_WakeupDiag_TFT KO LostCommBCM_FA LostCommBusB_VICM_F A CommBusAOff_VICM_FA CommBusBOff_VICM_FA AccCktLo_FA ModuleOffTime_FA		
					No Active DTC's TFTKO	P0451 P1458 P145C P145D P145E P2421 P2422 P2450		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EVAP System Small Leak Detected  (Sealed Fuel System)	P0442	A small leak (≥ 0.020") is detected in the EVAP system between the fuel cap, purge solenoid, and diurnal control valve (DCV). The ELCP vacuum pump creates a vacuum across a 0.020" reference orifice. This reference vacuum is then compared to the vacuum level created in the fuel tank to determine if a leak exists. The diagnostic has fast pass capability. If the Fuel Tank Pressure (FTP) sensor measures a fuel tank system pressure greater than 1,276 Pa or a fuel tank system vacuum greater than -1,278 Pa then both the small leak and large leak diagnostics pass without using the ELCP vacuum pump. The Fast Pass Full Test Sequence is conducted on the 0 th consecutive fast pass. All other times, the Fast Pass Reduced Test Sequence is conducted to conserve battery state of charge. The Fast Pass Reduced Test Sequence	If the ELCP pressure sensor (gauge) vacuum reading is less than the 0.020" reference orifice vacuum measurement times a plus a offset for then the fuel tank system has a small leak and the DTC fails.	1.00 multiplier 200 Pa 400 seconds	Propulsion system not active time  Distance since assembly plant Drive distance Min baro Max baro Min fuel level Max fuel level ECT Min IAT Max IAT Time since last test when passing P0442/P0455 Time since last test when failing P0442/P0455 Voltage Vehicle speed Vehicle not in assembly plant (value must = 0)  Propulsion system not active time  Previous propulsion system active time  Abort Conditions: Min fuel level slosh Max fuel level slosh Key up during test Refueling request button pressed  Service bay test active Device control exceeds  No Active DTC's	4.3 ≤ time ≤ 5.8 hours or 6.0 ≤ time ≤ 8.1 hours or 8.2 ≤ time ≤ 11.0 hours  ≥ 9.9 miles ≥ 0.1 miles ≥ 70 kPa ≤ 110 kPa ≥ 10 % ≤ 90 % ≤ 40 °C ≥ 4 °C ≤ 45 °C  ≥ 0 hours ≥ 0 hours ≥ 10 volts ≤ 3 MPH 0  ≥ 0 seconds  ≥ 0 seconds  ≥ 190 % ≤ 200 %  0.5 seconds  FuelLevelDataFault IAT_SensorFA	Once per trip, for each required wake-up event  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.
		includes the following diagnostics: ELCP Pump Stuck On (P145D), ELCP Sensor Performance (P1458), FTP Sensor Performance (P0451), DCV Stuck Closed (P2422), DCV Stuck Open (P2421), Small Leak (P0442) and Large Leak (P0455) diagnostics.			No Active DTC's TFTKO	ECT_Sensor_FA VehicleSpeedSensor_FA AmbientAirDefault VentCircuit_FA ELCP_Circuit_FA FTP_SensorCircuit_FA ELCP_PumpCircuit_FA ELCP_SwitchCircuit_FA VICM_WakeupDiag_FA VICM_WakeupDiag_TFT KO LostCommBCM_FA LostCommBusB_VICM_F A CommBusAOff_VICM_FA CommBusBOff_VICM_FA AccCktLo_FA ModuleOffTime_FA  P043E P043F P0451 P1458 P145C P145D P145E P145F P2421 P2422 P2450		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Purge Control Valve Open Circuit  (Sealed Fuel System)	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 impedance between signal and controller ground	PT Relay Voltage	Voltage ≥ 11 volts	20 failures out of 25 samples  250 ms / sample	Type B, 2 Trips



Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Vent Solenoid Control Open Circuit  (Sealed Fuel System)	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 impedance between signal and controller ground			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 Tank Pressure (FTP) Sensor Circuit Performance Diagnostic  (Sealed Fuel System)	P0451	Fuel Tank Pressure (FTP) Sensor Correlation Diagnostic.	<p>After a delay time of and a stabilization time of</p> <p>This section of the diagnostic can both pass and fail</p> <p>IF 1) the FTP sensor reading is and the FTP sensor is in a readable range. OR 2) the ELCP pressure sensor (gauge) reading is and the ELCP pressure sensor indicates that the FTP sensor is in a readable range. THEN If the average difference between the FTP sensor reading and ELCP pressure sensor (gauge) reading is after then a FTP sensor correlation failure has been detected and the DTC fails.</p> <p>This section of the diagnostic can only pass</p> <p>IF 1) the FTP sensor reading is and</p>	<p>2 seconds 3 seconds</p> <p>&gt; -3,811 Pa &lt; 3,388 Pa,</p> <p>&gt; -3,736 Pa &lt; 3,313 Pa,</p> <p>&gt; 1,021 Pa 5 seconds</p> <p>&lt; -3,811 Pa &gt; 3,388 Pa,</p>	<p>Propulsion System Not Active</p> <p>Propulsion system not active time</p> <p>Distance since assembly plant</p> <p>Drive distance</p> <p>Min baro</p> <p>Max baro</p> <p>Min fuel level</p> <p>Max fuel level</p> <p>ECT</p> <p>Min IAT</p> <p>MaxIAT</p> <p>Time since last test when passing P0442/P0455</p> <p>Time since last test when failing P0442/P0455</p> <p>Voltage</p> <p>Vehicle speed</p> <p>Vehicle not in assembly plant (value must = 0)</p> <p>Propulsion system not active time</p> <p>Previous propulsion system active time</p> <p>Abort Conditions: Min fuel level slosh Max fuel level slosh Key up during test Refueling request button pressed</p>	<p>4.3 ≤ time ≤ 5.8 hours or 6.0 ≤ time ≤ 8.1 hours or 8.2 ≤ time ≤ 11.0 hours ≥ 9.9 miles</p> <p>≥ 0.1 miles</p> <p>≥ 70 kPa ≤ 110 kPa</p> <p>≥ 10 % ≤ 90 % ≤ 40 °C ≥ 4 °C ≤ 45 °C</p> <p>≥ 0 hours</p> <p>≥ 0 hours</p> <p>≥ 10 volts ≤ 3 MPH</p> <p>0</p> <p>≥ 0 seconds</p> <p>≥ 0 seconds</p> <p>≥ 190 % ≤ 200 %</p>	<p>Once per trip with Propulsion System Not Active, for each required wake-up event</p> <p>Once per trip with Propulsion System Active and Engine On</p> <p>100 msec loop</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			the FTP sensor is outside its readable range. AND 2) the ELCP pressure sensor (gauge) reading is and the ELCP pressure sensor indicates that the FTP sensor is outside its readable range. THEN after the correlation is confirmed and the DTC passes.	$< -3,736 \text{ Pa}$ $> 3,313 \text{ Pa},$  5 seconds	Service bay test active Device control exceeds  No Active DTC's          No Active DTC's TFTKO   Propulsion System Active and Engine On  Min baro Max baro Min OAT Max OAT Vehicle not in assembly plant (value must = 0)  Engine Running Run/Crank Voltage Purge is not enabled	0.5 seconds  FuelLevelDataFault IAT_SensorFA ECT_Sensor_FA VehicleSpeedSensor_FA AmbientAirDefault VentCircuit_FA ELCP_Circuit_FA FTP_SensorCircuit_FA ELCP_PumpCircuit_FA ELCP_SwitchCircuit_FA VICM_WakeupDiag_FA VICM_WakeupDiag_TFTKO LostCommBCM_FA LostCommBusB_VICM_FA CommBusAOff_VICM_FA CommBusBOff_VICM_FA AccCktLo_FA ModuleOffTime_FA  P1458 P145D   $\geq 70 \text{ kPa}$ $\leq 110 \text{ kPa}$ $\geq 4 \text{ }^\circ\text{C}$ $\leq 35 \text{ }^\circ\text{C}$  0  Voltage $\geq 11 \text{ volts}$		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Abort Conditions: Refueling request button pressed  Device control exceeds  No Active DTC's	0.5 seconds  MAP_SensorFA EnginePowerLimited AmbientAirDefault OAT_EstAmbTemp_FA		
					P0442 P0443 P0449 P0452 P0453 P0455 P0458 P0459 P0498 P0499 P1458 P1459 P145A P145D P145E P2400 P2401 P2402 P2418 P2419 P2420 P2422 P2450			

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  (Sealed Fuel System)	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 (~ -3757 Pa) to 4.5 volts (~ 3329 Pa).	< 0.15 volts (3 % of Vref or ~ -4,377 Pa)			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  (Sealed Fuel System)	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 (~ -3757 Pa) to 4.5 volts (~ 3329 Pa).	> 4.85 volts ( 97 % of Vref or ~ 3,950 Pa)			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.
EVAP System Large Leak Detected  (Sealed Fuel System)	P0455	A large leak (>> 0.020") is detected in the EVAP system between the fuel cap, purge solenoid, and diurnal control valve (DCV) after a refueling event has been detected. The ELCP vacuum pump creates a vacuum across a 0.020" reference orifice. This reference vacuum is then compared to the vacuum level created in the fuel tank to determine if a leak exists. The diagnostic has fast pass capability. If the Fuel Tank Pressure (FTP) sensor measures a fuel tank system pressure greater than 1,276 Pa or a fuel tank system vacuum greater than -1,278 Pa then both the small leak and large leak diagnostics pass without using the ELCP vacuum pump. The Fast Pass Full Test Sequence is conducted on the 0th consecutive fast pass. All other times, the Fast Pass Reduced Test Sequence is conducted to conserve battery state of charge. The Fast Pass Reduced	After a refueling event has been detected and the small/large leak diagnostics have not passed.  If the ELCP pressure sensor (gauge) vacuum reading is less than the 0.020" reference orifice vacuum measurement times a plus a offset times a for then the fuel tank system has a large leak and the DTC fails.	1.00 multiplier 200 Pa 0.20 multiplier 400 seconds	Propulsion system not active time  Distance since assembly plant Drive distance Min baro Max baro Min fuel level Max fuel level Fuel level increase for ECT Min IAT Max IAT Time since last test when passing P0442/P0455  Time since last test when failing P0442/P0455  Voltage Vehicle speed Vehicle not in assembly plant (value must = 0)  Propulsion system not active time  Previous propulsion system active time  Refueling request active true  Abort Conditions:	4.3 ≤ time ≤ 5.8 hours or 6.0 ≤ time ≤ 8.1 hours or 8.2 ≤ time ≤ 11.0 hours ≥ 9.9 miles  ≥ 0.1 miles ≥ 70 kPa ≤ 110 kPa ≥ 10 % ≤ 90 % ≥ 10 % ≥ 5 seconds ≤ 40 °C ≥ 4 °C ≤ 45 °C  ≥ 0 hours  ≥ 0 hours  ≥ 10 volts ≤ 3 MPH 0  ≥ 0 seconds  ≥ 0 seconds	Once per trip after a refueling event has been detected, for each required wake-up event  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.
		Test Sequence includes the following diagnostics: ELCP Pump Stuck On (P145D), ELCP Sensor Performance (P1458), FTP Sensor Performance (P0451), DCV Stuck Closed (P2422), DCV Stuck Open (P2421), Small Leak (P0442) and Large Leak (P0455) diagnostics.			Min fuel level slosh Max fuel level slosh Key up during test Refueling request button pressed  Service bay test active Device control exceeds  No Active DTC's              No Active DTC's TFTKO	$\geq 190 \%$ $\leq 200 \%$     0.5 seconds  FuelLevelDataFault IAT_SensorFA ECT_Sensor_FA VehicleSpeedSensor_FA AmbientAirDefault VentCircuit_FA ELCPcircuit_FA FTP_SensorCircuit_FA ELCP_PumpCircuit_FA ELCP_SwitchCircuit_FA VICM_WakeupDiag_FA VICM_WakeupDiag_TFT KO LostCommBCM_FA LostCommBusB_VICM_F A CommBusAOff_VICM_FA CommBusBOff_VICM_FA AccCktLo_FA ModuleOffTime_FA  P043E P043F P0451 P1458 P145C P145D P145E P145F P2421 P2422 P2450		



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  (Sealed Fuel System)	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 impedance between signal and controller ground	PT Relay Voltage	Voltage ≥ 11 volts	20 failures out of 25 samples  250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Purge Control Valve Circuit High  (Sealed Fuel System)	P0459	This DTC checks for short to high voltage circuit failures during operation.	Voltage high during driver on state (indicates short to power)	Short to power: ≤ 0.5 Ω impedance between signal and controller power	PT Relay Voltage	Voltage ≥ 11 volts	20 failures out of 25 samples  250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 1 Performance  (For use on vehicles with a single fuel tank)	P0461	This DTC will detect a fuel sender stuck in range in the primary fuel tank.	Delta fuel volume change over an accumulated 149 miles.	< 3 liters	Engine Running  No active DTCs:	VehicleSpeedSensor_FA	250 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 1 Circuit Low Voltage	P0462	This DTC will detect a fuel sender stuck out of range low in the primary fuel tank.	Fuel level Sender % of 5V range	< 10 %			100 failures out of 125 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 1 Circuit High Voltage	P0463	This DTC will detect a fuel sender stuck out of range high in the primary fuel tank.	Fuel level Sender % of 5V range	> 60 %			100 failures out of 125 samples 100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Low Purge Flow Diagnostic  (Sealed Fuel System)	P0497	Low purge flow is detected	After an initial time delay of when the Fuel Tank Pressure (FTP) sensor reading is or after an initial time delay of when the FTP sensor reading is plus an ELCP switching valve delay time of if the ELCP pressure sensor (gauge) indicates a vacuum change for then a low purge flow failure has been detected and the DTC fails.	3 seconds  ≥ 299 Pa  3 seconds  < 299 Pa  0.2 seconds,  < 2,000 Pa 20 seconds	Min baro Max baro Min OAT Max OAT Engine RPM to enable Engine RPM to re-enable Engine vac to enable Engine vac to re-enable Engine airflow to enable Engine airflow to re- enable  Purge flow to enable Purge flow to re-enable Purge DC to enable Purge DC to re-enable Requested purge flow to enable  Delivered purge flow to re-enable  Delivered purge flow to enable  Vehicle not in assembly plant (value must = 0)  Engine Running Run/Crank Voltage Purge is enabled  Abort Conditions: Refueling request button pressed  Device control exceeds Fuel tank protection active when FTP sensor	≥ 70 kPa ≤ 110 kPa ≥ 4 °C ≤ 35 °C 1,500 ≤ RPM ≤ 3,400 1,600 ≤ RPM ≤ 3,300 10 kPa ≤ vac ≤ 37 kPa 11 kPa ≤ vac ≤ 35 kPa 9 gps ≤ airflow ≤ 34 gps 10 gps ≤ airflow ≤ 32 gps  ≥ 0.13 gps ≥ 0.14 gps ≥ 15.0 % ≥ 16.0 % ≥ 1.45 %  ≥ 1.40 %  ≥ 1.10 %  0  Voltage ≥ 11 volts  0.5 seconds < -24,909 Pa	Once per trip with Propulsion System Active and Engine On  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.
					for  No Active DTC's	5.0 seconds  MAP_SensorFA EnginePowerLimited AmbientAirDefault OAT_EstAmbTemp_FA  P0442 P0443 P0449 P0451 P0452 P0453 P0455 P0458 P0459 P0498 P0499 P1458 P1459 P145A P145D P145E P2400 P2401 P2402 P2418 P2419 P2420 P2422 P2450		

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  (Sealed Fuel System)	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 impedance between signal and controller ground			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.
Evaporative Emission System Vent Solenoid Control Circuit High  (Sealed Fuel System)	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 high during driver on state (indicates short to power)	Short to power: ≤ 0.5 Ω impedance 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.
Air Conditioning High Side Pressure Sensor (HSPS) Sensor Performance	P0531	Determines if the Air Conditioning High Side Pressure Sensor circuit voltage is stuck or biased in range	The pressure sensor has to be greater than a threshold value when propulsion system is off for a ambient stabilization time	Cold Test Pressure > Cold_Test_Threshold  <b>Cold_Test_Threshold</b> (function of ambient temperature).  (P0531 Cold Test Details on Supporting Tables)	Diagnostic enabled/ disabled  Cold Test enabled/ disabled  AC has been enabled this Trip  Enable Timer  AC Soak Timer - the soak timer can be established (via calibration enable) to be minimum of the Engine Off Time, and/or the Propulsion System Off Time, and/or the Battery Thermal Conditioning Off Time  Difference between Coolant Temperature and Air Temperature  No active DTC's	Enabled  Disabled  FALSE  Enabled Time > 0.1 Sec.  Minimum Soak Time => 28,800 Sec.  Use Engine Off Soak Time = TRUE Use Propulsion Off Soak Time= TRUE Use Battery Off Soak Time = TRUE  Temp Diff < 15.0 Deg C  Fault bundles: ACHighSidePressSnsrCkt FA ACFailedOnSD ACThrmlRefrigSpdVld ACCMLostComm ECT_Sensor_DefaultDete cted	80 failures out of 100 samples Report 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.
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 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 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	> 85 percent	Sensor Present  Diagnostic enabled/ disabled	Enabled  Enabled	80 failures out of 100 samples  Performed every 25 msec	Type B, 2 Trips

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	TRUE  1.00	fail continuously for greater than 0.500 seconds	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 continuously 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	TRUE 1.00	fail continuously for greater than 90.000 seconds	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 continuously 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	TRUE 1.00	fail continuously for greater than 90.000 seconds	Type C, No MIL

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



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  =====	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.
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

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 low 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  =====	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				

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

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
ECM RAM Failure	P0604	Indicates that the ECM has detected a RAM fault	Indicates that the primary processor is unable to correctly read data from or write data to system RAM. Detects data read does not match data written >=	254 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	Type A, 1 Trips
			Indicates that the primary processor is unable to correctly read data from or write data to cached RAM. Detects data read does not match data written >=	254 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
			Indicates that the primary processor is unable to correctly read data from or write data to TPU RAM. Detects data read does not match data written >=	5 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	
			Indicates that the primary processor detects a mismatch between the data and dual data is found during RAM updates. Detects a mismatch in data and dual data updates >	0.47856 s			When dual store updates occur.	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Indicates that the primary processor detects an illegal write attempt to protected RAM. Number of illegal writes are >	65,534 counts			Diagnostic runs continuously (background loop)	
			Indicates that the secondary processor is unable to correctly read data from or write data to system RAM. Detects data read does not match data written >=	5 counts			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously (background loop)	



Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal ECM Processor Integrity Fault	P0606	Indicates that the ECM has detected an internal processor integrity fault	Loss or invalid message of SPI communication from the Secondary Processor at initialization detected by the Primary Processor or loss or invalid message of SPI communication from the Secondary Processor after a valid message was received by the Primary Processor	Loss or invalid message at initialization detected or loss or invalid message after a valid message was received		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 received			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_TestEnbl d == 1 Value of KePISD_b_ALU_TestEnbl d is: 1. (If 0, this test is disabled)	25 ms	
			2 fails in a row in the Secondary processor's configuration register masks versus known good data			KePISD_b_ConfigRegTestEnbl d == 1 Value of KePISD_b_ConfigRegTestEnbl d 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_FltEnbl == 1 Value of KePISD_b_ConfigRegTestEnbl d 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_TestEnbl == 1 Value of KePISD_b_ALU_TestEnbl 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_ConfigRegTestEnbl == 1 Value of KePISD_b_ConfigRegTestEnbl is: 1. (If 0, this test is disabled)	12.5 to 25 ms	
			Checks number of stack over/under flow since last powerup reset >=	5		KeMEMD_b_StackLimitTestEnbl == 1 Value of KeMEMD_b_StackLimitTestEnbl is: 1. (If 0, this test is disabled)	variable, depends on length of time to corrupt stack	
			Voltage deviation >	0.4950		KePISD_b_A2D_CnvtrTestEnbl == 1 Value of KePISD_b_A2D_CnvtrTestEnbl 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 occurred 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 occurred 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 RAM variable, depends on length of time to write flash to RAM	
			MAIN processor DMA transfer from Flash to RAM has 1 failure			KePISD_b_DMA_XferTestEnbl == 1 Value of KePISD_b_DMA_XferTestEnbl 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: <b>Program Sequence Watch Enable f(Loop Time)</b>  (If 0, this Loop Time test is disabled)	Fail Table, f(Loop Time). See supporting tables: <b>PSW Sequence Fail f(Loop Time)</b>  /  Sample Table, f(Loop Time)See supporting tables: <b>PSW Sequence Sample f(Loop Time)</b>  counts  50 ms/count in	

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

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.
Fuel Pump Relay Control Circuit High Voltage	P0629	Diagnoses the fuel pump relay control high side driver circuit for circuit faults	Voltage 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	Run/Crank Voltage  Engine Speed	Voltage ≥ 11 volts  ≥ 0 RPM	8 failures out of 10 samples  250 ms / sample	Type B, 2 Trips

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



Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
VIN Not Programmed or Mismatched - Engine Control Module (ECM)	P0630	This DTC checks that the VIN is correctly written	At least one of the programmed VIN digits	= 00 or FF	OBD Manufacturer Enable Counter	= 0	250 ms / test Continuous	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
5 Volt Reference #1 Circuit	P0641	Detects a continuous or intermittent short on the 5 volt reference circuit #1	ECM Vref1 < or ECM Vref1 > or the difference between ECM filtered Vref1 and Vref1 >	4.8750 5.1250  0.0495		Run/Crank voltage > 6.41	19 / 39 counts or 0.1875 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Malfunction Indicator Lamp (MIL) Control Circuit (ODM) Open	P0650	Diagnoses the malfunction indicator lamp 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	Run/Crank Voltage  Remote Vehicle Start is not active	Voltage ≥ 11 volts	20 failures out of 25 samples  250 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.
5 Volt Reference #2 Circuit	P0651	Detects a continuous or intermittent short on the 5 volt reference circuit #2	ECM Vref2 < or ECM Vref2 > or the difference between ECM filtered Vref2 and Vref2 >	4.8750 5.1250  0.0495		Run/Crank voltage > 6.41	19 / 39 counts or 0.1875 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Powertrain Relay Control (ODM) Open	P0685	Diagnoses the powertrain relay 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 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

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
5 Volt Reference #3 Circuit	P0697	Detects a continuous or intermittent short on the 5 volt reference circuit #3	ECM Vref3 < or ECM Vref3 > or the difference between ECM filtered Vref3 and Vref3 >	4.8750 5.1250  0.0495		Run/Crank voltage > 6.41	19 / 39 counts or 0.1875 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Pump Control Module (FPCM) Requested MIL Illumination	P069E	Monitors the FPCM MIL request line to determine when the FPCM has detected a MIL illuminating fault.	Fuel Pump Control Module Emissions-Related DTC set			Time since power-up > 3 seconds	Continuous	Type A, No MIL



Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
5 Volt Reference #4 Circuit	P06A3	Detects a continuous or intermittent short on the 5 volt reference circuit #4	ECM Vref4 < or ECM Vref4 > or the difference between ECM filtered Vref4 and Vref4 >	4.8750 5.1250  0.0495		Run/Crank voltage > 6.41	19 / 39 counts or 0.1875 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Knock Sensor Processor 1 Performance	P06B6	This diagnostic checks for a fault with the internal test circuit used only for the '20 kHz' method of the Open Circuit Diagnostic	FFT Diagnostic Output	> OpenTestCktThrshMin and < OpenTestCktThrshMax  <b>See Supporting Tables</b>	Diagnostic Enabled?  Engine Run Time  Engine Speed  Cumulative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above)  Engine Air Flow	Yes  ≥ 2.0 seconds  > 600 RPM and < 5,000 RPM  ≥ 200 Revs  ≥ 40 mg/cylinder and ≤ 2,000 mg/cylinder	First Order Lag Filter with Weight Coefficient  Weight Coefficient = 0.0100  Updated each engine event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Wake-up Circuit Performance Diagnostic  (Sealed Fuel System)	P06E4	VICM Wake-up events were not received	Whenever the propulsion system goes active, the diagnostic reads its internal timer and evaluates the results from the wake-up events that could have occurred. For each wake-up event the status can be: Pass – the wake-up event occurred within a window Indeterminate – the ECM was already awake at the time the wake-up event could have occurred Fail – the wake-up event occurred outside a window or did not occur at all  If the 5.0 hourwake-up event did not occur from to then a failure has occurred.  If the 7.0 hourwake-up event did not occur from to then a failure has occurred.  If the 9.5 hourwake-up event did not occur from to then a failure has occurred.  At Propulsion System Active, if any of the wake- up events indicate a	4.3 hours 5.8 hours  6.0 hours 8.1 hours  8.2 hours 11.0 hours	Distance since assembly plant Drive distance  Time since last test when passing P0442/P0455  Time since last test when failing P0442/P0455  No Active DTC's	≥ 9.9 miles  ≥ 0.1 miles  ≥ 0 hours  ≥ 0 hours  VehicleSpeedSensor_FA ModuleOffTime_FA LostCommBusB_VICM_F A CommBusAOff_VICM_FA CommBusBOff_VICM_FA AccCktLo_FA	Once per each wake-up event when Propulsion System is not active  Final decision is made when Propulsion System is Active  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.
			failure then the DTC fails.					

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))  OR Serial Communication message (\$140 for PPEI2 or \$1C9 for PPEI3, \$1CA/\$1C6 for Hybrid)) rolling count value  OR Too many minimum limit torque request transitions occur from TRUE to FALSE to TRUE within a time period  Torque request greater than torque request diagnostic maximum threshold	Message <> 2's complement of message  Message rolling count value <> previous message rolling count value plus one  Requested torque intervention type toggles from not increasing request to increasing request  > 250 Nm for engine based traction torque system, OR > 2,588 Nm for axle based traction torque system	Serial communication to EBTCM (U0108)  Power Mode Engine Running  Status of traction in GMLAN message (\$4E9)	No loss of communication  = Run = True  = Traction Present	Count of 2's complement values not equal >= 10  Performed on every received message  6 rolling count failures out of 10 samples  Performed on every received message  >= 3 multi-transitions out of 5 samples.  Performed every 200 ms  >= 4 out of 10 samples  Performed on every received message	Type C, No MIL

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.
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.
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	<= 125 kPa*(g/s)   > 10 grams/sec  > 20.0 kPa )   > 20.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 500 RPM <= 8,000 RPM > -7 Deg C < 125 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 A 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.
O2S Insufficient Switching Bank 1 Sensor 1	P1133	This DTC determines if the O2 sensor is no longer sufficiently switching.	Fault condition present if Half Cycle L/R or R/L Switches are below the threshold.  OR  Slope Time L/R Switches  OR  Slope Time R/L Switches	H/C L/R switches < Threshold, or H/C R/L switches < Threshold, (refer to tables named <b>O2S HC L to R Switches Limit Bank 1 Sensor 1 "Pass/Fail Threshold table"</b> and <b>O2S HC R to L Switches Limit Bank 1 Sensor 1 "Pass/Fail Threshold table"</b> in Supporting tables tab)  < 3  < 3	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 LowFuelConditionDiagnostic Green O2S Condition	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefaultMAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnrCkt_FA FuelInjectorCircuit_FA AIR System FA EthanolCompositionSensor_FA EngineMisfireDetected_FA  = P0131, P0132 or P0134  10.0 < Volts < 32.0 = Not active = Not active = Not active = Not active = False  = Not Valid, See definition of <b>Green Sensor Delay Criteria - Airflow</b> and <b>Green Sensor Delay Criteria - Limit</b> for the following locations: B1S1, B2S1 (if applicable) in Supporting Tables tab.	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.
					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 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 Time	≥ 40 seconds = Valid ( the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's" ) > 50 °C > -40 °C > 90 seconds  > 2.0 seconds > 2.0 seconds > 2.0 seconds  17 ≤ gps ≤ 40 1,000 ≤ RPM ≤ 3,500 < 87 % Ethanol > 70 kpa ≥ 150 mgrams  = Closed Loop = TRUE = Enabled ≤ 100.0 mgrams = Not Defaulted not = Power Enrichment DFCO not active  ≥ 0.0 %  ===== > 1.0 seconds		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow A Supply Voltage Control Circuit Low	P121B	Diagnoses the Mass Air Flow Power Supply Circuit 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 Ohms impedance between signal and controller ground  Open Circuit: >= 200K Ohms impedance between signal and controller ground	Mass Air Flow Power is commanded on		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.
Mass Air Flow A Supply Voltage Control Circuit High	P121C	Diagnoses the Mass Air Flow Power Supply Circuit low side driver circuit for circuit faults	Voltage low during driver on state (indicates short- to-power)	Short to power: <= 0.5 Ohms impedance between signal and controller power	Mass Air Flow Power is commanded off		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.
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)	< -3.85 KJ/s (high RPM failure mode)  > 5.30 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  Other Enable Criteria:	< 350.00 degC  > -10.00 degC  <= 180.00 degC  >= 70.00 KPa  >= 550.00 degC  >= 50.00 seconds  > <b>CatalystLightOffExtendedEngineRunTimeExit</b>  This Extended Engine run time exit is a function of percent ethanol and Catmons NormRatioEWMA. Refer to "Supporting Tables" for details.  < 70.00 KPa	Runs once per trip when the cold start emission reduction strategy is active  Frequency: 100ms Loop  Test completes after 15 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.
					<p>OBD Manufacturer Enable Counter</p> <p>Vehicle Speed</p> <p>Allow diagnostic to calculate residual in an off-idle state. If the value of the OffIdleEnable is equal to 1 then the "DriverOffAccelPedal" will not be checked. However, if the value of OffIdleEnable is 0 then driver must be off the accel pedal</p> <p>A change in throttle position (tip-in/tip-out) will initiate a delay in the calculation of the average qualified residual value. Therefore: When the Pedal Close Delay Timer is : the diagnostic will continue the calculation.</p> <p>For Manual Transmission vehicles:</p>	<p>0</p> <p>&lt; 621.37 MPH</p> <p>1 (A value of 1 allows diagnostic to run and calculate the residual while off idle. A value of 0 requires calculation of the residual at idle)</p> <p>&gt; 2.00 seconds</p> <p>Clutch Pedal Top of Travel Achieved and Clutch Pedal Bottom of Travel Achieved. Refer to the "Clutch Pedal Top of Travel Achieved criteria" and "Clutch Pedal Bottom of Travel Achieved criteria" section of the "Supporting Tables" tab criteria</p>		



Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					<p>The diagnostic will delay calculation of the residual value and potentially weight the residual calculation differently based on engine run time. This is to ensure the diagnostic is operating in idle speed control as well as during the peak catalyst light off period. The time weighting factor must be :</p>	<p>&gt; 0 These are scalar values that are a function of engine run time. Refer to <b>ColdStartDiagnosticDelayBasedOnEngineRunTime</b> and the cal axis, <b>ColdStartDiagnosticDelayBasedOnEngineRunTimeCalAxis</b> in the "Supporting Tables" for details.</p>		
					<p>General Enable: DTC's Not Set:</p>	<p>AcceleratorPedalFailure ECT_Sensor_FA IAT_SensorCircuitFA MnfdTempSensorCktFP CrankSensorFaultActive FuelInjectorCircuit_FA MAF_SensorFA MAP_SensorFA EngineMisfireDetected_FA Clutch Sensor FA IAC_SystemRPM_FA IgnitionOutputDriver_FA TPS_FA VehicleSpeedSensor_FA 5VoltReferenceMAP_OOR_Fit TransmissionEngagedState_FA</p>		

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Leak Detection Pump Pressure Sensor Circuit Performance Diagnostic  (Sealed Fuel System)	P1458	ELCP Pressure Sensor Correlation Diagnostic	Propulsion System Not Active  If the difference between the ELCP pressure sensor (absolute) reading and the barometric pressure value from the MAP sensor is then increment the fail counter. This diagnostic runs for	> 3,000 Pa  14 seconds.	Propulsion System Not Active  Propulsion system not active time  Distance since assembly plant Drive distance Min baro Max baro Min fuel level Max fuel level ECT Min IAT Max IAT Time since last test when passing P0442/P0455  Time since last test when failing P0442/P0455  Voltage Vehicle speed Vehicle not in assembly plant (value must = 0)  Propulsion system not active time  Previous propulsion system active time  Abort Conditions: Min fuel level slosh	4.3 ≤ time ≤ 5.8 hours or 6.0 ≤ time ≤ 8.1 hours or 8.2 ≤ time ≤ 11.0 hours  ≥ 9.9 miles ≥ 0.1 miles ≥ 70 kPa ≤ 110 kPa ≥ 10 % ≤ 90 % ≤ 40 °C ≥ 4 °C ≤ 45 °C ≥ 0 hours  ≥ 0 hours  ≥ 10 volts ≤ 3 MPH 0  ≥ 0 seconds  ≥ 0 seconds  ≥ 190 %	Once or twice per trip with Propulsion System Not Active, for each required wake- up event  First time diagnostic runs,  50 failures out of 63 samples  Second time diagnostic runs,  50 failures out of 63 samples  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.
			<p>Propulsion System Active</p> <p>After a stabilization time</p>		<p>Max fuel level slosh Key up during test Refueling request button pressed</p> <p>Service bay test active Device control exceeds</p> <p>No Active DTC's</p> <p>No Active DTC's TFTKO</p>	<p>≤ 200 %</p> <p>0.5 seconds</p> <p>FuelLevelDataFault IAT_SensorFA ECT_Sensor_FA VehicleSpeedSensor_FA AmbientAirDefault VentCircuit_FA ELCPCircuit_FA FTP_SensorCircuit_FA ELCP_PumpCircuit_FA ELCP_SwitchCircuit_FA VICM_WakeupDiag_FA VICM_WakeupDiag_TFT KO LostCommBCM_FA LostCommBusB_VICM_F A CommBusAOff_VICM_FA CommBusBOff_VICM_FA AccCktLo_FA ModuleOffTime_FA</p> <p>P043E P043F P0451 P145C P145D P145E P145F P2421 P2422 P2450</p>		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			of  When a recent barometric pressure update has occurred within the last if the difference between the ELCP pressure sensor (absolute) reading and the barometric pressure value from the MAP sensor is then increment the fail counter.  When a recent barometric pressure update has not occurred within the last if the difference between the ELCP pressure sensor (absolute) reading and the barometric pressure value from the MAP sensor is then increment the fail counter.	10 seconds.  0.06 miles,  > 15,000 Pa  0.06 miles,  > 20,000 Pa	Propulsion System Active  Min baro Max baro Min OAT Max OAT Vehicle not in assembly plant (value must = 0)  Run/Crank Voltage Purge is not enabled  Abort Conditions: Refueling request button pressed  Device control exceeds  FTP correlation diagnostic (P0451) is running  Purge Low Flow diagnostic (P0497) is running  No Active DTC's	≥ 70 kPa ≤ 110 kPa ≥ 4 °C ≤ 35 °C  0  Voltage ≥ 11 volts  0.5 seconds  MAP_SensorFA EnginePowerLimited AmbientAirDefault OAT_EstAmbTemp_FA  P0443 P0458 P0459 P1459 P145A P145D P2400 P2401 P2402 P2418 P2419 P2420	When Propulsion System Active  50 failures out of 63 samples  100 msec loop	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P2450		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Leak Detection Pump Pressure Sensor Circuit Low Voltage  (Sealed Fuel System)	P1459	This DTC will detect an ELCP pressure sensor signal that is too low out of range.	ELCP pressure sensor signal	< 0.70 volts ( 14 % of Vref or ~ 47 kPa)			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.
Evaporative Emission System Leak Detection Pump Pressure Sensor Circuit High Voltage  (Sealed Fuel System)	P145A	This DTC will detect an ELCP pressure sensor signal that is too high out of range.	ELCP pressure sensor signal	> 4.85 volts (97 % of Vref or ~ 123 kPa)			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.
					Refueling request button pressed  Service bay test active Device control exceeds  No Active DTC's	0.5 seconds  FuelLevelDataFault IAT_SensorFA ECT_Sensor_FA VehicleSpeedSensor_FA AmbientAirDefault VentCircuit_FA ELCPCircuit_FA FTP_SensorCircuit_FA ELCP_PumpCircuit_FA ELCP_SwitchCircuit_FA VICM_WakeupDiag_FA VICM_WakeupDiag_TFT KO LostCommBCM_FA LostCommBusB_VICM_F A CommBusAOff_VICM_FA CommBusBOff_VICM_FA AccCktLo_FA ModuleOffTime_FA		
					No Active DTC's TFTKO	P043E P043F P0451 P1458 P145D P145E P2421 P2422 P2450		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Leak Detection Pump Stuck On  (Sealed Fuel System)	P145D	This DTC detects an ELCP vacuum pump that is stuck on.	<p>The 1st time in the test sequence when the ELCP vacuum pump is commanded off, after the ELCP switching valve transitions from vent to pump position, if the difference between an initial ELCP pressure sensor (absolute) reading and a second ELCP pressure sensor (absolute) reading is after then the ELCP vacuum pump is stuck on and the DTC fails.</p> <p>The 2nd time in the test sequence when the ELCP vacuum pump is commanded off, if the ELCP pressure sensor (gauge) vacuum reading is after then the ELCP vacuum pump is stuck on and the DTC fails.</p>	<p>&gt; 1,000 Pa 8 seconds</p> <p>&gt; 1,180 Pa 14 seconds</p>	<p>Propulsion system not active time</p> <p>Distance since assembly plant</p> <p>Drive distance</p> <p>Min baro</p> <p>Max baro</p> <p>Min fuel level</p> <p>Max fuel level</p> <p>ECT</p> <p>Min IAT</p> <p>Max IAT</p> <p>Time since last test when passing P0442/P0455</p> <p>Time since last test when failing P0442/P0455</p> <p>Voltage</p> <p>Vehicle speed</p> <p>Vehicle not in assembly plant (value must = 0)</p> <p>Propulsion system not active time</p> <p>Previous propulsion system active time</p> <p>Abort Conditions: Min fuel level slosh</p> <p>Max fuel level slosh</p> <p>Key up during test</p> <p>Refueling request button</p>	<p>4.3 ≤ time ≤ 5.8 hours or 6.0 ≤ time ≤ 8.1 hours or 8.2 ≤ time ≤ 11.0 hours</p> <p>≥ 9.9 miles</p> <p>≥ 0.1 miles</p> <p>≥ 70 kPa</p> <p>≤ 110 kPa</p> <p>≥ 10 %</p> <p>≤ 90 %</p> <p>≤ 40 °C</p> <p>≥ 4 °C</p> <p>≤ 45 °C</p> <p>≥ 0 hours</p> <p>≥ 0 hours</p> <p>≥ 10 volts</p> <p>≤ 3 MPH</p> <p>0</p> <p>≥ 0 seconds</p> <p>≥ 0 seconds</p> <p>≥ 190 %</p> <p>≤ 200 %</p>	<p>Once or twice per trip, for each required wake- up event</p> <p>100 msec loop</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					pressed  Service bay test active Device control exceeds  No Active DTC's          No Active DTC's TFTK	0.5 seconds  FuelLevelDataFault IAT_SensorFA ECT_Sensor_FA VehicleSpeedSensor_FA AmbientAirDefault VentCircuit_FA ELCPCircuit_FA FTP_SensorCircuit_FA ELCP_PumpCircuit_FA ELCP_SwitchCircuit_FA VICM_WakeupDiag_FA VICM_WakeupDiag_TFT KO LostCommBCM_FA LostCommBusB_VICM_F A CommBusAOff_VICM_FA CommBusBOff_VICM_FA AccCktLo_FA ModuleOffTime_FA  P043E P043F P0451 P1458 P145C P145E P2421 P2422 P2450		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EVAP System Leak Between Vent Control Valve and Leak Detection Pump  (Sealed Fuel System)	P145E	A small leak ( $\geq 0.020''$ ) is detected in the EVAP system between the Diurnal Control Valve (DCV) and the ELCP vacuum pump. This includes a leak through the DCV. The ELCP vacuum pump creates a vacuum across a 0.020" reference orifice. This reference vacuum is then compared to the vacuum level created between the Diurnal Control Valve (DCV) and the ELCP leak detection pump to determine if a leak exists.	If the ELCP pressure sensor (gauge) vacuum reading is less than the 0.020" reference orifice vacuum measurement times a plus a offset for then a small leak is detected between the DCV and ELCP vacuum pump and the DTC fails.	1.00 multiplier 200 Pa 30 seconds	Propulsion system not active time  Distance since assembly plant Drive distance Min baro Max baro Min fuel level Max fuel level ECT Min IAT Max IAT Time since last test when passing P0442/P0455  Time since last test when failing P0442/P0455  Voltage Vehicle speed Vehicle not in assembly plant (value must = 0)  Propulsion system not active time  Previous propulsion system active time  Abort Conditions: Min fuel level slosh Max fuel level slosh Key up during test Refueling request button	$4.3 \leq \text{time} \leq 5.8$ hours or $6.0 \leq \text{time} \leq 8.1$ hours or $8.2 \leq \text{time} \leq 11.0$ hours  $\geq 9.9$ miles  $\geq 0.1$ miles $\geq 70$ kPa $\leq 110$ kPa $\geq 10\%$ $\leq 90\%$ $\leq 40^\circ\text{C}$ $\geq 4^\circ\text{C}$ $\leq 45^\circ\text{C}$  $\geq 0$ hours  $\geq 0$ hours  $\geq 10$ volts $\leq 3$ MPH 0  $\geq 0$ seconds  $\geq 0$ seconds  $\geq 190\%$ $\leq 200\%$	Up to once per trip, for each required wake-up event  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.
					pressed  Service bay test active Device control exceeds  No Active DTC's	0.5 seconds  FuelLevelDataFault IAT_SensorFA ECT_Sensor_FA VehicleSpeedSensor_FA AmbientAirDefault VentCircuit_FA ELCPcircuit_FA FTP_SensorCircuit_FA ELCP_PumpCircuit_FA ELCP_SwitchCircuit_FA VICM_WakeupDiag_FA VICM_WakeupDiag_TFT KO LostCommBCM_FA LostCommBusB_VICM_F A CommBusAOff_VICM_FA CommBusBOff_VICM_FA AccCktLo_FA ModuleOffTime_FA		
					No Active DTC's TFTKO	P043E P043F P0451 P1458 P145C P145D P2450		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission System Leak Detection Reference Orifice Performance  (Sealed Fuel System)	P145F	1st and 2nd 0.020" reference orifice vacuum measurements do not correlate.	If the difference between the 1st 0.020" reference orifice vacuum measurement and the 2nd 0.020" reference orifice vacuum measurement is after then the 1st and 2nd reference orifice vacuum measurements do not correlate and the DTC fails.	> 510 Pa 30 seconds	Propulsion system not active time  Distance since assembly plant Drive distance Min baro Max baro Min fuel level Max fuel level ECT Min IAT Max IAT  Time since last test when passing P0442/P0455  Time since last test when failing P0442/P0455  Voltage Vehicle speed Vehicle not in assembly plant (value must = 0)  Propulsion system not active time  Previous propulsion system active time  Abort Conditions: Min fuel level slosh Max fuel level slosh Key up during test Refueling request button pressed	4.3 ≤ time ≤ 5.8 hours or 6.0 ≤ time ≤ 8.1 hours or 8.2 ≤ time ≤ 11.0 hours  ≥ 9.9 miles  ≥ 0.1 miles ≥ 70 kPa ≤ 110 kPa ≥ 10 % ≤ 90 % ≤ 40 °C ≥ 4 °C ≤ 45 °C  ≥ 0 hours  ≥ 0 hours  ≥ 10 volts ≤ 3 MPH 0  ≥ 0 seconds  ≥ 0 seconds  ≥ 190 % ≤ 200 %	Up to once per trip, for each required wake-up event  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.
					Service bay test active Device control exceeds  No Active DTC's	0.5 seconds  FuelLevelDataFault IAT_SensorFA ECT_Sensor_FA VehicleSpeedSensor_FA AmbientAirDefault VentCircuit_FA ELCP_Circuit_FA FTP_SensorCircuit_FA ELCP_PumpCircuit_FA ELCP_SwitchCircuit_FA VICM_WakeupDiag_FA VICM_WakeupDiag_TFT KO LostCommBCM_FA LostCommBusB_VICM_F A CommBusAOff_VICM_FA CommBusBOff_VICM_FA AccCktLo_FA ModuleOffTime_FA		
					No Active DTC's TFTKO	P043E P043F P0451 P1458 P145C P145D P145E P2421 P2422 P2450		



Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cooling Fan 1 Output Circuit (ODM) (EREV/ PHEV only) Open	P1485	Diagnoses the cooling fan 1 output 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	Battery voltage to enable Battery voltage to remain enabled Accessory line is high for  No Active DTC's	≥ 11 volts ≥ 10 volts  > 5 seconds  P2537	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.
Cooling Fan 1 Output Circuit Low Voltage (ODM) (EREV/ PHEV only)	P1486	Diagnoses the cooling fan 1 output 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	Battery voltage to enable Battery voltage to remain enabled Accessory line is high for  No Active DTC's	≥ 11 volts ≥ 10 volts  > 5 seconds  P2537	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.
Cooling Fan 1 Output Circuit High Voltage (ODM) (EREV/ PHEV only)	P1487	Diagnoses the cooling fan 1 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	Battery voltage to enable Battery voltage to remain enabled Accessory line is high for  No Active DTC's	≥ 11 volts ≥ 10 volts  > 5 seconds  P2537	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.
Steady State Actuation Fault	P1516	Detect an inability to maintain a steady state throttle position	The absolute difference between desired and indicated throttle position is >	2.00 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 Undertermin ed	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	Type C, 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	<p>1. Serial Communication 2's complement not equal for message \$181 for Strong Hybrid or Mild Hybrid Applications</p> <p>OR</p> <p>2. Serial Communication rolling count value shall be + 1 from previous \$181 message for Strong Hybrid or Mild Hybrid Applications</p>	<p>Message &lt;&gt; 2's complement of Engine Torque Signal</p> <p>and if Mild Hybrid:</p> <p>Message &lt;&gt; 2's complement of Motor Torque Signal</p> <p>OR</p> <p>Message rolling count value &lt;&gt; previous message rolling count value plus one</p>	<p>Secondary High Speed Bus is Present and No Serial communication loss to HCP (U1817)</p> <p>Run Crank Active</p> <p>Low Voltage not Present</p> <p>No Serial communication loss to HCP (U1817)</p> <p>Hybrid Type = Mild or Strong</p> <p>If Mild Hybrid Only: Torque source type = Crankshaft Torque</p>	<p>No loss of communication</p> <p>&gt;= 0.20 Sec</p> <p>&gt; 6.41</p> <p>= Strong</p> <p>= Trans Output Torque</p>	<p>1. &gt;= 10 Protect errors out of 15 samples</p> <p>OR</p> <p>2. &gt;= 10 Rolling count errors out of 15 samples</p> <p>Pass diagnostic if samples &gt;= 15</p> <p>Performed every received message</p>	Type A, 1 Trips

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)		>= 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
					Run Crank Active	>= 0.50 Sec		

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 position to zero for duration of fault		Chassis Brake Pedal Position Emissions Related Serial Data Error Diagnostic Enable	TRUE  1.00	10.00 / 16.00 counts	Type B, 2 Trips



Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Remote Vehicle Speed Limiting Signal Circuit	P162B	Determines if the speed request from OnStar is valid	Password Protect error - Serial Communication message - (\$3ED)  OR  Rolling count error - Serial Communication message (\$3ED) rolling count value	Message <> two's complement of message   Message <> previous message rolling count value + one	Vehicle Requested Speed Limit	< 158 MPH  Can be lower speed if being requested by another non_ECM module  No loss of communication	>= 10 Password Protect errors out of 10 samples  OR  >= 10 Rolling count errors out of 10 samples  Performed on every received message	Type C, No MIL

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
EVAP System Alarm Clock Signal Not Received  (Sealed Fuel System)	P162D	ECM could not set VICM Alarm Clock	<p>Whenever the propulsion system goes active, the diagnostic reads its internal timer and evaluates the results from the wake-up events that could have occurred.</p> <p>If the ECM did not receive feedback from the VICM that the alarm clock was set, the 5.0 hour wake-up event did not occur, and the ECM did not wake up for any reason from to then a failure has occurred.</p> <p>If the ECM did not receive feedback from the VICM that the alarm clock was set, the 7.0 hour wake-up event did not occur, and the ECM did not wake up for any reason from to then a failure has occurred.</p> <p>If the ECM did not receive feedback from the VICM that the alarm clock was set, the 9.5 hour wake-up event did not occur, and the ECM did not wake up for any reason from to then a failure has occurred.</p>	<p>4.3 hours 5.8 hours</p> <p>6.0 hours 8.1 hours</p> <p>8.2 hours 11.0 hours</p>	<p>Distance since assembly plant Drive distance</p> <p>Time since last test when passing P0442/P0455</p> <p>Time since last test when failing P0442/P0455</p> <p>No Active DTC's</p> <p>Abort Conditions: Service bay test active</p>	<p>≥ 9.9 miles</p> <p>≥ 0.1 miles</p> <p>≥ 0 hours</p> <p>≥ 0 hours</p> <p>VehicleSpeedSensor_FA ModuleOffTime_FA LostCommBCM_FA LostCommBusB_VICM_FA A CommBusAOff_VICM_FA CommBusBOff_VICM_FA AccCktLo_FA</p>	<p>Once per each wake-up event when Propulsion System is not active</p> <p>Final decision is made when Propulsion System is Active</p> <p>100 msec loop</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			At Propulsion System Active, if any of the wake-up events indicate a failure then the DTC fails.					

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: <b>PT Relay Pull-in Run/Crank Voltage f(IAT)</b>  OR PT Relay Ignition voltage > 5.50 )  AND  Run/Crank voltage > 5.50 .	240 / 480 counts or 0.4750 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Redundant Memory Performance	P16F3	Detect Processor Calculation faults due to RAM corruptions, ALU failures and ROM failures  For all of the following cases: If the individual diagnostic threshold is equal to 2048 ms, this individual case is not applicable. If any of the following cases are X out of Y diagnostics and the fail (x) is greater than the sample (Y), this individual case is also not applicable.	Desired Throttle Area calculated does not equal its redundant calculation	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	Type A, 1 Trips
			Equivalence Ratio torque compensation exceeds threshold	-19,999,999,961,012,900,000.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Absolute difference between Equivalence Ratio torque compensation and its dual store out of bounds given by threshold	19,999,999,961,012,900,000.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Absolute difference of Accessory torque and its redundant calculation is out of bounds given by threshold range	19,999,999,961,012,900,000.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Absolute difference of Filtered Air-per-cylinder and its redundant calculation is out of bounds given by threshold range	19,999,999,961,012,900,000.00 mg	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Absolute difference between the previous Final Advance and the current Final Advance not Adjusted for Equivalence Ratio is out of bounds given by threshold range	1,023.98 degrees		Engine speed >0rpm	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Torque Learn offset is out of bounds given by threshold range	High Threshold 0.00 Nm  Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			One step ahead calculation of air-per-cylinder and two step ahead is greater than threshold	80.00 mg		Engine speed > 8,192 rpm	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Difference between Unmanaged Spark and PACS Spark is greater than threshold	19,999,999,961,012,900,000.00 degrees	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Commanded Predicted Engine Torque and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	
			Zero pedal axle torque is out of bounds given by threshold range	High Threshold 1,151.00 Nm Low Threshold -1,726.50 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	
			Creep Coast Axle Torque is out of bounds given by threshold range	High Threshold 1,151.00 Nm Low Threshold -1,726.50 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	



Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Absolute difference of Friction torque and its redundant calculation is out of bounds given by threshold range	19,999,999,961,012,900,000.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Arbitrated Air-Per-Cylinder filter coefficient is out of bounds given by threshold range	High Threshold 1.000  Low Threshold 19,999,999,961,012,900,000.000	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Launch spark is active but the launch spark redundant path indicates it should not be active	N/A		Engine speed < 7,800.00 or 7,900.00 rpm (hysteresis pair)	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Rate limited vehicle speed and its dual store do not equal	N/A		Time since first CAN message with vehicle speed >= 0.500 sec	5 / 8 counts; 25.0msec/count	
			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 multiplier	
			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 2,048 ms continuous, 0.5 down time multiplier	
			Commanded engine torque due to slow actuators and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	Up/down timer 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.
							multiplier	
			TOS to wheel speed conversion factor is out of bounds given by threshold range	High Threshold: 1.10 T/C Range Hi  0.10 T/C Range Lo  Low Threshold: 1.10 T/C Range Hi  0.10 T/C Range Lo	Ignition State	Accessory, run or crank	5 / 15 counts; 25.0msec/count	
			TOS to wheel speed conversion factor and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	10 / 16 counts; 25.0msec/count	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Cylinders active greater than commanded	32,767 cylinders		Engine run flag = TRUE > 409.59s Number of cylinder events since engine run > 65,535  No fuel injector faults active	Up/down timer 2,048ms continuous, 0.5 down time multiplier	
			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-riden  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	5 / 15 counts; 25.0msec/count	
			Driver progression mode	N/A	Ignition State	Accessory, run or crank	Up/down timer	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			and its dual store do not equal				175 ms continuous, 0.5 down time multiplier	
			Predicted torque for uncorrected zero pedal determination is greater than calculated limit.	Table, f(Engine, Oil Temp). See supporting tables + 19,999,999,961,012,9 00,000.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Engine Predicted Request Without Motor is greater than its redundant calculation plus threshold	19,999,999,961,012,9 00,000.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Engine Immediate Request Without Motor is	19,999,999,961,012,9 00,000.00	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.
			greater than its redundant calculation plus threshold	Nm			ms continuous, 0.5 down time multiplier	
			Positive Torque Offset is greater than its redundant calculation plus threshold  OR  Positive Torque Offset is less than its redundant calculation minus threshold	164.43 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Commanded Predicted Engine Request is greater than its redundant	164.43 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous,	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			calculation plus threshold				0.5 down time multiplier	
			Commanded Hybrid Predicted Crankshaft Request is greater than its redundant calculation plus threshold	19,999,999,961,012,9 00,000.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Commanded Hybrid Immediate Crankshaft Request is less than its redundant calculation minus threshold	19,999,999,961,012,9 00,000.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Regeneration Brake Assist is not within a specified range	Brake Regen Assist < 0 Nm or Brake Regen Assist > 1,000.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	
			Cylinder Spark Delta Correction exceeds the absolute difference as compared to Unadjusted Cylinder Spark Delta	19,999,999,961,012,900,000.00 degrees	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			1. Cylinder Torque Offset exceeds step size threshold	1. 19,999,999,961,012,900,000.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5	



Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			OR  2. Sum of Cylinder Torque Offset exceeds sum threshold	2. 19,999,999,961,012,900,000.00 Nm			down time multiplier	
			Engine Capacity Minimum Immediate Without Motor is greater than its dual store plus threshold	19,999,999,961,012,900,000.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Engine Capacity Minimum Engine Off is greater than threshold	0 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Engine Capacity Minimum Engine Immediate Without Motor is greater than threshold	0 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Commanded Immediate Engine Request is greater than its redundant calculation plus threshold	164.43 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	
			PTO Torque Request exceeds allowed rate limited PTO Torque	19,999,999,961,012,9 00,000.00 Nm/25ms	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.
			Request				0.5 down time multiplier	
			Engine Speed Lores Intake Firing (event based) calculation does not equal its redundant calculation	N/A		Engine speed greater than 0rpm	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Engine Speed Lores Intake Firing timing (event based) calculation does not equal its redundant calculation	N/A		Engine speed greater than 0rpm	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Idle speed control calculated predicted minimum torque request exceeds calculated torque limit	Table, f(Oil Temp, RPM). See supporting tables: <b>Speed Control External Load f(Oil Temp, RPM) + 19,999,999,961,012,9 00,000.00 Nm</b>	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Idle speed control calculated predicted minimum torque without reserves exceeds calculated torque limit	Table, f(Oil Temp, RPM). See supporting tables: <b>Speed Control External Load f(Oil Temp, RPM) + 19,999,999,961,012,900,000.00 Nm</b>	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Difference between Driver Requested Immediate Torque primary path and its secondary exceeds threshold	1,151.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	
			Driver Immediate Request is less than its redundant calculation minus threshold	1,151.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Commanded Immediate Request is greater than its redundant calculation plus threshold  OR  Commanded Immediate Request is less than its redundant calculation minus threshold	1,151.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	

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 175 ms continuous, 0.5 down time multiplier	
			Cylinders active greater than commanded	1 cylinder		Engine speed greater than 0rpm and less than 3,200 rpm  AFM apps only	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Difference between Cruise Axle Torque Arbitrated Request and Cruise Axle Torque Request exceeds threshold	143.88 Nm		Cruise has been engaged for more than 4.00 seconds	Up/down timer 175 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Desired engine torque request greater than redundant calculation plus threshold	19,999,999,961,012,900,000.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Engine min capacity above threshold	19,999,999,961,012,900,000.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			No fast unmanaged retarded spark above the applied spark plus the threshold	Table, f(RPM,APC). See supporting tables: <b>Delta Spark Threshold f (RPM,APC)</b>		Engine speed greater than 0rpm	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Absolute difference of adjustment factor based on temperature and its dual store above threshold	19,999,999,961,012,900,000.00 m/s	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			1. Absolute difference of redundant calculated engine speed above threshold	19,999,999,961,012,900,000 RPM		Engine speed greater than 0 RPM	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			After throttle blade pressure and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Speed Control's Predicted Torque Request and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5	



Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							down time multiplier	
			Engine oil temperature and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Desired throttle position greater than redundant calculation plus threshold	19,999,999,961,012,9 00,000.00 percent	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Absolute difference of the rate limited pre-throttle pressure and its redundant calculation greater than threshold	19,999,999,961,012,9 00,000.00 kpa	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Throttle desired torque above desired torque plus threshold	164.43 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Desired filtered throttle torque exceeds the threshold plus the higher of desired throttle torque or modeled throttle torque	19,999,999,961,012,9 00,000.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Torque feedback proportional term is out of allowable range or its dual store copy does not match	High Threshold 19,999,999,961,012,9 00,000.00 Nm  Low Threshold -19,999,999,961,012, 900,000.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Torque feedback integral term magnitude or rate of change is out of allowable range or its dual store copy do not match	High Threshold 19,999,999,961,012,900,000.00 Nm  Low Threshold -19,999,999,961,012,900,000.00 Nm  Rate of change threshold 19,999,999,961,012,900,000.00 Nm/loop	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Difference of Final Torque feedback proportional plus integral term and its redundant calculation is out of bounds given by threshold range	High Threshold 164.43 Nm  Low Threshold	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				- 164.43 Nm				
			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 2,048 ms continuous, 0.5 down time multiplier	
			Difference of torque model coefficients and its redundant calculation is out of bounds given by threshold range	High Threshold 19,999,999,961,012,9 00,000.0000000 Low Threshold - 19,999,999,961,012,9 00,000.0000000	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Difference of base friction torque and its redundant	High Threshold	Ignition State	Accessory, run or crank	Up/down timer 475	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			calculation is out of bounds given by threshold range	164.43 Nm  Low Threshold  - 164.43 Nm			ms continuous, 0.5 down time multiplier	
			Accessory drive friction torque is out of bounds given by threshold range	High Threshold 164.43 Nm  Low Threshold  0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	
			AC friction torque is greater than commanded by AC control software or less than threshold limit	High Threshold 0.00 Nm  Low Threshold	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				0.00 Nm				
			Difference of Oil temperature delta friction torque and its redundant calculation is out of bounds given by threshold range	High Threshold  164.43 Nm  Low Threshold  - 164.43 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Generator friction torque is out of bounds given by threshold range	High Threshold 164.43 Nm  Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multiplier	
			Supercharger friction torque is out of bounds given by threshold range	High Threshold 164.43 Nm  Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Filtered Torque error magnitude or its increase rate of change is out of allowable range or its dual store copy do not match	High Threshold 19,999,999,961,012,900,000.00 Nm		Engine speed >0rpm MAF, MAP and Baro DTCs are false	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.
				Low Threshold -19,999,999,961,012, 900,000.00 Nm  Rate of change threshold  19,999,999,961,012,9 00,000.00 Nm/loop			multiplier	
			Torque error compensation is out of bounds given by threshold range	High Threshold 19,999,999,961,012,9 00,000.00 Nm  Low Threshold  0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Delta Torque Baro	High Threshold	Ignition State	Accessory, run or crank	Up/down timer	



Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			compensation is out of bounds given by threshold range	19,999,999,961,012,900,000.00 Nm  Low Threshold -19,999,999,961,012,900,000.00 Nm			2,048 ms continuous, 0.5 down time multiplier	
			1. Difference of reserve torque value and its redundant calculation exceed threshold  OR 2. Reserve request does not agree with operating conditions or Difference of final predicted torque and its redundant calculation exceed threshold  OR 3. Rate of change of reserve torque exceeds threshold, increasing direction only  OR	1. 19,999,999,961,012,900,000.00 Nm  2. N/A  3. 19,999,999,961,012,900,000.00 Nm  4. 19,999,999,961,012,900,000.00 Nm	3. & 4.: Ignition State	1. & 2.: Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 19,999,999,961,012,900,000.00 Nm  3. & 4.: Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			4. Reserve engine torque above allowable capacity threshold					
			Engine Vacuum and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			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: <b>Delta MAP Threshold f(Desired Engine Torque)</b>		Engine speed >0rpm	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Min. Axle Torque Capacity is greater than threshold	-2,520.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	
			Driver Predicted Request is greater than its redundant calculation plus	1,151.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous,	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			threshold  OR  Driver Predicted Request is less than its redundant calculation minus threshold				0.5 down time multiplier	
			Cold Delta Friction Torque and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor 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: <b>Speed Control External Load f(Oil Temp, RPM) + 19,999,999,961,012,900,000.00 Nm</b>	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Commanded Predicted Axle Torque and its dual store do not match	1 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	
			Steady State Estimated Engine Torque and its dual store are not equal	N/A		AFM not changing from Active to Inactive and preload torque not changing and one loop after React command  Engine speed >0rpm	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Difference of Weighting factor for number of cylinders fueled and its redundant calculation is above threshold	19,999,999,961,012,900,000.00		Engine run flag = TRUE > 409.59s	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Difference of minimum spark advance limit and its redundant calculation is out of bounds given by threshold range	1,023.98 degrees	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Difference of commanded spark advance and adjusted delivered is out of bounds given by threshold range	1,023.98 degrees		Engine speed >0rpm	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Absolute difference between Estimated Engine Torque and its dual store are above a	19,999,999,961,012,900,000.00 Nm		Engine speed >0rpm	Up/down timer 2,048 ms continuous, 0.5	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			threshold				down time multiplier	
			Absolute difference between Estimated Engine Torque without reductions due to torque control and its dual store are above a threshold	19,999,999,961,012,900,000.00 Nm		Engine speed >0rpm	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Difference of desired spark advance for managed torque and its redundant calculation is out of bounds given by threshold range	1,023.98 degrees		Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 19,999,999,961,012,900,000.00 Nm	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Absolute difference of Engine Capacity Minimum Running Immediate Brake Torque Excluding Cylinder Sensitivity and its redundant calculation is out of bounds given by	19,999,999,961,012,900,000.00 Nm		Engine speed >0rpm	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			threshold range					
			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:  19,999,999,961,012,900,000 ms		Engine speed > 8,192 rpm	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Rate limited cruise axle torque request and its dual store do not match within a threshold	143.88 Nm	Ignition State	Accessory, run or crank	Up/down timer 163 ms continuous, 0.5 down time multiplier	
			1. Absolute difference of Calculated accelerator pedal position compensated for carpet	1. 5.00 %	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			learn and error conditions and its redundant calculation is out of bounds given by threshold range  OR  2. Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions and its dual store do not equal  OR  3. Absolute difference of Calculated accelerator pedal position and its dual store do not equal	2. N/A  3. N/A			down time multiplier	
			Commanded axle torque is greater than its redundant calculation by threshold	1,151.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	



Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Commanded axle torque is less than its redundant calculation by threshold	-863.25 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multiplier	
			Preload Throttle Area is greater than its redundant calculation by threshold	0.10 %		Engine speed >0rpm  AFM apps only	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Preload timer and its redundant calculation do not equal	N/A	Ignition State	Accessory, run or crank  AFM apps only	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			AC friction torque is greater than commanded by AC control software	0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Engine Speed Lores Intake Firing (time based) calculation does not equal its redundant calculation	N/A		Engine speed >0rpm	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			Absolute difference of the calculated spark offset for equivalence ratio and its redundant cacluation is greater than a threshold	1,023.98 degrees		Engine speed >0rpm	Up/down timer 2,048 ms continuous, 0.5 down time multiplier	
			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 175 ms continuous, 0.5 down time multiplier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transmission Mode Switch Signal Circuit  Include for programs that are NOT hybrid start stop conventional	P1762	Vehicles that are not hybrid start stop conventional applications, this diagnoses the transmission mode switch signal circuit (BCM to ECM Rolling Count check)	Rolling count value received from BCM does not match expected value	= TRUE	Engine Speed Engine Speed  Engine speed between min/max for  Vehicle Speed for	≥ 200 RPM ≤ 7,500 RPM  ≥ 5.0 seconds  ≤ 318.14 MPH ≥ 5.0 seconds	> 3 error counts for > 10.0 seconds  100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Driver Intended Brake Torque Fault	P1B12	Detect a rolling count or protection value error in Driver Intended Brake Torque serial data	X of Y failure, or continuous criteria have been met for rolling count or protection errors for Driver Intended Brake Torque.			Propulsion System is active  KeBRKI_b_TrqSerialData FailEnbl == 1 Value of KeBRKI_b_TrqSerialData FailEnbl is: 1. (If 0, this test is disabled)  Manufacturer Enable Counter is 0	10 / 16 counts or 0.488 seconds continuous; 25 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.
Hybrid Powertrain Control Module (HPC) 2 Requested MIL Illumination	P1E00	Monitors the HPC 2 MIL request line to determine when the HPC has detected a MIL illuminating fault.	HPC 2 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.
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  Volts	20  failures out of 25  samples250 ms / sample, continuous	Type X, No MIL

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 Volts	20 failures out of 25 samples 250 ms / sample, continuous	Type X, No MIL

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 Volts	20 failures out of 25 samples 250 ms / sample, continuous	Type X, No MIL



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 Volts	20 failures out of 25 samples 250 ms / sample, continuous	Type X, No MIL

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 >	10.00 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)	39 counts; 12.5 ms/count in the primary processor	Type A, 1 Trips
			OR					
			Difference between modeled throttle position and measured throttle position >	10.00 percent	Ignition voltage failure is false (P1682)	AND  ((Engine Running AND Ignition Voltage > 5.50 ) OR Ignition Voltage > 11.00 )		
			Throttle Position >	37.60 percent		Powertrain Relay voltage > 6.41  TPS minimum learn is active	11 counts; 12.5 ms/count in the primary processor	
			Throttle Position >	100.00 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.
Throttle return to default	P2119	Throttle unable to return to default throttle position after de- energizing ETC motor.	(Normalized TPS1 Voltage > AND Normalizd TPS2 Voltage > On the main processor)	1.6170		Throttle de-energized for Actuator, Controller, or Ignition Faults (P21104, P2100, P2101, P2102, P2103, P1682, P0068, P16F3) No TPS circuit faults PT Relay Voltage > 5.500  No 5V reference error or fault for # 4 5V reference circuit (P06A3)	0.4969 s	Type C, No MIL
			OR					
			(Normalized TPS1 Voltage < AND Normalizd TPS2 Voltage < On the main processor)	1.1070				
				0.9970				
			(Normalized TPS1 Voltage > AND Normalizd TPS2 Voltage > On the main processor)	1.6170  1.7270		Throttle de-energized for Battery Saver Mode  Engine not running No TPS circuit faults PT Relay Voltage > 5.500  No 5V reference error or fault for # 4 5V reference circuit (P06A3)	1.5000 s	
			OR					
			(Normalized TPS1 Voltage < AND Normalizd TPS2 Voltage < On the main processor)	1.1070  0.9970				

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 >	7.022 % offset at min. throttle position with a linear threshold to 9.664 % 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)	639 / 1,279 counts or 154 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)	639 / 1,279 counts or 154 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 >	10.001 % 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 faultst 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 faultst 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.
Vehicle Speed – Output Shaft Speed Correlation	P215B	Detect invalid vehicle speed source.	The absolute difference between wheel speed vehicle speed and TOS vehicle speed greater than >  OR  Secure vehicle speed source is unavailable	6.21 mph		Time since first CAN activity > 0.5000 s  Secure vehicle speed source is TOS vehicle speed or wheel speed vehicle speed  Trans engaged state is equal to engaged.	400 / 800 counts for wheel speed correlation  or  400 / 800 counts for TOS correlation; 25ms/count	Type A, 1 Trips

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 minimum learn window after multiple attempts to learn the minimum.	During TPS min learn on the Main processor, TPS Voltage >  AND  Number of learn attempts >	0.9550   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)	<p>Engine Coolant Temp (ECT) is <math>\leq</math> commanded temperature minus 11 Deg C and normalized ratio is <math>\leq</math> than 2.00 .</p> <p>When above is present for more than 5 seconds, fail counts start. Engine total airgrams is accumulated when 1 <math>\leq</math> AirFlow <math>\leq</math> 100 grams per second.</p> <p>== Ratio Definition:=== Current temp difference between ECT and RCT minus PwrUp difference divided by total airgrams. Note: Minimum total airgrams is 100.0 grams.</p>		<p>No Active DTC's</p> <p>Engine not run time</p> <p>Engine run time</p> <p>Fuel Condition ECT at Power Up IAT min T-Stat Heater duty cycle commanded</p> <p>Airflow</p>	<p>MAF_SensorFA IAT_SensorFA THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA</p> <p><math>\geq</math> 1,800 seconds</p> <p>50 <math>\leq</math> Time <math>\leq</math> 1,370 seconds</p> <p>Ethanol <math>\leq</math> 86 % -10.0 <math>\leq</math> ECT <math>\leq</math> 59.0 °C -7 °C <math>\leq</math> IAT <math>\leq</math> 60 °C.</p> <p><math>\leq</math> 50 %</p> <p>1.0 <math>\leq</math> Airflow <math>\leq</math> 100.0 gps</p>	<p>20 failures out of 150 samples</p> <p>1 sec/ sample</p> <p>Once per ignition key cycle</p>	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.	<p>Filtered Ratio &gt;</p> <p>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.</p> <p>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.</p> <p>The Ratio metric is calculated by selecting a threshold calibration from a 17x17 table (Supporting Table "<b>Variance Threshold Bank1</b>") and subtracting it from the measured Variance. The result is then divided by a normalizer calibration from another 17 x 17 table (Supporting Table</p>	0.49	<p>System Voltage</p> <p>Fuel Level</p> <p>Engine Coolant Temperature</p> <p>Cumulative engine run time</p> <p>Diagnostic enabled at Idle (regardless of other operating conditions)</p> <p>Engine speed range</p> <p>Engine speed delta during a short term sample period</p> <p>Mass Airflow (MAF) range</p> <p>Cumulative delta MAF during a short term sample period</p> <p>Filtered MAF delta between samples Note: first order lag filter coefficient applied to MAF = 0.050</p> <p>Air Per Cylinder (APC)</p> <p>APC delta during short term sample period</p> <p>Filtered APC delta between samples</p>	<p>no lower than 10.0 Volts for more than 0.2 seconds</p> <p>&gt; 10.0 percent AND no fuel level sensor fault</p> <p>&gt; -20 degrees C</p> <p>&gt; 40.0 seconds</p> <p>No</p> <p>1,200 to 3,800 RPM</p> <p>&lt; 100 RPM</p> <p>0 to 10,000 g/s</p> <p>&lt; 5 g/s</p> <p>&lt; 0.20 g/s</p> <p>120 to 400 mg/cylinder</p> <p>&lt; 75 mg/cylinder</p> <p>&lt; 5.00 percent</p>	<p>Minimum of 1 test per trip, up to 8 tests per trip during RSR or FIR.</p> <p>The front O2 sensor voltage is sampled once per cylinder event. Therefore, the time required to complete a single test (when all enable conditions are met) decreases as engine speed increases. For example, 9.00 seconds of data is required at 1000 rpm while double this time is required at 500 rpm and half this time is required at 2000 rpm. This data is collected only when enable conditions are met, and as such significantly more operating time is required than is indicated above. Generally, a report will be</p>	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			<p>"Normalizer Bank1"). This quotient is then multiplied by a quality factor calibration from a 17 x 17 table (Supporting Table "Quality Factor Bank1"). This result is referred to as the Ratio. Note that the quality factor ranges between 0 and 1 and represents robustness to false diagnosis in the current operating region. Regions with low quality factors are not used.</p> <p>Finally, a EWMA filter is applied to the Ratio metric to generate the Filtered Ratio malfunction criteria metric. Generally, a normal system will result in a negative Filtered Ratio while a failing system will result in a positive Filtered Ratio.</p> <p>The range of the Filtered Ratio metric is application specific since both the emissions sensitivity and relationship between imbalance and the Variance metric are application specific.</p>		<p>Note: first order lag filter coefficient applied to APC = 1.000</p> <p>Spark Advance</p> <p>Throttle Area (percent of max)</p> <p>Intake Cam Phaser Angle</p> <p>Exhaust Cam Phaser Angle</p> <p>Quality Factor (QF) QF calibrations are located in a 17x17 lookup table versus engine speed and load (Supporting Table "Quality Factor Bank1"). QF values less than "1" indicate that we don't have 4sigma/2sigma robustness in that region. The quality of the data is determined via statistical analysis of Variance data.</p> <p>Fuel Control Status Closed Loop and Long Term FT Enabled for:</p> <p>AIR pump not on CASE learn not active EGR - no device control, no intrusive diagnostics EVAP - no device control, no intrusive diagnostics Engine OverSpeed</p>	<p>5 to 55 degrees</p> <p>0 to 200 percent</p> <p>0 to 25 degrees</p> <p>0 to 25 degrees</p> <p>&gt;= 0.99</p> <p>&gt;= 1.2 seconds (Please see "Closed Loop Enable Criteria" and "Long Term FT Enable Criteria" in Supporting Tables)</p>	<p>made within 5 minutes of operation.</p> <p>For RSR or FIR, 16 tests must complete before the diagnostic can report.</p>	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Protection Not Active Idle speed control normal PTO Not Active Injector base pulse width above min limit 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:	>= 0.20  >= 0.50  0.00  0.00  EngineMisfireDetected_F A MAP_SensorFA MAF_SensorFA ECT_Sensor_FA TPS_ThrottleAuthorityDef aulted FuelInjectorCircuit_FA AIR System FA EvapExcessPurgePsbl_F A CamSensorAnyLocationF A		





Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					enable test Vehicle Speed range to keep test enabled (after initially enabled)  Closed loop integral Closed Loop Active Evap Ethanol Post fuel cell EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on Time  Predicted Catalyst temp Fuel State  ===== All of the above met for at least 3.0 seconds, and then the Force Cat Rich intrusive stage is requested. ===== During Stuck Lean test the following must stay TRUE or the test will abort: 0.95 ≤ Fuel EQR ≤ 1.10	28.0 ≤ MPH ≤ 82.0  24.9 ≤ MPH ≤ 87.0  0.84 ≤ C/L Int ≤ 1.07 = TRUE not in control of purge not in estimate mode = enabled = not active  = not active  ≥ 100.0 sec  600 ≤ °C ≤ 1,000 = DFCE possible		



Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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  ≥ 100.0 sec  600 ≤ °C ≤ 1,000 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.
Evaporative Emission System Leak Detection Pump Control Open Circuit  (Sealed Fuel System)	P2400	Diagnoses the leak detection 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			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.
Evaporative Emission System Leak Detection Pump Control Circuit Low  (Sealed Fuel System)	P2401	Diagnoses the leak detection pump 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			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.
Evaporative Emission System Leak Detection Pump Control Circuit High  (Sealed Fuel System)	P2402	Diagnoses the leak detection pump low side driver circuit for circuit faults. If the P2402 is active, an intrusive test is performed with the pump commanded on for 15 seconds.	Voltage low during driver on state (indicates short to power)	Short to power: ≤ 0.5 Ω impedance 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.
Evaporative Emission System Switching Valve Control Open Circuit  (Sealed Fuel System)	P2418	Diagnoses the switching valve 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			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.
Evaporative Emission System Switching Valve Control Circuit Low  (Sealed Fuel System)	P2419	Diagnoses the switching valve 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			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.
Evaporative Emission System Switching Valve Control Circuit High  (Sealed Fuel System)	P2420	Diagnoses the switching valve low side driver circuit for circuit faults. If the P2420 is active, an intrusive test is performed with the switching valve commanded on for 15 seconds.	Voltage low during driver on state (indicates short to power)	Short to power: ≤ 0.5 Ω impedance 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.
EVAP System Vent Valve Stuck Closed  (Sealed Fuel System)	P2422	This DTC detects a Diurnal Control Valve (DCV) that is stuck closed. There are two ways to run this diagnostic depending on the amount of pressure or vacuum in the fuel tank system.	<p>When sufficient pressure or vacuum exists in the fuel tank system</p> <p>When the Fuel Tank Pressure (FTP) sensor indicates a pressure or a vacuum</p> <p>With the DCV commanded opened, if the change in the FTP sensor reading is after then the DCV is stuck closed and the DTC fails.</p> <p>When no pressure or vacuum exists in the fuel tank system</p> <p>When the FTP sensor indicates a pressure or a vacuum</p> <p>With the DCV commanded opened, the ELCP switching valve in the pump position and the ELCP vacuum pump commanded on, if the 0.020" reference orifice vacuum measurement minus the ELCP pressure sensor (gauge) vacuum reading is</p>	<p>&gt; 697 Pa &lt; -697 Pa.</p> <p>&lt; 249 Pa 10 seconds</p> <p>&lt; 697 Pa &gt; -697 Pa.</p> <p>&lt; 300 Pa</p>	<p>Propulsion system not active time</p> <p>Odometer Drive distance Min baro Max baro Min fuel level Max fuel level ECT Min IAT Max IAT Time since last test when passing P0442/P0455</p> <p>Time since last test when failing P0442/P0455</p> <p>Voltage Vehicle speed</p> <p>Vehicle not in assembly plant (value must = 0)</p> <p>Propulsion system not active time</p> <p>Previous propulsion system active time</p> <p>Abort Conditions: Min fuel level slosh Max fuel level slosh Key up during test Refueling request button</p>	<p>4.3 ≤ time ≤ 5.8 hours or 6.0 ≤ time ≤ 8.1 hours or 8.2 ≤ time ≤ 11.0 hours</p> <p>≥ 9.9 miles ≥ 0.1 miles ≥ 70 kPa ≤ 110 kPa ≥ 10 % ≤ 90 % ≤ 40 °C ≥ 4 °C ≤ 45 °C</p> <p>≥ 0 hours</p> <p>≥ 0 hours</p> <p>≥ 10 volts ≤ 3 MPH</p> <p>0</p> <p>≥ 0 seconds</p> <p>≥ 0 seconds</p> <p>≥ 190 % ≤ 200 %</p>	<p>Up to once per trip, for each required wake-up event</p> <p>100 msec loop</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			after then the DCV is stuck closed and the DTC fails.	5 seconds	pressed  Service bay test active Device control exceeds  No Active DTC's	0.5 seconds  FuelLevelDataFault IAT_SensorFA ECT_Sensor_FA VehicleSpeedSensor_FA AmbientAirDefault VentCircuit_FA ELCPCircuit_FA FTP_SensorCircuit_FA ELCP_PumpCircuit_FA ELCP_SwitchCircuit_FA VICM_WakeupDiag_FA VICM_WakeupDiag_TFT KO LostCommBCM_FA LostCommBusB_VICM_F A CommBusAOff_VICM_FA CommBusBOff_VICM_FA AccCktLo_FA ModuleOffTime_FA  P043E P043F P0451 P1458 P145C P145D P145F P2422 P2450		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Secondary AIR System Pressure Sensor Circuit Bank 1	P2430	This DTC detects a stuck in range pressure sensor signal when the AIR pump is commanded on.	Average Pressure Error  AND Signal Variation	< 0.50 kPa  < 1.00 kPa	BARO Inlet Air Temp Coolant Temp Engine off time System Voltage MAP not Engine Speed MAF not  No active DTCs:	> 60 kPa > -11.0 deg C > -10.0 deg C < 38.0 > 10.0 seconds > 10.0 Volts < 32.0 < 20 kPa for 2.0 sec < 3,000 RPM > 50 gm/s for 3.0 sec  AIRValveControlCircuit FA AIRPumpControlCircuit FA AIRSysPressSnsrB1CktL oFA AIRSysPressSnsrB1CktHi FA ControllerProcessorPerf_ FA 5VoltReferenceA_FA 5VoltReferenceB_FA	Stuck in range cumulative time > 5.0 seconds  Frequency: Once per trip when 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)	> 14.0 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 > -10.0 deg C < 38.0 > 10.0 seconds > 10.0 Volts < 32.0 < 20 kPa for 2.0 sec < 3,000 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 cumulative test weight is based on distance from the last Baro update. See <b>Baro Skewed Sensor Weight Factor</b> 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 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 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 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 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 open. This test is run during Phase 2 (Pump commanded On, valve commanded closed)	Average Pressure Error  or	< <b>Bank 1 Valve Pressure Error</b> 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 > -10.0 deg C < 38.0 > 10.0 seconds > 10.0 Volts < 32.0 < 20 kPa for 2.0 sec < 3,000 RPM > 50 gm/s for 3.0 sec > 0.5 seconds  AIRSystemPressureSens or 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: <b>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</b> (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	> <b>Bank 1 Pump Pressure Error</b> 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 > -10.0 deg C < 38.0 > 10.0 seconds > 10.0 Volts < 32.0 < 20 kPa for > 2.0 sec. < 3,000 RPM > 50 gm/s for > 3.0 sec. > 4.0 seconds  Phase 3 cumulative test weight is based on the distance from the last Baro update. See <b>Baro Skewed Sensor Weight Factor</b> table.  AIRSystemPressureSens orFA AIRValveControlCircuit FA AIRPumpControlCircuit FA MAF_SensorFA AmbientAirDefault_NA IAT_SensorFA ECT_Sensor_FA EngineMisfireDetected_F A CatalystSysEfficiencyLoB 1_FA CatalystSysEfficiencyLoB 2_FA ControllerProcessorPerf_ FA 5VoltReferenceA_FA 5VoltReferenceB_FA IgnitionOutputDriver_FA FuelInjectorCircuit_FA	Phase 3 Cumulative 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.
ELCP Switching Valve Control Performance  (Sealed Fuel System)	P2450	This DTC detects a ELCP switching valve that is stuck.	When the ELCP vacuum pump is commanded on and the ELCP switching valve transitions from vent to pump position, if the difference between the 1st 0.020" orifice reference vacuum measurement and the ELCP pressure sensor (gauge) vacuum reading is after then the ELCP switching valve is stuck and the DTC fails.	< 400 Pa 5 seconds	Propulsion system not active time  Distance since assembly plant Drive distance Min baro Max baro Min fuel level Max fuel level ECT Min IAT Max IAT Time since last test when passing P0442/P0455  Time since last test when failing P0442/P0455  Voltage Vehicle speed  Vehicle not in assembly plant (value must = 0)  Propulsion system not active time  Previous propulsion system active time  Abort Conditions: Min fuel level slosh Max fuel level slosh Key up during test Refueling request button pressed  Service bay test active	4.3 ≤ time ≤ 5.8 hours or 6.0 ≤ time ≤ 8.1 hours or 8.2 ≤ time ≤ 11.0 hours  ≥ 9.9 miles  ≥ 0.1 miles ≥ 70 kPa ≤ 110 kPa ≥ 10 % ≤ 90 % ≤ 40 °C ≥ 4 °C ≤ 45 °C  ≥ 0 hours  ≥ 0 hours  ≥ 10 volts ≤ 3 MPH  0  ≥ 0 seconds  ≥ 0 seconds  ≥ 190 % ≤ 200 %	Up to once per trip, for each required wake- up event  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.
Ignition Switch Accessory Position Circuit Low  (EREV/ PHEV only)	P2537	This DTC checks for short to low voltage circuit failures during operation.	The ECM detects that the state of the accessory line is low when it should be high.  The diagnostic is evaluated when Propulsion System Active time is > 5.0 seconds.  Diagnostic fails when pass counts are	< 8 counts.			12.5 ms / sample  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.
ECM/PCM Internal Engine Off Timer Performance  11.12.41 and beyond	P2610	<p>This DTC determines if the hardware timer does not initialize or count properly. There are two tests to ensure proper functioning of the timer: Count Up Test (CUT) and Range Test (RaTe).</p> <p>Count Up Test (CUT): Verifies that the HWIO timer is counting up with the proper increment.</p> <p>Range Test (RaTe): When the run/crank is not active both the hardware and mirror timers are started. The timers are compared when ECM shutdown is initiated or run/crank becomes active.</p>	<p>Count Up Test:  Time difference between the current read and the previous read of the timer</p> <p>Range Test:  The variation of the HWIO timer and mirror timer is</p>	<p>&gt; 1.50 seconds</p> <p>&gt; 25 %.</p>			<p>Count Up Test: 4 failures out of 20 samples  1 sec / sample</p> <p>Continuous while run/crank is not active and until controller shutdown is initiated.</p> <p>Range Test: Once per trip when controller shutdown is initiated or run/crank becomes active.</p>	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position Signal Output Circuit Low	P2618	Diagnoses the Crankshaft Position Signal Output 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 Ohms impedance between signal and controller ground  Open Circuit: >= 200 K Ohms impedance between signal and controller ground	Powertrain Relay Voltage  Engine is not cranking  Crankshaft Position Output is commanded high	>= 11.00 Volts	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.
Crankshaft Position Signal Output Circuit High	P2619	Diagnoses the Crankshaft Position Signal Output low side driver circuit for circuit faults	Voltage low during driver on state (indicates short- to-power)	Short to power: <= 0.5 Ohms impedance between signal and controller power	Powertrain Relay Voltage  Engine is not cranking  Crankshaft Position Output is commanded low	>= 11.00 Volts	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.
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 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	Run/Crank Voltage  Remote Vehicle Start is not active	Voltage ≥ 11 volts	20 failures out of 25 samples  250 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.
Control Module Communicati on Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures exceeds  before the sample time of is reached	4 counts (equivalent to 0.50 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	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.
					OFF for	> 0.1125 seconds		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Communicati on Bus B Off	U0074	This DTC monitors for a BUS B off condition	Bus off failures exceeds  before the sample time of is reached	4 counts (equivalent to 0.50 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	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.
					CAN hardware is bus OFF for	> 0.1125 seconds		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on With TCM	U0101	This DTC monitors for a loss of communication with the transmission control module	Message is not received from controller for  Message \$0C7  Message \$0F9  Message \$1F5	 ≥ 0.5 seconds  ≥ 0.5 seconds  ≥ 0.5 seconds	General Enable Criteria:  U0073  Normal CAN transmission on Bus A  Device Control  High Voltage Virtual Network Management  Ignition Voltage Criteria:  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	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.
					and High Voltage Virtual Network Management is not active for  U0101  TCM	> 0.4000 seconds  Not Active on Current Key Cycle  is present on the bus		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communicati on 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	≥ 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	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.
					and High Voltage Virtual Network Management is 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 Communicati on With Brake System Control Module	U0129	This DTC monitors for a loss of communication with the Brake System Control Module.	Message is not received from controller for	≥ 10.0 seconds	General Enable Criteria:  U0073  Normal CAN transmission on Bus A  Device Control  High Voltage Virtual Network Management  Ignition Voltage Criteria:  Ignition voltage     Power Mode  Off Cycle Enable Criteria:  KeCAND_b_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	Not Active on Current Key Cycle  Enabled  Not Active  Not Active  ≥= 11.00 or ≥= 6.41  = run  = 0 (1 indicates enabled)  = Active  > 11.00	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					accessory or run or crank and High Voltage Virtual Network Management is not active for  U0129  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 Communicati on With Body Control Module	U0140	This DTC monitors for a loss of communication with the Body Control Module.	Message is not received from controller for	≥ 10.0 seconds	General Enable Criteria:  U0073  Normal CAN transmission on Bus A  Device Control  High Voltage Virtual Network Management  Ignition Voltage Criteria:  Ignition voltage           Power Mode  Off Cycle Enable Criteria:  KeCAND_b_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	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.
					accessory or run or crank and High Voltage Virtual Network Management is not active for  U0140  Body 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 Communicati on with Electric A/C Compressor Control Module	U016B	This DTC monitors for a loss of communication with the Electric A/C Compressor Control Module.	Message is not received from controller for	≥ 10.0 seconds	General Enable Criteria:  U0073  Normal CAN transmission on Bus A  Device Control  High Voltage Virtual Network Management  Ignition Voltage Criteria:  Ignition voltage    Power Mode  Off Cycle Enable Criteria:  KeCAND_b_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	Not Active on Current Key Cycle  Enabled  Not Active  Not Active  ≥= 11.00 or ≥= 6.41  = run  = 0 (1 indicates enabled)  = Active  > 11.00	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					accessory or run or crank and High Voltage Virtual Network Management is not active for  U016B  Electric A/C Compressor 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 Communicati on 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	≥ 0.5 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	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.
					accessory or run or crank and High Voltage Virtual 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 Communicati on with Hybrid Powertrain Control Module B	U179A	This DTC monitors for a loss of communication with the Hybrid Powertrain Control Module B	Message is not received from controller for	≥ 10.0 seconds	General Enable Criteria:  U0073  Normal CAN transmission on Bus A  Device Control  High Voltage Virtual Network Management  Ignition Voltage Criteria:  Ignition voltage    Power Mode  Off Cycle Enable Criteria:  KeCAND_b_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	Not Active on Current Key Cycle  Enabled  Not Active  Not Active  ≥= 11.00 or ≥= 6.41  = run  = 0 (1 indicates enabled)  = Active  > 11.00	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					accessory or run or crank and High Voltage Virtual Network Management is not active for  U179A  Hybrid Powertrain Control Module B	> 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 Communicati on 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	≥ 0.5 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  > 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.
Lost Communicati on with Hybrid Powertrain Control Module B on Bus B	U182D	This DTC monitors for a loss of communication with the Hybrid Powertrain Control Module B on Bus B	Message is not received from controller for  Message \$1D8  Message \$3C5  Message \$3DA  Message \$3FF  Message \$4C2	  ≥ 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 > 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 B, 2 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  U182D  Hybrid Powertrain Control Module B (VICM)	> 0.4000 seconds  Not Active on Current Key Cycle  is present on the bus		

**Engine run time greater than**  
**KtFSTA\_t\_ClosedLoopAutostart (HYBRID ONLY)**  
     AutoStart CoolantX1      X2      X3      X4      X5      X6      X7      X8      X9      X10      X11  
     Close Loop Enable TimeY1      Y2      Y3      Y4      Y5      Y6      Y7      Y8      Y9      Y10      Y11  
**and**  
**KtFSTA\_t\_ClosedLoopTime**  
     Start-Up CoolantX1      X2      X3      X4      X5      X6      X7      X8      X9      X10      X11  
     Close Loop Enable TimeY1      Y2      Y3      Y4      Y5      Y6      Y7      Y8      Y9      Y10      Y11  
**and pre converter O2 sensor voltage less than**  
**KfFULC\_U\_O2\_SensorReadyThresh**  
**Lo**  
     Voltage < XXXXmilliVolts  
**for**  
**KcFULC\_O2\_SensorReadyEvents**  
     Time (events \* 12.5 milliseconds) > XXXXevents  
**and**  
**COSC (Converter Oxygen Storage Control) not enabled**  
**and**  
**Consumed AirFuel Ratio is stoichiometry i.e. not in component protection**  
**and**  
**POPD or Catalyst Diagnostic not intrusive**  
**and**  
**Turbo Scavenging Mode not enabled**  
**and**  
**All cylinders whose valves are active also have their injectors enabled**  
**and**  
**O2S\_Bank\_1\_TFTKO, O2S\_Bank\_2\_TFTKO, FuelInjectorCircuit\_FA and CylnderDeacDriverTFTKO = False**  
  
**Long Term FT Enable Criteria**

Closed Loop Enable and  
Coolant greater than  
KfFCLL\_T\_AdaptiveLoCoolant

Coolant > XXXXCelcius

or less than  
KfFCLL\_T\_AdaptiveHiCoolant

Coolant < XXXXCelcius

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 < XXXXmilliVolts

for  
KcFCLP\_Cnt\_O2RdyCyclesThrsh

Time (events \* 12.5 milliseconds) > XXXXevents

Long Term Secondary Fuel Trim  
Enable Criteria

KtFCLP\_t\_PostIntglDisableTime



12 OBDG1B Engine Diagnostics

MAIN SECTION  
1 OF 1 SECTION

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
<b>Plus</b>											
<b>KtFCLP_t_PostIntglRampInTime</b>											
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
<b>and</b>											
<b>KeFCLP_T_IntegrationCatalystMax</b>											
Modeled Catalyst Temperature	<input type="text" value="&lt; XXXXCelcius"/>										
<b>and</b>											
<b>KeFCLP_T_IntegrationCatalystMin</b>											
Modeled Catalyst Temperature	<input type="text" value="&gt; XXXXCelcius"/>										
<b>and</b>											
<b>PO2S_Bank_1_Snsr_2_FA and</b>											
<b>PO2S_Bank_2_Snsr_2_FA = False</b>											

**Description:** P0011 - Cam Position Error Limit for performance diagnostic

**Notes:** KtPHSD\_phi\_CamPosErrorLimlc1

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
400	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
800	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
1,200	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
1,600	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
2,000	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
2,400	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
2,800	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
3,200	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
3,600	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
4,000	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
4,400	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
4,800	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
5,200	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
5,600	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
6,000	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
6,400	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
6,800	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5

**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	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
800	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
1,200	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
1,600	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
2,000	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
2,400	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
2,800	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
3,200	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
3,600	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
4,000	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
4,400	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
4,800	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
5,200	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
5,600	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
6,000	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
6,400	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
6,800	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5

**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	51.5	41.5	11.5	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	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	3.0	3.0	3.0
4,000	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	3.0	3.0	3.0
4,400	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	3.0	3.0	3.0
4,800	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	3.0	3.0	3.0
5,200	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	3.0	3.0	3.0
5,600	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	3.0	3.0	3.0
6,000	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	3.0	3.0	3.0
6,400	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	3.0	3.0	3.0
6,800	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	3.0	3.0	3.0

**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	51.5	41.5	11.5	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	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	3.0	3.0	3.0
4,000	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	3.0	3.0	3.0
4,400	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	3.0	3.0	3.0
4,800	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	3.0	3.0	3.0
5,200	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	3.0	3.0	3.0
5,600	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	3.0	3.0	3.0
6,000	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	3.0	3.0	3.0
6,400	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	3.0	3.0	3.0
6,800	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	3.0	3.0	3.0

**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	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
2	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
3	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
4	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
6	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
7	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
8	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
9	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
10	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
11	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
12	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
13	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
14	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
15	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
16	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
17	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5

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

**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\_PerfCylAbnFiltIntensity < 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	0.195	0.195	0.195	0.203	0.247	0.338	0.378	0.450	0.421	0.510	0.510	0.510	0.510	0.510	0.510	0.510	0.510



**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	6.1602	6.1602	6.1602	6.0293	5.9980	6.0215	6.0566	6.0625	5.9902	5.8027	5.4531	4.8984	4.8984	4.8984	4.8984	4.8984	4.8984

**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	18.9473	18.9473	18.9473	18.4883	18.3750	18.4395	18.5195	18.4473	18.0586	17.1875	15.6699	13.3398	13.3398	13.3398	13.3398	13.3398	13.3398

**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.:  $KtKNKD\_k\_OpenMinNN < VaKNKD\_k\_OpenFilIntensity < KtKNKD\_k\_OpenMaxNN$ .

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	0.0000	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

**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	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	0.0371	0.0410	0.0488	0.0566	0.0664	0.0762	0.0859	0.0957	0.1094	0.1309	0.1406	0.1504	0.1602	0.1699	0.1797	0.1895	0.2012

**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	0.074	0.074	0.074	0.084	0.104	0.133	0.170	0.211	0.258	0.307	0.355	0.402	0.447	0.488	0.523	0.551	0.568

**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	0.275	0.275	0.275	0.275	0.328	0.379	0.531	0.732	0.988	1.303	1.678	2.119	2.631	3.219	3.883	4.631	5.465

<b>Description:</b> Defines which Knock Open Circuit Diagnostic method to use.					
<b>Notes:</b> 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.					
<b>P0325_P0330_OpenMethod - Part 1</b>					
y/x	0	1	2	3	4
1	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz
<b>P0325_P0330_OpenMethod - Part 2</b>					
y/x	5	6	7	8	9
1	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz
<b>P0325_P0330_OpenMethod - Part 3</b>					
y/x	10	11	12	13	14
1	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz
<b>P0325_P0330_OpenMethod - Part 4</b>					
y/x	15	16			
1	CeKNKD_e_Open_20KHz	CeKNKD_e_Open_20KHz			

**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 relevant for a four-cylinder engine and only the first six values in the table are relevant 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



**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	6,500
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

**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	6,500
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

**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

**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	6,500
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

**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	6,500
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

**Description:** P0101\_P0106\_P0121\_P012B\_P0236\_P1101 MAP3 Residual Weight Factor based on RPM

**Notes:**

y/x	0	400	800	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,000	4,400	4,800	5,200	5,600	6,000	6,500
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

**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	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0

**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	155.0	140.0	135.0	50.0	22.0	15.0	14.0	14.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0



**Description:** KtFCLL\_p\_AdaptiveLowMAP\_Limit

**Notes:** MAP in KPa

y/x	65	70	75	80	85	90	95	100	105
1	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0

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

**Notes:** Time in seconds

y/x	-40	-29	-18	-6	5	16	28	39	50	61	73	84	95	106	118	129	140
1	100.0	100.0	100.0	60.0	60.0	50.0	40.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0

**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	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	0.0	0.0	0.0	0.0

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

**Notes:** Voltage in millivolts

y/x	1
1	1,100

**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	25

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

**Notes:** Degrees Celcius

y/x	1
1	40

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

**Notes:** Degrees Celcius

y/x	1
1	120

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

**Notes:** Voltage in millivolts

y/x	1
1	1,100



**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	80

**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	1,000

**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	300

**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	-10	2	13	25	36	48	59
1	2,100	1,800	1,500	1,200	900	600	300

**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	-10	2	13	25	36	48	59
1	2,100	1,800	1,500	1,200	900	600	300

**Description:** KtTHMD\_T\_DCRD\_FastFailTempDiff

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

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

**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	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20

**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	2	3	3	10	15	20	23	28
1	0	0	1	1	1	1	1	1	1



**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	50	50	50	50	50
0.125	50	50	50	50	50
0.250	50	50	50	50	50
0.375	50	50	50	50	50
0.500	50	50	50	50	50
0.625	50	50	50	50	50
0.750	50	50	50	50	50
0.875	50	50	50	50	50
1.000	50	50	50	50	50

**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	2	3	3	10	15	20	23	28

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

**Notes:** KtEONV\_t\_IdleCondTimePreset

**P0442: Estimate of Ambient Temperature Valid Conditioning Time as a Function of Ignition Off Time Table - Part 1**

y/x	0	600	1,200	1,800	2,400	3,000	3,600	4,200	4,800	5,400	6,000	6,600	7,200	7,800	8,400	9,000	9,600
1	78	245	245	245	245	245	185	183	181	179	176	174	172	170	168	166	163

**P0442: Estimate of Ambient Temperature Valid Conditioning Time as a Function of Ignition Off Time Table - Part 2**

y/x	10,200	10,800	11,700	12,600	13,500	14,400	15,300	16,200	17,100	18,000	19,200	20,400	21,600	22,800	24,000	25,200	
1	161	159	156	153	149	146	144	143	141	140	137	135	133	129	124	120	

**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

**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	100	100	80	75	70	65	60	60	60	60	60	55	50	45	40	30	30

**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	1,000	1,200	1,350	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,650	3,800	4,000	4,200
40	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
80	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
120	15.00	1.25	1.25	2.00	2.00	15.00	0.75	0.75	0.75	0.75	15.00	0.75	0.75	1.00	1.00	15.00	15.00
160	15.00	1.25	1.25	2.00	2.25	2.50	0.75	0.75	0.75	0.75	2.75	1.50	0.75	1.00	1.00	15.00	15.00
200	15.00	2.25	2.25	2.50	2.50	2.00	1.75	1.25	1.50	3.00	2.75	2.50	1.25	1.50	1.50	15.00	15.00
240	15.00	3.75	3.75	3.25	3.25	1.75	2.00	2.50	2.00	3.50	2.50	2.25	1.75	2.00	2.00	15.00	15.00
275	15.00	4.25	4.25	3.50	3.50	2.50	2.50	3.75	2.75	3.00	3.75	1.75	1.75	1.75	1.75	15.00	15.00
330	15.00	2.75	2.75	2.75	2.50	2.25	4.50	3.50	3.25	3.50	3.00	3.50	3.00	2.00	2.00	15.00	15.00
380	15.00	2.75	2.75	2.75	2.50	2.50	2.50	3.25	2.50	2.00	2.00	2.50	1.75	1.50	1.50	15.00	15.00
400	15.00	15.00	15.00	15.00	15.00	2.50	2.50	3.25	2.50	2.00	2.00	2.00	1.75	1.50	1.50	15.00	15.00
440	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
480	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
520	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
560	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
640	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
720	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
800	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00

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**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	1,000	1,200	1,350	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,650	3,800	4,000	4,200
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160	0.00	0.00	1.00	0.75	0.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	0.95	0.80	0.00	0.00	0.00
200	0.00	0.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00	0.80	1.00	1.00	0.80	0.00	0.00	0.00
240	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00
275	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.80	1.00	1.00	1.00	0.80	0.00	0.00	0.00
330	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
380	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	0.00
400	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
440	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
480	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
520	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
560	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
640	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
720	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
800	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**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	1,000	1,200	1,350	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,650	3,800	4,000	4,200
40	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
80	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
120	15.00	1.75	1.75	0.25	0.25	15.00	0.75	0.75	1.00	1.00	15.00	0.50	0.50	0.00	0.00	15.00	15.00
160	15.00	1.75	1.75	0.25	1.25	2.00	0.75	0.75	1.00	1.00	0.75	0.75	0.50	0.00	0.00	15.00	15.00
200	15.00	4.50	4.50	3.25	2.00	2.75	2.50	2.25	2.00	1.50	0.75	1.00	1.50	1.00	1.00	15.00	15.00
240	15.00	5.50	5.50	3.75	2.50	3.25	2.50	2.00	2.50	2.50	2.00	1.75	1.50	1.25	1.25	15.00	15.00
275	15.00	6.00	6.00	3.75	2.75	3.25	3.00	1.75	3.50	3.00	1.75	2.25	1.75	1.75	1.75	15.00	15.00
330	15.00	7.00	7.00	4.25	3.25	3.50	2.25	3.25	3.25	2.50	2.50	1.00	1.00	1.50	1.50	15.00	15.00
380	15.00	7.00	7.00	4.25	3.25	3.25	3.00	2.00	2.25	3.00	2.50	1.75	1.75	1.50	1.50	15.00	15.00
400	15.00	15.00	15.00	15.00	15.00	3.00	3.00	2.00	2.25	3.00	2.50	2.00	1.75	1.50	1.50	15.00	15.00
440	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
480	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
520	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
560	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
640	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
720	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
800	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00



<b>Description:</b> 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.				
<b>Notes:</b> DTCs: P0171, P0172, P0174, P0175; Calibration Name: KaFADD_e_SelectCellSet; Axis is Long Term Fuel Trim Cell I.D.				
<b>P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage - Part 1</b>				
y/x	CeFADR_e_Cell00_PurgOnAirMode 5	CeFADR_e_Cell01_PurgOnAirMode 4	CeFADR_e_Cell02_PurgOnAirMode 3	CeFADR_e_Cell03_PurgOnAirMode 2
1	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell
<b>P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage - Part 2</b>				
y/x	CeFADR_e_Cell04_PurgOnAirMode 1	CeFADR_e_Cell05_PurgOnAirMode 0	CeFADR_e_Cell06_PurgOnIdle	CeFADR_e_Cell07_PurgOnDecel
1	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_NonSelectedCell
<b>P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage - Part 3</b>				
y/x	CeFADR_e_Cell08_PurgOffAirMode 5	CeFADR_e_Cell09_PurgOffAirMode 4	CeFADR_e_Cell10_PurgOffAirMode 3	CeFADR_e_Cell11_PurgOffAirMode 2
1	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell
<b>P0171_P0172_P0174_P0175 Long-Term Fuel Trim Cell Usage - Part 4</b>				
y/x	CeFADR_e_Cell12_PurgOffAirMode 1	CeFADR_e_Cell13_PurgOffAirMode 0	CeFADR_e_Cell14_PurgOffIdle	CeFADR_e_Cell15_PurgOffDecel
1	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_NonSelectedCell

**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	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
2	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
3	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
4	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
5	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	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	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0
14	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
15	0	0	0	0	0	0	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

**Description:** KtEOSD\_d\_HC\_LRSLimRS1

**Notes:** X axis is estimated Ethanol percentage, Please see the table below named "KnE85G\_Pct\_FFS\_CompAtEngAxis" for the 5 X axis table breakpoints. Y axis is Average airflow during the response test (gps). Z axis is the limit for L2R Half Cycle switches, Note: The cell contains the mininum switches, below which the fault is indicated.

y/x	0	10	50	70	80
0.0	26	26	26	26	26
6.3	26	26	26	26	26
12.5	27	27	27	27	27
18.8	28	28	28	28	28
25.0	28	28	28	28	28
31.3	29	29	29	29	29
37.5	29	29	29	29	29
43.8	30	30	30	30	30
50.0	30	30	30	30	30
56.3	30	30	30	30	30
62.5	30	30	30	30	30
68.8	30	30	30	30	30
75.0	30	30	30	30	30
81.3	30	30	30	30	30
87.5	30	30	30	30	30
93.8	30	30	30	30	30
100.0	30	30	30	30	30

**Description:** KtEOSD\_d\_HC\_RLSLimRS1

**Notes:** X axis is estimated Ethanol percentage, Please see the table below named "KnE85G\_Pct\_FFS\_CompAtEngAxis" for the 5 X axis table breakpoints. Y axis is Average airflow during the response test (gps). Z axis is the limit for R2L Half Cycle switches, Note: The cell contains the mininum switches, below which the fault is indicated.

y/x	0	10	50	70	80
0.0	26	26	26	26	26
6.3	26	26	26	26	26
12.5	27	27	27	27	27
18.8	28	28	28	28	28
25.0	28	28	28	28	28
31.3	29	29	29	29	29
37.5	29	29	29	29	29
43.8	30	30	30	30	30
50.0	30	30	30	30	30
56.3	30	30	30	30	30
62.5	30	30	30	30	30
68.8	30	30	30	30	30
75.0	30	30	30	30	30
81.3	30	30	30	30	30
87.5	30	30	30	30	30
93.8	30	30	30	30	30
100.0	30	30	30	30	30

**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, P2270, 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

**Description:** This Calibration is the accumulated 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, P2270, 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	360,000	120,000	120,000

**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	0.024	0.036	0.048	0.060	0.072	0.084	0.096	0.108	0.120	0.132	0.144	0.156	0.168	0.180	0.192	1.000

**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	0.036	0.048	0.060	0.072	0.084	0.096	0.108	0.120	0.132	0.144	0.156	0.168	0.180	0.192	0.204	1.000



**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

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

**Notes:** DTC: P0411; Cal: KtAIRD\_K\_SAI\_TstBaroDsbl; 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

**Description:** KtAIRD\_K\_SAI\_TstMAF\_Dsbl: 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

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

**Notes:** DTC: P0411; Cal: KtAIRD\_K\_SAI\_TstVoltDsbl; 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

**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

**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	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0

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

**Notes:** DTCs: P2440; Cal: KtAIRD\_K\_VlvTstBaroDsbl; 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

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

**Notes:** DTCs: P2440; Cal: KtAIRD\_K\_VlvTstMAF\_Dsbl; 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



**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

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

**Notes:** DTCs: P2440; Cal: KtAIRD\_K\_VlvTstTempDsbl; 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

**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

**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

**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

**Description:** Fail threshold for PSW per operating loop.

**Notes:** P0606, KaPISD\_Cnt\_SequenceFail[x]

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

**Description:** Sample threshold for PSW per operating loop.

**Notes:** P0606, KaPISD\_Cnt\_SequenceSmp[x]

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

**Description:** The Run/Crank voltages required to pull in the PT relay as a function of induction air temperature.

**Notes:** P1682, KtPMDD\_U\_PT\_RelayPullInEnbl

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



**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	500.0	980.7	1,461.5	1,942.2	2,423.0	2,903.7	3,384.5	3,865.2	4,345.9	4,826.7	5,307.4	5,788.2	6,268.9	6,749.6	7,230.4	7,711.1	8,191.9
80.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0
160.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0
240.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0
320.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0
400.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0
480.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0
560.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0
640.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0
720.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0
800.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0
880.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0
960.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0
1,040.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0
1,120.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0
1,200.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0
1,280.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0
1,360.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0	1,024.0

**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	1,000.00	2,000.00	3,000.00	4,000.00	5,000.00	6,000.00
1.00	256.00	256.00	256.00	256.00	256.00	256.00

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**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
700.00	4,096.00	4,096.00	4,096.00	4,096.00	4,096.00	4,096.00
900.00	4,096.00	4,096.00	4,096.00	4,096.00	4,096.00	4,096.00
1,100.00	70.00	70.00	70.00	70.00	60.00	50.00
1,400.00	45.00	42.00	38.00	35.00	35.00	35.00
1,600.00	32.89	29.44	27.18	25.55	18.09	15.26
1,800.00	34.82	31.10	28.67	26.92	19.35	16.51
2,000.00	37.64	32.56	30.68	29.85	21.71	18.36
2,200.00	40.80	35.20	33.13	32.22	23.24	19.84
2,500.00	43.58	39.76	37.58	36.01	26.21	23.06
2,700.00	42.72	38.90	36.72	35.15	25.34	22.19
3,000.00	40.65	36.83	34.65	33.08	23.27	20.13
3,300.00	36.87	33.05	30.87	29.30	19.49	16.35
3,500.00	13.41	9.58	7.41	5.84	-3.97	-7.12
3,700.00	7.50	3.67	1.50	-0.08	-9.88	-13.03
4,000.00	4.25	0.43	-1.75	-3.32	-13.13	-16.28
4,500.00	4.25	0.43	-1.75	-3.32	-13.13	-16.28
5,000.00	4.25	0.43	-1.75	-3.32	-13.13	-16.28

**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 altitude 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
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
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

**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
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
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

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

**Notes:** Used for P0300-P0308. Cal Name: KtMISF\_dt\_SCD\_OffIdleMode

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
8	32,767	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

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

**Notes:** Used for P0300-P0308. Cal Name: KtMISF\_ddt\_SCD\_OffIdleMode

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000
8	32,767	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

12 OBDG1B Engine Diagnostics

**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	1,250	1,300	1,350	1,375	1,400	1,425	1,450	1,500	1,600	1,700	1,800	1,900	2,000
8	600	550	550	550	550	550	550	380	380	300	300	145	145
9	800	500	500	500	500	500	500	310	310	285	285	138	138
11	750	500	500	500	500	500	500	250	250	245	245	127	127
12	700	500	500	500	500	500	500	260	260	255	255	130	130
13	750	500	500	500	500	500	500	285	285	280	280	135	135
15	800	500	500	500	500	500	500	290	290	285	285	150	150
17	850	500	500	500	500	500	500	388	388	310	310	160	160
19	1,100	250	250	250	250	250	250	390	390	315	315	210	210
22	1,200	400	400	400	400	400	400	400	400	325	325	235	235
25	1,400	480	480	480	480	480	480	450	450	390	390	240	240
29	1,700	495	495	495	495	495	495	550	550	390	390	310	310
33	2,300	650	650	650	650	650	650	600	600	390	390	315	315
38	2,800	750	750	750	750	750	750	650	650	390	390	315	315
42	3,000	825	825	825	825	825	825	800	800	500	500	320	320
48	3,400	850	850	850	850	850	850	900	900	525	525	320	320
54	3,700	875	875	875	875	875	875	1,000	1,000	525	525	360	360
60	3,800	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	855	855	450	450



12 OBDG1B Engine Diagnostics

**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	1,250	1,300	1,350	1,375	1,400	1,425	1,450	1,500	1,600	1,700	1,800	1,900	2,000
8	1,300	550	550	550	550	550	550	400	400	350	350	250	250
9	1,250	500	500	500	500	500	500	350	350	300	300	240	240
11	1,200	500	500	500	500	500	500	300	300	275	275	220	220
12	1,300	500	500	500	500	500	500	305	305	280	280	220	220
13	1,400	500	500	500	500	500	500	310	310	285	285	225	225
15	1,500	500	500	500	500	500	500	325	325	290	290	225	225
17	1,600	500	500	500	500	500	500	400	400	350	350	230	230
19	1,800	500	500	500	500	500	500	500	500	360	360	235	235
22	2,000	525	500	500	500	500	500	600	600	375	375	240	240
25	2,500	600	600	600	600	600	600	650	650	400	400	245	245
29	3,500	610	610	610	610	610	610	750	750	400	400	315	315
33	4,500	675	675	675	675	675	675	850	850	400	400	320	320
38	5,000	800	800	800	800	800	800	950	950	400	400	320	320
42	5,500	825	825	825	825	825	825	1,275	1,275	700	700	320	320
48	5,600	850	850	850	850	850	850	1,325	1,325	770	770	320	320
54	5,750	875	875	875	875	875	875	1,350	1,350	775	775	375	375
60	4,000	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	860	860	625	625

12 OBDG1B Engine Diagnostics

MAIN SECTION  
1 OF 1 SECTION

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

**Notes:** Used for P0300-P0308. Cal Name: KtMISF\_CylinderMode

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	
8	5,000	5,000	4,000	2,500	2,500	2,000	800	800	800	550	380	300	145	140	120	90	85	70	25	20	15	15	15	15	15	15	15
9	5,000	5,000	4,000	2,500	2,500	2,000	750	750	750	475	310	285	138	130	100	80	75	60	16	12	11	10	10	10	10	10	10
11	5,000	5,000	4,000	2,500	2,500	2,000	700	700	700	475	250	245	127	123	95	70	55	50	18	13	12	8	8	8	8	8	8
12	5,000	5,000	4,000	2,500	2,500	2,000	750	750	750	475	260	255	130	125	98	70	55	50	20	14	13	9	9	9	9	9	9
13	5,000	5,000	4,000	2,500	2,500	2,000	800	800	800	533	285	280	135	130	100	70	55	50	22	15	14	9	9	9	9	9	9
15	5,000	5,000	4,000	2,500	2,500	2,000	850	850	850	535	290	285	150	140	105	75	55	50	23	18	18	9	9	9	9	9	9
17	5,000	5,000	4,000	2,500	2,500	2,000	1,100	1,100	1,100	575	388	310	160	160	110	80	65	55	25	19	18	10	10	10	10	10	10
19	5,000	5,000	4,000	2,500	2,500	2,000	1,200	1,200	1,200	650	390	315	210	180	125	90	70	65	30	20	19	11	11	11	11	11	11
22	5,000	5,000	4,000	2,500	2,500	2,000	1,400	1,400	1,400	825	400	325	235	200	140	100	75	75	35	23	20	12	12	12	12	12	12
25	5,000	5,000	4,000	2,500	2,500	2,000	1,450	1,450	1,450	850	450	390	240	235	200	125	100	85	40	24	21	12	12	12	12	12	12
29	5,000	5,000	4,000	2,500	2,500	2,000	1,500	1,500	1,500	950	550	390	310	270	200	125	120	90	40	30	23	15	15	15	15	15	15
33	5,000	5,000	4,000	2,500	2,500	2,000	1,600	1,600	1,600	1,000	600	390	315	295	210	125	120	90	40	33	24	18	18	18	18	18	18
38	5,000	5,000	4,000	2,500	2,500	2,000	1,800	1,800	1,800	1,050	650	390	315	310	210	125	120	120	60	33	30	23	23	23	23	23	23
42	5,000	5,000	4,000	2,500	2,500	2,000	1,900	1,900	1,900	1,400	800	500	320	320	210	125	120	120	69	44	40	28	28	28	28	28	28
48	5,000	5,000	4,000	2,500	2,500	2,000	2,000	2,000	2,000	1,425	900	525	320	320	315	220	130	130	80	53	42	34	34	34	34	34	34
54	5,000	5,000	4,000	2,500	2,500	2,000	2,000	2,000	2,000	1,450	1,000	525	360	360	350	250	235	145	90	56	46	41	41	41	41	41	41
61	5,000	5,000	4,000	2,500	2,500	2,000	2,000	2,000	2,000	1,800	1,300	855	450	375	365	300	260	150	100	65	60	44	44	44	44	44	44

12 OBDG1B Engine Diagnostics

MAIN SECTION  
1 OF 1 SECTION

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

**Notes:** Used for P0300-P0308. Cal Name: KtMISF\_ddt\_CylinderMode

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	
8	5,000	5,000	4,000	2,500	2,500	2,000	1,300	1,300	1,300	600	400	350	250	240	160	140	120	90	45	35	30	25	25	25	25	25	24
9	5,000	5,000	4,000	2,500	2,500	2,000	1,250	1,250	1,250	475	350	300	240	220	150	120	100	80	38	27	24	17	17	17	17	16	
11	5,000	5,000	4,000	2,500	2,500	2,000	1,200	1,200	1,200	475	300	275	220	180	135	105	90	70	39	28	24	17	17	17	17	16	
12	5,000	5,000	4,000	2,500	2,500	2,000	1,200	1,200	1,200	600	305	280	220	190	140	110	95	77	40	29	24	17	17	17	17	16	
13	5,000	5,000	4,000	2,500	2,500	2,000	1,200	1,200	1,200	752	310	285	225	220	165	125	105	78	40	30	24	17	17	17	17	16	
15	5,000	5,000	4,000	2,500	2,500	2,000	1,200	1,200	1,200	775	325	290	225	220	170	130	110	85	40	33	24	19	19	19	19	18	
17	5,000	5,000	4,000	2,500	2,500	2,000	1,450	1,450	1,450	800	400	350	230	225	175	130	115	88	40	33	26	21	21	21	21	20	
19	5,000	5,000	4,000	2,500	2,500	2,000	1,600	1,600	1,600	925	500	360	235	230	180	130	120	92	40	33	30	26	26	26	26	25	
22	5,000	5,000	4,000	2,500	2,500	2,000	1,700	1,700	1,700	935	600	375	240	235	190	130	120	94	40	33	33	30	30	30	30	29	
25	5,000	5,000	4,000	2,500	2,500	2,000	1,750	1,750	1,750	950	650	400	245	240	200	130	120	95	40	33	33	33	33	33	33	32	
29	5,000	5,000	4,000	2,500	2,500	2,000	1,775	1,775	1,775	975	750	400	315	300	210	130	120	95	40	33	33	33	33	33	33	32	
33	5,000	5,000	4,000	2,500	2,500	2,000	1,800	1,800	1,800	1,050	850	400	320	300	210	130	120	95	40	33	33	33	33	33	33	32	
38	5,000	5,000	4,000	2,500	2,500	2,000	1,900	1,900	1,900	1,100	950	400	320	315	210	130	120	120	60	33	33	33	33	33	33	32	
42	5,000	5,000	4,000	2,500	2,500	2,000	2,000	2,000	2,000	1,425	1,275	700	320	320	210	130	120	120	69	44	40	40	40	40	40	39	
48	5,000	5,000	4,000	2,500	2,500	2,500	2,100	2,100	2,100	1,450	1,325	770	320	320	320	220	130	130	80	53	42	42	42	42	42	41	
54	5,000	5,000	4,000	2,500	2,500	2,500	2,200	2,200	2,200	1,500	1,350	775	375	375	370	355	245	145	90	56	46	46	46	46	46	45	
61	5,000	5,000	4,000	2,500	2,500	2,500	2,300	2,300	2,300	1,850	1,400	860	625	550	510	360	260	150	100	65	60	58	58	58	58	57	

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

**Notes:** Used for P0300-P0308. Cal Name: KtMISF\_RevolutionMode

y/x	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
9	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
11	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	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	32,767
15	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
17	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	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	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	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	32,767
29	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
33	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	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	32,767
42	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
48	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
54	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
61	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

**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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	32,767

**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	5.79	5.79	5.79	5.79	5.79	5.73	5.58	5.28	5.63	5.75	7.20	7.80	8.10	8.15	8.30	8.40	8.50	8.60	12.21	14.61	17.00	19.40	21.79	24.19	26.58	28.98

**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	0.85	0.87	0.89	0.91	0.94	0.96	0.98	1.00	1.02

**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	10.70	9.90	9.25	8.70	8.30	8.20	8.10	8.10	8.10	8.10	8.20	8.25	8.30	8.35	8.40	8.45	8.60	8.65	10.99	13.33	15.67	18.01	20.36	22.70	25.04	27.38



**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	24.6	24.6	24.6	24.6	12.1	7.9	7.9	7.9
10	24.6	24.6	24.6	24.6	12.1	7.9	7.9	7.9
20	24.6	24.6	24.6	12.1	12.1	7.9	7.9	7.9
30	12.1	12.1	12.1	12.1	7.9	5.9	5.9	5.9
40	12.1	12.1	12.1	12.1	5.9	4.6	4.6	4.6
50	12.1	12.1	12.1	7.9	4.6	4.6	4.6	4.6
60	12.1	12.1	12.1	4.6	4.6	4.6	4.6	4.6
70	12.1	12.1	12.1	4.6	4.6	4.6	4.6	4.6
80	12.1	12.1	12.1	4.6	4.6	4.6	4.6	4.6
90	12.1	12.1	12.1	4.6	4.6	4.6	4.6	4.6
100	12.1	12.1	12.1	4.6	4.6	4.6	4.6	4.6

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

**Notes:** Used for P0300-P0308. Cal Name: KtRRDI\_a\_RoughRoadThresh

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

**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	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04

**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	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

**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	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

**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

**Description:** Crankshaft should return to normal after the misfire. If crankshaft snap value after single isolated misfire being evaluated 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

**Description:** Crankshaft should return to normal after the misfire. If crankshaft snap value after the misfire being evaluated 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\_MaxPptrnRecogMult

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



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

**Notes:** Used for P0300-P0308. Cal Name: KaMSFD\_Cnt\_RingFilter

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

**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	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

<b>Description:</b> Engine OverSpeed Limit versus gear						
<b>Notes:</b> Used for P0300-P0308. Cal Name: KaEOSC_n_EngOvrspdLimitGear						
<b>P0300 EngineOverSpeedLimit - Part 1</b>						
y/x	CeTGRR_e_TransGr1	CeTGRR_e_TransGr2	CeTGRR_e_TransGr3	CeTGRR_e_TransGr4	CeTGRR_e_TransGr5	CeTGRR_e_TransGr6
1	4,900	4,900	4,900	4,900	4,900	4,900
<b>P0300 EngineOverSpeedLimit - Part 2</b>						
y/x	CeTGRR_e_TransGrEVT 1	CeTGRR_e_TransGrEVT 2	CeTGRR_e_TransGrNeut	CeTGRR_e_TransGrRvrs	CeTGRR_e_TransGrPark	
1	4,900	4,900	2,000	2,000	2,000	

**Description:** Vehicle Speed Axis for Delta Predicted AC Pressure

**Notes:** For P0531: KnACCD\_v\_HSPRat\_EngageTstVehSpd used in both the Quality Factor and Delta Predicted table lookup

y/x	1	2	3	4	5	6	7	8	9
1	0	20	40	60	80	100	120	140	160

**Description:** Ambient Temperature Axis for Delta Predicted AC Pressure

**Notes:** For P0531: KnACCD\_T\_HSPRat\_EngageTstAmb used in both the Quality Factor and Delta Predicted table lookup

y/x	1	2	3	4	5	6	7	8	9
1	0	20	30	40	50	60	70	80	100

**Description:** AC High Side Pressure Sensor Sensor Engage Test Predicted Delta Pressure

**Notes:** For P0531: KtACCD\_p\_HSPR\_DeltaPredicted with X Axis is defined by KnACCD\_T\_HSPRat\_EngageTstAmb and Y Axis is defined by KnACCD\_v\_HSPRat\_EngageTstVehSpd

y/x	0	20	30	40	50	60	70	80	100
0	40.00	50.00	60.00	70.00	75.00	80.00	100.00	100.00	100.00
20	40.00	50.00	60.00	70.00	75.00	80.00	100.00	100.00	100.00
40	40.00	50.00	60.00	70.00	75.00	80.00	100.00	100.00	100.00
60	40.00	50.00	60.00	70.00	75.00	80.00	100.00	100.00	100.00
80	40.00	50.00	60.00	70.00	75.00	80.00	100.00	100.00	100.00
100	40.00	50.00	60.00	70.00	75.00	80.00	100.00	100.00	100.00
120	40.00	50.00	60.00	70.00	75.00	80.00	100.00	100.00	100.00
140	40.00	50.00	60.00	70.00	75.00	80.00	100.00	100.00	100.00
160	40.00	50.00	60.00	70.00	75.00	80.00	100.00	100.00	100.00

<b>Description:</b> Delta Predicted Quality Factor for the Engage Test									
<b>Notes:</b> For P0531: KtACCD_k_HSPR_QualFactor with X Axis is defined by KnACCD_T_HSPRat_EngageTstAmb and Y Axis is defined by KnACCD_v_HSPRat_EngageTstVehSpd									
y/x	0	20	30	40	50	60	70	80	100
0	0.05000	0.25800	0.42999	0.46333	0.53000	0.63000	0.71666	0.83667	0.99001
20	0.05000	0.23500	0.38000	0.42667	0.49333	0.58000	0.67334	0.80667	0.99001
40	0.05000	0.16000	0.28000	0.31334	0.39000	0.50999	0.61667	0.75999	0.95000
60	0.05000	0.14999	0.25999	0.28999	0.34666	0.44000	0.53999	0.69333	0.92999
80	0.05000	0.13750	0.25000	0.28334	0.33667	0.41000	0.49001	0.63000	0.88000
100	0.05000	0.12250	0.23000	0.26334	0.31334	0.38000	0.46001	0.57666	0.78000
120	0.05000	0.09999	0.20000	0.25333	0.29666	0.33000	0.40334	0.52000	0.73000
140	0.05000	0.09000	0.18500	0.22000	0.24666	0.28000	0.34666	0.39667	0.48000
160	0.05000	0.08499	0.17999	0.19333	0.20999	0.23000	0.28333	0.32666	0.41000

**Description:** Coolant Weighting Factor Axis for Delta Predicted AC Pressure

**Notes:** For P0531: KnACCD\_T\_HSPRat\_EngageTstCool

y/x	1	2	3	4	5	6	7	8	9
1	-40	-20	0	20	40	60	80	100	120



<b>Description:</b> Coolant Weighting Factor for Delta Predicted AC Pressure									
<b>Notes:</b> For P0531: KtACCD_k_HSPRat_EngageCoolCoeff with X Axis is Engine Coolant defined by KnACCD_T_HSPRat_EngageTstCool to weight the Delta Predicted Pressure									
y/x	-40	-20	0	20	40	60	80	100	120
1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

**Description:** Ambient Temperature Axis for the On Test

**Notes:** For P0531: KnACCD\_T\_HSPRat\_OnTestPresMin

y/x	1	2	3	4	5
1	0	20	40	60	100

**Description:** AC High Side Pressure Sensor Rationality On Test Threshold

**Notes:** For P0531: KtACCD\_p\_HSPRat\_OnTestPresMin with X Axis is defined by KnACCD\_T\_HSPRat\_OnTestPresMin

y/x	0	20	40	60	100
1	65.0	195.0	260.0	325.0	455.0

**Description:** FanSpeed Weighting Factor Axis for Delta Predicted AC Pressure

**Notes:** For P0531: KnACCD\_Pct\_HSPRat\_EngageTstFan

y/x	1	2	3	4	5	6	7	8	9
1	10	20	30	40	50	60	70	80	95

**Description:** FanSpeed Weighting Factor for Delta Predicted AC Pressure

**Notes:** For P0531: KtACCD\_k\_HSPRat\_EngageFanCoeff with X Axis is Fan Speed as desfined by KnACCD\_Pct\_HSPRat\_EngageTestFan to weight the Delta Predicted Pressure

y/x	10	20	30	40	50	60	70	80	95
1	1	1	1	1	1	1	1	1	0

**Description:** Ambeint Temperature Axis for the Off Test

**Notes:** For P0531: KnACCD\_T\_HSPRat\_OffTestPresMax

y/x	1	2	3	4	5
1	0	20	40	60	100

**Description:** AC High Side Pressure Sensor Rationality Off Test Threshold

**Notes:** For P0531: KtACCD\_p\_HSPRat\_OffTestPresMax with X Axis is defined by KnACCD\_T\_HSPRat\_OffTestPresMax

y/x	0	20	40	60	100
1	1,000	1,400	1,800	2,000	2,300

<b>Bundle Name:</b> 5VoltReferenceA_FA
P0641
<b>Bundle Name:</b> 5VoltReferenceB_FA
P0651
<b>Bundle Name:</b> 5VoltReferenceMAP_OOR_Fit
P0697
<b>Bundle Name:</b> A/F Imbalance Bank1
P219A
<b>Bundle Name:</b> A/F Imbalance Bank2
P219B
<b>Bundle Name:</b> AAP_SnsrCktFP
Naturally aspirated: P2228, P2229. Turbocharged: P0237, P0238
<b>Bundle Name:</b> AAP_SnsrFA
Naturally Aspirated: P2227, P2228, P2229, P2230. Turbocharged: P0237, P0238.
<b>Bundle Name:</b> AAP_SnsrTFTKO
Naturally Aspirated: P2227, P2228, P2229, P2230. Turbocharged: P0237, P0238.
<b>Bundle Name:</b> AAP2_SnsrCktFP
P2228, P2229
<b>Bundle Name:</b> AAP2_SnsrFA
P2227, P2228, P2229, P2230
<b>Bundle Name:</b> AAP2_SnsrTFTKO
P2227, P2228, P2229, P2230
<b>Bundle Name:</b> AccCktLo_FA
P2537
<b>Bundle Name:</b> AcceleratorPedalFailure
P2122, P2123, P2127, P2128, P2138, P0697, P06A3
<b>Bundle Name:</b> ACCMLostComm
U016B
<b>Bundle Name:</b> ACFailedOnSD
See ACCM Document
<b>Bundle Name:</b> ACHighSidePressSnsrCktFA
P0532, P0533
<b>Bundle Name:</b> ACThrmlRefrigSpdVld
See ACCM Document
<b>Bundle Name:</b> AfterThrottlePressTFTKO
Naturally Aspirated or Turbocharged: P0106, P0107, P0108. Supercharged: P012B, P012C, P012D.
<b>Bundle Name:</b> AfterThrottlePressureFA
Naturally Aspirated or Turbocharged: P0106, P0107, P0108. Supercharged: P012B, P012C, P012D.



<b>Bundle Name:</b> AfterThrottleVacuumTFTKO
Naturally Aspirated or Turbocharged: P0106, P0107, P0108. Supercharged: P012B, P012C, P012D.
<b>Bundle Name:</b> AIR System FA
P0411, P2440, P2444
<b>Bundle Name:</b> AIRPumpControlCircuit FA
P0418
<b>Bundle Name:</b> AIRSystemPressureSensor FA
P2430, P2431, P2432, P2433, P2435, P2436, P2437, P2438
<b>Bundle Name:</b> AIRValveControlCircuit FA
P0412
<b>Bundle Name:</b> AmbientAirDefault
Baro Sensor Present: P2227, P2228, P2229, P2230. No Baro Sensor Present: P0101, P0102, P0103, P0106, P0107, P0108, P0111, P0112, P0113, P0114, P0121, P0122, P0123, P012B, P012C, P012D, P0222, P0223, P1221
<b>Bundle Name:</b> AmbPresDfltStatus
Baro Sensor Present: P2227, P2228, P2229, P2230. No Baro Sensor Present: P0101, P0102, P0103, P0106, P0107, P0108, P0111, P0112, P0113, P0114, P0121, P0122, P0123, P012B, P012C, P012D, P0222, P0223, P1221
<b>Bundle Name:</b> AmbPresSnsrCktFA
P2228, P2229
<b>Bundle Name:</b> AmbPresSnsrCktFP
P2228, P2229
<b>Bundle Name:</b> AnyCamPhaser_FA
P0010, P0011, P0013, P0014, P0020, P0021, P0023, P0024
<b>Bundle Name:</b> AnyCamPhaser_TFTKO
P0010, P0011, P0013, P0014, P0020, P0021, P0023, P0024
<b>Bundle Name:</b> BrakeBoosterSensorFA
P0556, P0557, P0558
<b>Bundle Name:</b> BrakeBoosterVacuumValid
P0556, P0557, P0558
<b>Bundle Name:</b> BSTR_b_ExcsvBstFA
P226B
<b>Bundle Name:</b> BSTR_b_ExcsvBstTFTKO
P226B
<b>Bundle Name:</b> BSTR_b_IC_PmpCktFA
P023A, P023C
<b>Bundle Name:</b> BSTR_b_PCA_CktFA
P0033, P0034, P0035, P0045, P0047, P0048, P0243, P0245, P0246, P0247, P0249, P0250
<b>Bundle Name:</b> BSTR_b_PCA_CktLoFA

P0034, P0047, P0245, P0249
<b>Bundle Name:</b> BSTR_b_PCA_CktLoTFTKO
P0034, P0047, P0245, P0249
<b>Bundle Name:</b> BSTR_b_PCA_CktTFTKO
P0033, P0034, P0035, P0045, P0047, P0048, P0243, P0245, P0246, P0247, P0249, P0250
<b>Bundle Name:</b> BSTR_b_PCA_FA
P0234, P0299, P0033, P0034, P0035, P0045, P0047, P0048, P0243, P0245, P0246, P2261, P0247, P0249, P0250
<b>Bundle Name:</b> BSTR_b_PCA_PstnSnsrFA
P003A, P2564, P2565
<b>Bundle Name:</b> BSTR_b_PCA_PstnSnsrTFTKO
P003A, P2564, P2565
<b>Bundle Name:</b> BSTR_b_PCA_TFTKO
P0234, P0299, P0033, P0034, P0035, P0045, P0047, P0048, P0243, P0245, P0246, P2261, P0247, P0249, P0250
<b>Bundle Name:</b> BSTR_b_PresCntrlTooHiFA
P0234
<b>Bundle Name:</b> BSTR_b_PresCntrlTooHiTFTKO
P0234
<b>Bundle Name:</b> BSTR_b_PresCntrlTooLoFA
P0299
<b>Bundle Name:</b> BSTR_b_PresCntrlTooLoTFTKO
P0299
<b>Bundle Name:</b> BSTR_b_PstnCntrlFA
P166D, P166E
<b>Bundle Name:</b> BSTR_b_PstnCntrlTooHiFA
P166E
<b>Bundle Name:</b> BSTR_b_PstnCntrlTooHiTFTKO
P166E
<b>Bundle Name:</b> BSTR_b_PstnCntrlTooLoFA
P166D
<b>Bundle Name:</b> BSTR_b_PstnCntrlTooLoTFTKO
P166D
<b>Bundle Name:</b> BSTR_b_TurboBypassCktFA
P0033, P0034, P0035, P00C0, P00C1, P00C2
<b>Bundle Name:</b> BSTR_b_TurboBypassCktTFTKO
P0033, P0034, P0035, P00C0, P00C1, P00C2
<b>Bundle Name:</b> BSTR_b_TurboBypB_CktFA
P00C0, P00C1, P00C2
<b>Bundle Name:</b> BSTR_b_TurboBypB_CktTFTKO

P00C0, P00C1, P00C2
<b>Bundle Name:</b> CamLctnExhFA
P0017, P0019, P0365, P0366, P0390, P0391
<b>Bundle Name:</b> CamLctnIntFA
P0016, P0018, P0340, P0341, P0345, P0346
<b>Bundle Name:</b> CamSensor_FA
P0016, P0017, P0018, P0019, P0340, P0341, P0345, P0346, P0365, P0366, P0390, P0391
<b>Bundle Name:</b> CamSensor_TFTKO
P0016, P0017, P0018, P0019, P0340, P0341, P0345, P0346, P0365, P0366, P0390, P0391
<b>Bundle Name:</b> CamSensorAnyLctnTFTKO
P0016, P0017, P0018, P0019, P0340, P0341, P0345, P0346, P0365, P0366, P0390, P0391
<b>Bundle Name:</b> CamSensorAnyLocationFA
P0016, P0017, P0018, P0019, P0340, P0341, P0345, P0346, P0365, P0366, P0390, P0391
<b>Bundle Name:</b> CamSensorFA
P0016, P0017, P0018, P0019, P0340, P0341, P0345, P0346, P0365, P0366, P0390, P0391
<b>Bundle Name:</b> CamSensorTFTKO
P0016, P0017, P0018, P0019, P0340, P0341, P0345, P0346, P0365, P0366, P0390, P0391
<b>Bundle Name:</b> CatalystSysEfficiencyLoB1_FA
P0420
<b>Bundle Name:</b> CatalystSysEfficiencyLoB2_FA
P0430
<b>Bundle Name:</b> ClutchPstnSnsr FA
P0806, P0807, P0808
<b>Bundle Name:</b> ClutchPstnSnsrCktHi FA
P0808
<b>Bundle Name:</b> ClutchPstnSnsrCktLo FA
P0807
<b>Bundle Name:</b> ClutchPstnSnsrNotLearned
P080A
<b>Bundle Name:</b> CoolingFanSpeedTooHigh_FA
P0495
<b>Bundle Name:</b> CrankCamCorrelationTFTKO
P0016, P0017, P0018, P0019
<b>Bundle Name:</b> CrankExhaustCamCorrelationFA
P0017, P0019
<b>Bundle Name:</b> CrankExhaustCamCorrFA
P0017, P0019
<b>Bundle Name:</b> CrankIntakeCamCorrelationFA

P0016, P0018
<b>Bundle Name:</b> CrankIntakeCamCorrFA
P0016, P0018
<b>Bundle Name:</b> CrankSensor_FA
P0335, P0336
<b>Bundle Name:</b> CrankSensor_TFTKO
P0335, P0336
<b>Bundle Name:</b> CrankSensorFA
P0335, P0336
<b>Bundle Name:</b> CrankSensorFaultActive
P0335, P0336
<b>Bundle Name:</b> CrankSensorTestFailedTKO
P0335, P0336
<b>Bundle Name:</b> CrankSensorTFTKO
P0335, P0336
<b>Bundle Name:</b> CylDeacSystemTFTKO
P3400
<b>Bundle Name:</b> CylnderDeacDriverTFTKO
P3401, P3409, P3417, P3425, P3433, P3441, P3449
<b>Bundle Name:</b> ECT_Sensor_Ckt_FA
P0117, P0118, P0119
<b>Bundle Name:</b> ECT_Sensor_Ckt_FP
P0117, P0118
<b>Bundle Name:</b> ECT_Sensor_Ckt_High_FP
P0118
<b>Bundle Name:</b> ECT_Sensor_Ckt_Low_FP
P0117
<b>Bundle Name:</b> ECT_Sensor_Ckt_TFTKO
P0117, P0118, P0119
<b>Bundle Name:</b> ECT_Sensor_Ckt_TPTKO
P0117, P0118, P0019
<b>Bundle Name:</b> ECT_Sensor_DefaultDetected
P0117, P0118, P0116, P0125
<b>Bundle Name:</b> ECT_Sensor_FA
P0117, P0118, P0116, P0125, P0128
<b>Bundle Name:</b> ECT_Sensor_Perf_FA
P0116
<b>Bundle Name:</b> ECT_Sensor_TFTKO

P0117, P0118, P0116, P0125, P0119
<b>Bundle Name:</b> EGRValve_FP
P0405, P0406, P042E
<b>Bundle Name:</b> EGRValveCircuit_FA
P0403, P0404, P0405, P0406
<b>Bundle Name:</b> EGRValveCircuit_TFTKO
P0403, P0404, P0405, P0406
<b>Bundle Name:</b> EGRValvePerformance_FA
P0401, P042E
<b>Bundle Name:</b> EGRValvePerformance_TFTKO
P0401, P042E
<b>Bundle Name:</b> EngineMetalOvertempActive
P1258
<b>Bundle Name:</b> EngineMisfireDetected_FA
P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308
<b>Bundle Name:</b> EngineMisfireDetected_TFTKO
P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308
<b>Bundle Name:</b> EngineModeNotRunTimer_FA
P2610
<b>Bundle Name:</b> EngineModeNotRunTimerError
P2610
<b>Bundle Name:</b> EnginePowerLimited
P0068, P0122, P0123, P0222, P0223, P0606, P16F3, P1104, P2100, P2101, P2102, P2103, P160E, P160D, P0191, P0192, P0193, P00C8, P00C9, P16A0, P16A1, P16A2
<b>Bundle Name:</b> EngineTorqueEstInaccurate
EngineMisfireDetected_FA, FuelInjedorCircuit_FA, FuelInjedorCircuit_TFTKO, FuelTrimSystemB1_FA, FuelTrimSystemB2_FA, MAF_SensorTFTKO, MAP_SensorTFTKO, EGRValuePerforamnce_FA
<b>Bundle Name:</b> EngModeNotRunTmErr
P2610
<b>Bundle Name:</b> EngOilModeledTempValid
ECT_Sensor_FA, IAT_SensorCircuitFA
<b>Bundle Name:</b> EngOilPressureSensorCktFA
P0522, P0523
<b>Bundle Name:</b> EngOilPressureSensorFA
P0521, P0522, P0523
<b>Bundle Name:</b> EngOilTempSensorCircuitFA
P0197, P0198
<b>Bundle Name:</b> Ethanol Composition Sensor FA

P0178, P0179, P2269
<b>Bundle Name:</b> EvapExcessPurgePsbl_FA
Conventional fuel system, P0442, P0455, P0458, P0496
<b>Bundle Name:</b> EvapPurgeSolenoidCircuit_FA
P0443, P0458, P0459
<b>Bundle Name:</b> EvapReducedPurgePsbl_FA
Only EREV sealed fuel system, P0443, P0446, P0449, P0459, P0497, P0499, P2419, P2422
<b>Bundle Name:</b> EvapVentSolenoidCircuit_FA
P0449, P0498, P0499
<b>Bundle Name:</b> ExhaustCamSensor_FA
P0017, P0019, P0365, P0366, P0390, P0391
<b>Bundle Name:</b> ExhaustCamSensor_TFTKO
P0017, P0019, P0365, P0366, P0390, P0391
<b>Bundle Name:</b> ExhaustCamSensorFA
P0017, P0019, P0365, P0366, P0390, P0391
<b>Bundle Name:</b> ExhaustCamSensorTFTKO
P0017, P0019, P0365, P0366, P0390, P0391
<b>Bundle Name:</b> FanOutputDriver_FA
P0480, P0481, P0482, P0691, P0692, P0693, P0694, P0695, P0696, P1485 (EREV), P1486 (EREV), P1487 (EREV)
<b>Bundle Name:</b> FHPD_b_HPC_PresErrNeg_FA
P228D
<b>Bundle Name:</b> FHPD_b_HPC_PresErrNeg_TFTKO
P228D
<b>Bundle Name:</b> FHPD_b_HPC_PresErrPos_FA
P228C
<b>Bundle Name:</b> FHPD_b_HPC_PresErrPos_TFTKO
P228C
<b>Bundle Name:</b> FHPD_b_HPC_Windup_TFTKO
P0089
<b>Bundle Name:</b> FHPD_b_HPC_Windup_FA
P0089
<b>Bundle Name:</b> FHPD_b_PumpCurr_FA
P163A
<b>Bundle Name:</b> FHPD_b_PumpCurr_TFTKO
P163A
<b>Bundle Name:</b> FHPR_b_FRP_SnsrCkt_FA
P0192, P0193
<b>Bundle Name:</b> FHPR_b_FRP_SnsrCkt_TFTKO

P0192, P0193
<b>Bundle Name:</b> FHPR_b_FRP_SnsrPerfDiag_FA
P0191
<b>Bundle Name:</b> FHPR_b_FRP_SnsrPerfDiag_TFTKO
P0191
<b>Bundle Name:</b> FHPR_b_PumpCkt_FA
P0090, P0091, P0092, P00C8, P00C9, P00CA
<b>Bundle Name:</b> FHPR_b_PumpCkt_TFTKO
P0090, P0091, P0092, P00C8, P00C9, P00CA
<b>Bundle Name:</b> FuelInjectorCircuit_FA
P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0261, P0264, P0267, P0270, P0273, P0276, P0279, P0282, P0262, P0265, P0268, P0271, PP0274, 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
<b>Bundle Name:</b> FuelInjectorCircuit_TFTKO
P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0261, P0264, P0267, P0270, P0273, P0276, P0279, P0282, P0262, P0265, P0268, P0271, PP0274, 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
<b>Bundle Name:</b> FuelLevelDataFault
P0461, P0462, P0463, P2066, P2067, P2068
<b>Bundle Name:</b> FuelTrimSystemB1_FA
P0171, P0172
<b>Bundle Name:</b> FuelTrimSystemB1_TFTKO
P0171, P0172
<b>Bundle Name:</b> FuelTrimSystemB2_FA
P0174, P0175
<b>Bundle Name:</b> FuelTrimSystemB2_TFTKO
P0174, P0175
<b>Bundle Name:</b> HumidityFA
P0097, P0098, P11C2, P11C3, P2227, P2228, P2229, P2230
<b>Bundle Name:</b> HumTempSnsrCktFA
P0097, P0098
<b>Bundle Name:</b> HumTempSnsrCktFP
P0097, P0098
<b>Bundle Name:</b> HumTempSnsrFA
P0096, P0097, P0098, P0099
<b>Bundle Name:</b> IAC_SystemRPM_FA
P0506, P0507
<b>Bundle Name:</b> IAT_ContCorrFA
P2199

<b>Bundle Name:</b> IAT_SensorCircuitFA
P0112, P0113
<b>Bundle Name:</b> IAT_SensorCircuitFP
P0112, P0113
<b>Bundle Name:</b> IAT_SensorCircuitTFTKO
P0112, P0113
<b>Bundle Name:</b> IAT_SensorFA
P0111, P0112, P0113, P0114
<b>Bundle Name:</b> IAT_SensorTFTKO
P0111, P0112, P0113, P0114
<b>Bundle Name:</b> IgnitionOffTimer_FA
P2610
<b>Bundle Name:</b> IgnitionOffTimeValid
P2610
<b>Bundle Name:</b> IgnitionOutputDriver_FA
P0351, P0352, P0353, P0354, P0355, P0356, P0357, P0358
<b>Bundle Name:</b> IntakeCamSensor_FA
P0016, P0018, P0340, P0341, P0345, P0346
<b>Bundle Name:</b> IntakeCamSensor_TFTKO
P0016, P0018, P0340, P0341, P0345, P0346
<b>Bundle Name:</b> IntakeCamSensorFA
P0016, P0018, P0340, P0341, P0345, P0346
<b>Bundle Name:</b> IntakeCamSensorTFTKO
P0016, P0018, P0340, P0341, P0345, P0346
<b>Bundle Name:</b> IntkCamPhaser_FA
P0010, P0011, P0020, P0021
<b>Bundle Name:</b> KS_Ckt_Perf_B1B2_FA
P0324, P0325, P0326, P0327, P0328, P0330, P0332, P0333, P06B6, P06B7
<b>Bundle Name:</b> Long Name
Short Name
<b>Bundle Name:</b> LowFuelConditionDiagnostic
<b>LowFuelConditionDiagnostic - Other Definitions:</b>
Flag set to TRUE if the fuel level < 10.0 % AND
No Active DTCs: FuelLevelDataFault, P0462, P0463 for at least 30.0 seconds
<b>Bundle Name:</b> MAF_SensorCircuitFA
P0102, P0103, P010C, P010D
<b>Bundle Name:</b> MAF_SensorCircuitTFTKO



P0102, P0103, P010C, P010D
<b>Bundle Name:</b> MAF_SensorFA
P0101, P0102, P0103, P010C, P010D
<b>Bundle Name:</b> MAF_SensorFP
P0102, P0103, P010C, P010D
<b>Bundle Name:</b> MAF_SensorPerfFA
P0101
<b>Bundle Name:</b> MAF_SensorPerfTFTKO
P0101
<b>Bundle Name:</b> MAF_SensorTFTKO
P0101, P0102, P0103, P010C, P010D
<b>Bundle Name:</b> MAF_SnsrCktFA
P121B, P121C
<b>Bundle Name:</b> MAF_SnsrCktTFTKO
P121B, P121C
<b>Bundle Name:</b> MAP_EngineVacuumStatus
P0106, P0107, P0108 Fault Active OR P0107, P0108 Fault Pending
<b>Bundle Name:</b> MAP_SensorCircuitFA
P0107, P0108
<b>Bundle Name:</b> MAP_SensorCircuitFP
P0107, P0108
<b>Bundle Name:</b> MAP_SensorFA
P0106, P0107, P0108
<b>Bundle Name:</b> MAP_SensorPerfFA
P0106
<b>Bundle Name:</b> MAP_SensorPerfTFTKO
P0106
<b>Bundle Name:</b> MAP_SensorTFTKO
P0106, P0107, P0108
<b>Bundle Name:</b> MnfdTempSensorCktFA
Turbocharged or Supercharged, with Humidity sensor: P112C, P112D. Turbocharged or Supercharged, without Humidity sensor: P0097, P0098. Naturally Aspirated: P0112, P0113.
<b>Bundle Name:</b> MnfdTempSensorCktFP
Turbocharged or Supercharged, with Humidity sensor: P112C, P112D. Turbocharged or Supercharged, without Humidity sensor: P0097, P0098. Naturally Aspirated: P0112, P0113.
<b>Bundle Name:</b> MnfdTempSensorCktTFTKO
Turbocharged or Supercharged, with Humidity sensor: P112C, P112D. Turbocharged or Supercharged, without Humidity sensor: P0097, P0098. Naturally Aspirated: P0112, P0113.
<b>Bundle Name:</b> 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.

<b>Bundle Name:</b> 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.
<b>Bundle Name:</b> ModuleOffTime_FA
P2610
<b>Bundle Name:</b> ModuleOffTimeErr
P2610
<b>Bundle Name:</b> no validity name is assigned to this fault bundle
<b>Bundle Name:</b> 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.
<b>Bundle Name:</b> 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.
<b>Bundle Name:</b> 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.
<b>Bundle Name:</b> 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.
<b>Bundle Name:</b> PowertrainRelayFault
P1682
<b>Bundle Name:</b> PowertrainRelayStateOn_Error
P0685
<b>Bundle Name:</b> PowertrainRelayStateOn_FA
P0685
<b>Bundle Name:</b> PPS1_OutOfRange
P2122, P2123
<b>Bundle Name:</b> PPS1_OutOfRange_Composite
P2122, P2123, P06A3
<b>Bundle Name:</b> PPS2_OutOfRange
P2127, P2128
<b>Bundle Name:</b> PPS2_OutOfRange_Composite
P2127, P2128, P0697
<b>Bundle Name:</b> SCIAP_SensorCircuitFA
P012C, P012D
<b>Bundle Name:</b> SCIAP_SensorCircuitFP

P012C, P012D
<b>Bundle Name:</b> SCIAP_SensorFA
P012B, P012C, P012D
<b>Bundle Name:</b> SCIAP_SensorPerfFA
P012B
<b>Bundle Name:</b> SCIAP_SensorPerfTFTKO
P012B
<b>Bundle Name:</b> SCIAP_SensorTFTKO
P012B, P012C, P012D
<b>Bundle Name:</b> SuperchargerBypassValveFA
P2261
<b>Bundle Name:</b> SystemVoltageHigh_FA
P0563
<b>Bundle Name:</b> SystemVoltageLow_FA
P0562
<b>Bundle Name:</b> TC_BoostPresSnsrCktFA
P0237, P0238
<b>Bundle Name:</b> TC_BoostPresSnsrFA
P0236, P0237, P0238
<b>Bundle Name:</b> TCM_EngSpdReqCkt
P150C
<b>Bundle Name:</b> THMR_AHV_FA
P2681, P26A3, P26A6, P26A7, P26A9
<b>Bundle Name:</b> THMR_AWP_AuxPumpFA
B2920, B2923, B2922
<b>Bundle Name:</b> THMR_ECT_Sensor_Ckt_FA
P0116, P0117, P0118, P00B6
<b>Bundle Name:</b> THMR_Insuff_Flow_FA
P00B7
<b>Bundle Name:</b> THMR_RCT_Sensor_Ckt_FA
P00B3, P00B4
<b>Bundle Name:</b> THMR_SWP_Control_FA
P261D, P261A, P261C
<b>Bundle Name:</b> THMR_Therm_Control_FA
P0597, P0598, P0599
<b>Bundle Name:</b> 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.

<b>Bundle Name:</b> 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.
<b>Bundle Name:</b> ThrottlePositionSnsrPerfFA
P0121
<b>Bundle Name:</b> ThrottlePositionSnsrPerfTFTKO
P0121
<b>Bundle Name:</b> TIAP_SensorPerfFA
P0236
<b>Bundle Name:</b> TPS_FA
P0122, P0123, P0222, P0223, P2135
<b>Bundle Name:</b> TPS_FaultPending
P0122, P0123, P0222, P0223, P2135
<b>Bundle Name:</b> TPS_Performance_FA
P0068, P0121, P1104, P2100, P2101, P2102, P2103
<b>Bundle Name:</b> TPS_Performance_TFTKO
P0068, P0121, P1104, P2100, P2101, P2102, P2103
<b>Bundle Name:</b> TPS_TFTKO
P0122, P0123, P0222, P0223, P2135
<b>Bundle Name:</b> TPS_ThrottleAuthorityDefaulted
P0068, P0122, P0123, P0222, P0223, P16F3, P1104, P2100, P2101, P2102, P2103, P2135
<b>Bundle Name:</b> TPS1_OutOfRange_Composite
P0122, P0123, P06A3
<b>Bundle Name:</b> TPS2_OutOfRange_Composite
P0222, P0223, P06A3
<b>Bundle Name:</b> Trans Output Rotations Rolling Count Validity
<b>Bundle Name:</b> Transfer Pump is Commanded On
<b>Transfer Pump is Commanded On - Other Definitions:</b>
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
<b>Bundle Name:</b> Transmission Actual Gear Validity
<b>Bundle Name:</b> Transmission Engaged State Validity

<b>Bundle Name:</b> Transmission Estimated Gear Validity
<b>Bundle Name:</b> Transmission Gear Ratio Validity
<b>Bundle Name:</b> Transmission Gear Selector Position Validity
<b>Bundle Name:</b> Transmission Oil Temperature Validity
<b>Bundle Name:</b> Transmission Output Shaft Angular Velocity Validity
<b>Bundle Name:</b> Transmission Overall Actual Torque Ratio Validity
<b>Bundle Name:</b> Transmission Overall Estimated Torque Ratio Validity
<b>Bundle Name:</b> Transmission Shift Lever Position Validity
<b>Bundle Name:</b> Transmission Turbine Angular Velocity Validity
<b>Bundle Name:</b> TransmissionEngagedState_FA MYD/MYC/MYB:, P182E, P1915
<b>Bundle Name:</b> TransmissionGearDefaulted MYD/MYC/MYB:, P182E, P1915
<b>Bundle Name:</b> VehicleSpeedSensor_FA P0502, P0503, P0722, P0723
<b>Bundle Name:</b> VehicleSpeedSensorError P0502, P0503, P0722, P0723

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OBD II Gasoline Monitoring Requirements Checklist

Component/System	MONITORING REQUIREMENTS: List the DTC of the monitor that detects the following failure mode:									
Catalyst	(e)(1.2.2)									
	Conversion Efficiency P0420	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heated Catalyst	(e)(2.2)									
	Heating Performance NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Misfire	(e)(3.2.1)	(e)(3.2.2)	(e)(3.2.2)							
	Catalyst Damage Misfire P0300	FTP Level Misfire: First 1000-revs P0300	FTP Level Misfire: 4 x 1000-revs P0300	NA	NA	NA	NA	NA	NA	NA
Evaporative System	(e)(4.2.2)(A)	(e)(4.2.2)(B)	(e)(4.2.2)(C)	(e)(4.2.5)						
	Purge Flow P0497	0.040" Leak Check P0442	0.020" Leak Check P0442	0.090" Leak Check in Lieu of 0.040" NA	NA	NA	NA	NA	NA	NA
Secondary Air	(e)(5.2.3)	(e)(5.2.4)								
	Insufficient Flow Emission Threshold P0411	Functional Monitor In Lieu of Emission Threshold P0411, P2440, P2444	NA	NA	NA	NA	NA	NA	NA	NA
Fuel System	(e)(6.2.1)(A)	(e)(6.2.1)(B)	(e)(6.2.1)(C)	(e)(6.2.2)	(e)(6.2.3)	(e)(6.2.4)				
	Emission Threshold P0171, P0172	Secondary Fuel Trim Emission Threshold NA	Air-fuel Ratio Cylinder Imbalance P219A, P0300	Adaptive Limits Reached P0171, P0172	Secondary Fuel Trim Adaptive Limits Reached NA	Fails to Enter Closed Loop NA				NA
Upstream Exhaust Gas Sensor	(e)(7.2.1)(A)	(e)(7.2.1)(B)	(e)(7.2.1)(B)	(e)(7.2.1)(B)	(e)(7.2.1)(C)	(e)(7.2.1)(D)	(e)(7.2.3)(A)	(e)(7.2.3)(B)		
	Emission Threshold P0133	Open Circuit P0134	Out-of-Range High P0132	Out-of-Range Low P0131	Feedback: Slow/fails to Enter, Default OL NA	Sufficient for Other Diagnostics P0131, P0132, P0134, P0133	Heater Performance P0053, P0135	Heater Circuit Continuity P0030	NA	NA
Downstream Exhaust Gas Sensor	(e)(7.2.2)(A)	(e)(7.2.2)(B)	(e)(7.2.2)(D)	(e)(7.2.2)(D)	(d)(2.2.3) & (e)(6.2.4)	(e)(7.2.2)(C)	(e)(7.2.3)(A)	(e)(7.2.3)(B)		
	Emissions Threshold P013A, P013B, P013E, P013F	Open Circuit P0140	Out-of-Range High P0138, P2271	Out-of-Range Low P0137, P2270	Feedback: Slow/fails to Enter, Default OL P0054, P0137, P0138, P0140, P0141, P013A, P013B, P013E, P013F, P2270, P2271	Sufficient for Other Diagnostics P013A, P013B, P013E, P013F, P2270, P2271	Heater Performance P0054, P0141	Heater Circuit Continuity P0036	NA	NA
	(e)(8.2.1)	(e)(8.2.1)	(e)(8.2.2)							

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EGR	Low Flow Emission Threshold	High Flow Emission Threshold	Functional Monitor in Lieu of Emission Threshold							
	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Crankcase Ventilation	(e)(9.2.2) Disconnection									
	P0106, P0171, P0300	NA	NA	NA	NA	NA	NA	NA	NA	NA
Engine Cooling System	(e)(10.2.1) Time to Reach Threshold Temp	(e)(10.2.2)(A) ECT Open Circuit	(e)(10.2.2)(A) ECT Out-of-Range High	(e)(10.2.2)(A) ECT Out-of-Range Low	(e)(10.2.2)(B) Time to Reach Closed Loop	(e)(10.2.2)(C) ECT Stuck Below Highest Minimum Enable Temp	(e)(10.2.2)(D) ECT Stuck Above Lowest Maximum Enable Temp			
	P0128, P2181	P0118, P0119, P00B4	P0118, P00B4	P0117, P00B3	NA	P0128, P00B6	P0116, P00B6	NA	NA	NA
Cold Start Strategy	(e)(11.2.1)(A) Emission Threshold	(e)(11.2.1)(B) Functional Monitor In Lieu of Emission Threshold	(e)(11.2.2)(A) Phase-in Single Element Functional Monitor	(e)(11.2.2)(B) Phase-in Emission Threshold						
	P1400	P1400	P0300, P1400	P1400	NA	NA	NA	NA	NA	NA
VVT System	(e)(13.2.1) Target Error Emission Threshold	(e)(13.2.3) Target Error Functional Monitor in Lieu of Emission Threshold	(e)(13.2.2) Slow Response Emission Threshold	(e)(13.2.3) Slow Response Functional Monitor in Lieu of Emission Threshold						
	P0011, P0014	P0011, P0014	P0011, P0014	P0011, P0014	NA	NA	NA	NA	NA	NA
Direct Ozone Reduction (DOR) System	(e)(14.2.1) Functional Monitor for <50% Std Credit	(e)(14.2.2) Emission Threshold Monitor for >50% Std Credit								
	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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**OBD II Gasoline Monitoring Requirements Checklist**

List the DTC of comprehensive component monitor that detects the following failure mode:

Monitor/System	Input Out-of-Range High	Input Out-of-Range Low	Input Open Circuit	Input Rationality Low	Input Rationality High	Input Other Rationality	Output Functional	Output Shorted High	Output Shorted Low	Output Open Circuit
A/C Clutch Relay Control	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
A/C High Side	P0533	P0532	P0532	P0531	P0531	NA	NA	NA	NA	NA
AIR Pressure Sensor Bank 1	P2433	P2432	P2432	P2431	P2431	P2430	NA	NA	NA	NA
AIR Pressure Sensor Bank 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AIR Pump Command Bank 1	NA	NA	NA	NA	NA	NA	NA	P0418	P0418	P0418
AIR Pump Solenoid Relay	NA	NA	NA	NA	NA	NA	NA	P0412	P0412	P0412
Barometric Pressure	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Brake Booster Pressure	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CAM Phase Control Bank 1 Exhaust	NA	NA	NA	NA	NA	NA	P0014	P2091	P2090	P2091
CAM Phase Control Bank 1 Intake	NA	NA	NA	NA	NA	NA	P0011	P2089	P2088	P2089
CAM Phase Control Bank 2 Exhaust	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CAM Phase Control Bank 2 Intake	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cam Position Bank1 Exhaust	P0365	P0365	P0365	P0366	P0366	P0017	NA	NA	NA	NA
Cam Position Bank1 Intake	P0340	P0340	P0340	P0341	P0341	P0016	NA	NA	NA	NA
Cam Position Bank2 Exhaust	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cam Position Bank2 Intake	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Camshaft Position Output Signal	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Canister Vent Solenoid	NA	NA	NA	NA	NA	NA	P2422	P0499	P0498	P0449
Clutch Pedal Position	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Control Canister Purge Solenoid	NA	NA	NA	NA	NA	NA	P0497	P0459	P0458	P0443
Crank Position	P0335	P0335	P0335	P0336	P0336	NA	NA	NA	NA	NA
Crankshaft Position Output Signal	NA	NA	NA	NA	NA	NA	NA	P2619	P2618	NA
Cylinder Deactivate A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cylinder Deactivate B	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cylinder Deactivate C	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cylinder Deactivate D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EGR Valve Position	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ELCP Pressure Sensor	P145A	P1459	P1459	NA	NA	P1458	NA	NA	NA	NA
ELCP Switching Valve	NA	NA	NA	NA	NA	NA	P2450	P2420	P2419	P2418
ELCP Vacuum Pump	NA	NA	NA	NA	NA	NA	P145C, P145D	P2402	P2401	P2400
Engine Metal Over Temperature Active	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ETC Motor Close	NA	NA	NA	NA	NA	NA	P2101, P1516, P2176	NA	NA	NA
ETC Motor Open	NA	NA	NA	NA	NA	NA	P2101, P1516, P2176	NA	NA	NA
Fan Control #1	NA	NA	NA	NA	NA	NA	NA	P1487	P1486	P1485
Fan Control #2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fan Control #3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Feul Economy Mode Switch Circuit	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel Composition	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA



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Fuel Injector A	NA	NA	NA	NA	NA	NA	NA	P0262	P0261	P0201
Fuel Injector B	NA	NA	NA	NA	NA	NA	NA	P0265	P0264	P0202
Fuel Injector C	NA	NA	NA	NA	NA	NA	NA	P0268	P0267	P0203
Fuel Injector D	NA	NA	NA	NA	NA	NA	NA	P0271	P0270	P0204
Fuel Injector E	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel Injector F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel Injector G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel Injector H	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel Level	P0463	P0462	P0463	NA	NA	P0461	NA	NA	NA	NA
Fuel Level 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel Pump 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel pump Control	NA	NA	NA	NA	NA	NA	NA	NA	P0628	NA
Fuel Tank Vapor Pressure	P0453	P0452	P0452	NA	NA	P0451	NA	NA	NA	NA
Humidity	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ignition Off Timer	NA	NA	NA	NA	NA	P2610	NA	NA	NA	NA
IMTV Position	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Intake Air Temperature	P0113	P0112	P0113	P0111	P0111	P0114	NA	NA	NA	NA
Intake Air Temperature 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Intake Air Temperature 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Intake Manifold Runner Control	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Intake Manifold Tuning Valve Control	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Malfunction Indicator Lamp	NA	NA	NA	NA	NA	NA	NA	NA	P263A	P0650
Manifold Absolute Pressure	P0108	P0107	P0107	P0106	P0106	P1101	NA	NA	NA	NA
Mass Air Flow	P0103	P0102	P0102	P0101	P0101	P1101	NA	NA	NA	NA
Mass Air Flow 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mass Air Flow Supply Voltage Control	NA	NA	NA	NA	NA	NA	NA	P121C	P121B	NA
Outside Air Temperature	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pedal Position 1	P2123	P2122	P2122	P2138	P2138	NA	NA	NA	NA	NA
Pedal Position 2	P2128	P2127	P2127	P2138	P2138	NA	NA	NA	NA	NA
Powertrain Relay Control	NA	NA	NA	NA	NA	NA	NA	NA	NA	P0685
Powertrain Relay Feedback	NA	NA	NA	NA	P0690	NA	NA	NA	NA	NA
Reverse Inhibit	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SENT Communication A Circuit (Throttle)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SIDI High Pressure Pump	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SIDI High Pressure Sensor	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SIDI High Pressure Start	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SIDI Injector Driver Circuit	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Skip Shift Solenoid	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Starter Relay Control	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Supercharger Inlet Pressure	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
System Voltage	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Throttle Position 1	P0123	P0122	P0122	P2135	P2135	P0121, P2119	NA	NA	NA	NA
Throttle Position 2	P0223	P0222	P0223	P2135	P2135	P0121, P2119	NA	NA	NA	NA
Transmission Mode Switch A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Transmission Mode Switch B	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Transmission Mode Switch Signal Circuit	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Turbocharger Boost Pressure	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
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