Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft Actuator Solenoid Circuit – Bank 1	P0010	Detects a VVT system error by monitoring the 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.		System supply voltage is within limitsOutput driver is commanded on, Ignition switch is in crank or run position	> 11 Volts	20 failures out of 25 samples250 ms / sample, continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Camshaft System Performance – Bank 1	P0011	Detects a VVT system error by comparing the desired and actual cam positions when VVT is activated	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive	(Intake cam Bank 1) Cam Position Error > 8.00 deg. (CamPosErrorLimIc1)	DTC's are NOT active: P0010, IntakeCamSensorTFTKO CrankSensorTFTKO CrankIntakeCamCorrelationFA. Engine is running VVT is enabled Desired camshaft position > 0 Power Take Off (PTO) not active	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 < 8.00 (CamPosErrorLimIc1) or have both > 18.00 deg. (MaxTravelInt - CamPosErrorLimIc1). Desired cam position cannot vary more than 7.50 Cam Deg for at least 3.35 sec. (KtPHSD_t_StablePositionTimeIc1)	100.00 failures out of 1,000.00 samples100 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP)- Camshaft Position (CMP) Correlation Bank 1 Sensor A	P0016	Detects cam to crank misalignment by monitoring if cam sensor pulse for bank 1 sensor A occurs during the incorrect crank position	2 cam sensor pulses more than -11.0 crank degrees before or 11.0 crank degrees after nominal position in one cam revolution.		Crankshaft and camshaft position signals are synchronized Engine is Spinning Cam phaser is in "parked" position No Active DTCs: Time since last execution of diagnostic	 P0335, P0336 P0340,P0341 5VoltReferenceA_FA 5VoltReferenceB_FA < 1.0 seconds	2 failures out of 3 tests. A failed test is 4 failures out of 5 samples. There is a delay after the first failed test to allow the camshaft position to return to the park position. This time is defined by the table "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	This DTC checks the Heater Output Driver circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit) or voltage high during driver closed state (indicates short to voltage).		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	This DTC checks the Heater Output Driver circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit) or voltage high during driver closed state (indicates short to voltage).		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 2 Sensor 1	P0050	This DTC checks the Heater Output Driver circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit) or voltage high during driver closed state (indicates short to voltage).		Ignition Voltage Engine Speed	= Crank or Run > 11.0 volts > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
HO2S Heater Resistance Bank 1 Sensor 1	P0053	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Heater Resistance outside of the expected range of	2.8 < Ω < 9.5	No Active DTC's Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P2610 IAT_SensorFA < 8.0 ºC > 28,800 seconds -30.0 < ºC < 45.0 < 32.0 volts < 3.00 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	2.8 < Ω < 9.5	No Active DTC's Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P2610 IAT_SensorFA < 8.0 ºC > 28,800 seconds -30.0 < ºC < 45.0 < 32.0 volts < 3.05 seconds	Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Control Circuit Bank 2 Sensor 2	P0056	This DTC checks the Heater Output Driver circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit) or voltage high during driver closed state (indicates short to voltage).		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 2 Sensor 1	P0059	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Heater Resistance outside of the expected range of	3.8 < Ω < 10.4	No Active DTC's Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P2610 IAT_SensorFA < 8.0 ºC > 28,800 seconds -30.0 < ºC < 45.0 < 32.0 volts < 3.00 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 2 Sensor 2	P0060	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Heater Resistance outside of the expected range of	3.8 < Ω < 10.4	No Active DTC's Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run time	ECT_Sensor_FA P2610 IAT_SensorFA < 8.0 ºC > 28,800 seconds -30.0 < ºC < 45.0 < 32.0 volts < 3.05 seconds	Once per valid cold start	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Radiator Coolant Temp Sensor Circuit High Voltage	P00B4	Circuit Continuity This DTC detects a short to high or open in the RCT signal circuit or the RCT sensor.	RCT Resistance (@ -60ºC)	> 419,000 Ohms	Engine run time OR IAT min	> 10.0 seconds ≥ -7.0 °C	5 failures out of 25 samples 1 sec/ sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Radiator Coolant Temp - Engine Coolant Temp (ECT) Correlation	P00B6	This DTC detects a difference between ECT and RCT after a soak condition.	A failure will be reported if any of the following occur: 1) Absolute difference between ECT at power up & RCT at power up is ≥ an IAT based threshold table lookup value(fast fail). 2) Absolute difference between ECT at power up & RCT at power up is > by 19.3 ºC and a block heater has not been detected. 3) ECT at power up > IAT at power up by 19.3 ºC and the time spent cranking the engine without starting is greater than 10.0 seconds with the LowFuelConditionDiag	See "P00B6: Fail if power up ECT exceeds RCT by these values" in the Supporting tables section = False	No Active DTC's Engine Off Soak Time Propulsion Off Soak Time Non-volatile memory initization Test complete this trip Test aborted this trip IAT LowFuelCondition Diag ========== Block Heater detection is enabled when either of the following occurs: 1) ECT at power up > IAT at power up by 2) Cranking time ========== Block Heater is detected and diagnostic is aborted when 1) or 2) occurs. 1a) Vehicle drive time 1b) Vehicle speed 1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is	VehicleSpeedSensor_FA IAT_SensorCircuitFA THMR_RCT_Sensor_Ckt _FA THMR_ECT_Sensor_Ckt _FA IgnitionOffTimeValid TimeSinceEngineRunning Valid > 28,800 seconds > 0 seconds = Not occurred = False = False ≥ -7 ºC = False ========== > 19.3 ºC < 10.0 Seconds ========== > 400 Seconds with > 14.9 MPH and 0.50 times the seconds with vehicle speed below	1 failure 500 msec/ sample Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					below 1b as follows: 1d) IAT drops from power up IAT 2a) ECT drops from power up ECT 2b) Engine run time ========== Diagnostic is aborted when 3) or 4) occurs: 3) Engine run time with vehicle speed below 1b 4) Minimum IAT during test	1b ≥ 3.3 ºC > 1 ºC Within > 30 Seconds ========== > 1800 Seconds ≤ -7.0 ºC		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow System Performance (naturally aspirated)	P0101	Determines if the MAF sensor is stuck within the normal operating range	Filtered Throttle Model Error AND ABS(Measured Flow – Modeled Air Flow) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered	<= 300 kPa*(g/s) > 20 grams/sec > 20.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) No Active DTCs: No Pending DTCs:	>= 465 RPM <= 4,600 RPM >= -7 Deg C <= 125 Deg C >= -20 Deg C <= 100 Deg C >= 0.00 Filtered Throttle Model Error multiplied by TPS Residual Weight Factor based on RPM Modeled Air Flow Error multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor based on MAF Est MAP Model 2 Error multiplied by MAP2 Residual Weight Factor based on RPM See "Residual Weight Factor" tables. MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow Sensor Circuit Low Frequency	P0102	Detects a continuous short to low or a open in either the signal circuit or the MAF sensor	MAF Output	<= 1,950 Hertz (~ 2.60 gm/sec)	Engine Run Time Engine Speed Ignition Voltage Above criteria present for a period of time	> 1.0 seconds >= 300 RPM >= 8.0 Volts >= 1.0 seconds	400 failures out of 500 samples 1 sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Mass Air Flow Sensor Circuit High Frequency	P0103	Detects a high frequency output from the MAF sensor	MAF Output	>= 13,200 Hertz (~ 1047.0 gm/sec)	Engine Run Time Engine Speed Ignition Voltage Above criteria present for a period of time	> 1.0 seconds >= 300 RPM >= 8.0 Volts >= 1.0 seconds	400 failures out of 500 samples 1 sample every cylinder firing event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Manifold Absolute Pressure Sensor Performance (naturally aspirated)	P0106	Determines if the MAP sensor is stuck within the normal operating range	Filtered Throttle Model Error AND ABS(Measured MAP – MAP Model 1) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered	<= 300 kPa*(g/s) > 20.0 kPa > 20.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) No Active DTCs: No Pending DTCs:	>= 465 RPM <= 4,600 RPM >= -7 Deg C <= 125 Deg C >= -20 Deg C <= 100 Deg C >= 0.00 Filtered Throttle Model Error multiplied by TPS Residual Weight Factor based on RPM MAP Model 1 Error multiplied by MAP1 Residual Weight Factor based on RPM MAP Model 2 Error multiplied by MAP2 Residual Weight Factor based on RPM See "Residual Weight Factor" tables. MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP	Continuous Calculations are performed every 12.5 msec	Type B, 2 Trips
			Manifold Pressure OR	< 50.0 kPa	Time between current ignition cycle and the last		4 failures out of 5 samples	

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

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

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

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	< 48 Ohms (~150 deg C)	Engine Run Time	> 0.00 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Circuit High	P0113	Detects a continuous open circuit in the IAT signal circuit or the IAT sensor	Raw IAT Input	> 404,973 Ohms (~-60 deg C)	Engine Run Time	> 0.00 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Intake Air Temperature Sensor Intermittent In-Range	P0114	Detects a noisy or erratic IAT signal circuit or IAT sensor	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current IAT reading - IAT reading from 100 milliseconds previous)	> 125.00 DegC 25 consecutive IAT samples	Continuous		3 failures out of 4 samples Each sample takes 2.5 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature (ECT) Sensor Performance	P0116	This DTC detects ECT temp sensor stuck in mid range.	A failure will be reported if any of the following (1-3) occur after the following soak conditions, Engine off time > 28,800 seconds Propulsion system off time > 0 seconds 1) ECT at power up > IAT at power up by an IAT based table lookup value (fast fail). 2) ECT at power up > IAT at power up by 19.3 Deg C and a block heater has not been detected. 3) ECT at power up > IAT at power up by 19.3 Deg C and the time spent cranking the engine without starting is greater than 10.0 seconds with the LowFuelConditionDiag	See "P0116: Fail if power up ECT exceeds IAT by these values" in the Supporting tables section = False	No Active DTC's Non-volatile memory initization Test complete this trip Test aborted this trip IAT LowFuelCondition Diag ========== Block Heater detection is enabled when either of the following occurs: 1) ECT at power up > IAT at power up by 2) Cranking time ========== Block Heater is detected and diagnostic is aborted when 1) or 2) occurs: 1a) Vehicle drive time 1b) Vehicle speed 1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is below 1b as follows: 1d) IAT drops from power	VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA IgnitionOffTime Valid TimeSinceEngineRunning Valid = Not occurred = False = False ≥ -7 ºC = False ========== > 19.3 ºC < 10.0 seconds ========== > 400 seconds > 14.9 MPH 0.00 times the seconds with vehicle speed below 1b	1 failure 500 msec/ sample Once per valid cold start	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					up IAT 2a) ECT drops from power up ECT 2b) Engine run time ========== Diagnostic is aborted when 3) or 4) occurs: 3) Engine run time with vehicle speed below 1b 4) Minimum IAT during test	≥ 3.3 ºC ≥ 1 ºC Within ≤ 30 seconds ========== > 1800 seconds ≤ -7 ºC		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temp Sensor Circuit Low	P0117	Circuit Continuity This DTC detects a short to ground in the ECT signal circuit or the ECT sensor.	ECT Resistance (@ 150ºC)	< 45 Ohms			5 failures out of 6 samples 1 sec/ sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temp Sensor Circuit High	P0118	Circuit Continuity This DTC detects a short to high or open in the ECT signal circuit or the ECT sensor.	ECT Resistance (@ -60ºC)	> 419,000 Ohms	Engine run time OR IAT min	> 10.0 seconds ≥ -7.0 °C	5 failures out of 6 samples 1 sec/ sample Continuous	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature (ECT) Sensor Circuit Intermittent	P0119	Circuit Continuity This DTC detects large step changes in the ECT signal circuit or the ECT sensor. Allowable high and low limits are calculated for the next sample based on the previous sample.	ECT temperature step change: 1) postive step change is greater than high limit OR 2) negitive step change is lower than low limit.		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	> 300 kPa*(g/s) > 20 grams/sec <= 20.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) No Active DTCs: No Pending DTCs:	>= 465 RPM <= 4,600 RPM > -7 Deg C < 125 Deg C > -20 Deg C < 100 Deg C >= 0.00 Filtered Throttle Model Error multiplied by TPS Residual Weight Factor based on RPM Modeled Air Flow Error multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor based on MAF Est See "Residual Weight Factor" tables. MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA IAT_SensorFA EGRValve_FP ECT_Sensor_Ckt_FP IAT_SensorCircuitFP	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Coolant Temperature Below Stat Regulating Temperature	P0128	This DTC detects if the engine coolant temperature rises too slowly due to an ECT or Cooling system fault	Engine run time is accumulated when airflow is ≥ 17 grams per sec during Range #1 or #2: ========== Range #1 (Primary) ECT reaches Commanded temperature minus 11 °C when IAT min is < 55 °C and ≥ 10 °C. ========== Range #2 (Alternate) ECT reaches Commanded temperature minus 31 °C when IATmin is < 10 °C and ≥ -7 °C. ==========	See “P0128: Maximum Accumulated Time for IAT and Start-up ECT conditions“ in the Supporting tables section	No Active DTC's Engine not run time Engine run time Fuel Condition == Range #1 == (Primary) Test ECT at start run Average AirflowT-Stat Heater duty commanded cycle ========== == Range #2 == (Alternate) Test ECT at start run Average AirflowT-Stat Heater duty commanded cycle ==========	MAF_SensorFA IAT_SensorFA THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA ≥ 1,800 seconds 10 ≤ Eng Run Tme ≤ 1,370 seconds Ethanol ≤ 87 % ========== -7 ≤ ECT ≤ 70 °C ≥ 17.0 gps ≤ 0 % ========== -7 ≤ ECT ≤ 60 °C ≥ 17.0 gps ≤ 0 % ==========	1 failure to set DTC 1 sec/ sample Once per ignition key cycle	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Low Voltage Bank 1 Sensor 1	P0131	This DTC determines if the O2 sensor circuit is shorted to low.	Oxygen Sensor Signal	< 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 Low Fuel Condition Diag Equivalence Ratio Air Per Cylinder Fuel Control State Closed Loop Active All Fuel Injectors for active Cylinders Fuel Condition Fuel State All of the above met for	TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA = Not active = Not active = Not active = Not active 10.0 < Volts < 32.0 = Not active = Not active = Not active = Not active = False 0.9922 < ratio < 1.0137 50 < mgram < 700 = Closed Loop = TRUE Enabled (On) Ethanol ≤ 87 % DFCO not active > 2.0 seconds	380 failures out of 475 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit High Voltage Bank 1 Sensor 1	P0132	This DTC determines if the O2 sensor circuit is shorted to high.	Oxygen Sensor Signal	> 1,050 mvolts	== Open Test Criteria == No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Fuel Condition ========== No Active DTC's Low Fuel Condition Diag Fuel Condition Initial delay after Open Test Criteria met (cold start condition) Initial delay after Open Test Criteria met (not cold start condition) Equivalence Ratio Air Per Cylinder Fuel Control State	========== TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA 10.0 < Volts < 32.0 = All Cylinders active = Complete > 5 seconds > 225 seconds ≤ 87 % Ethanol ========== MAP_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA = False ≤ 87 % Ethanol > 40.0 seconds when engine soak time > 28,800 seconds > 40.0 seconds when engine soak time ≤ 28,800 seconds 0.9922 ≤ ratio ≤ 1.0137 50 ≤ mgram ≤ 700 not = Power Enrichment	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Slow Response Bank 1 Sensor 1	P0133	This DTC determines if the O2 sensor response time is degraded.	The average response time is caluclated over the test time, and compared to the threshold. Refer to P0133 - O2S Slow Response Bank 1 Sensor 1 "Pass/Fail Threshold table" 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 Low Fuel Condition Diag Green O2S Condition O2 Heater on for Learned Htr resistance	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131, P0132, P0134 10.0 < Volts < 32.0 = Not active = Not active = Not active = Not active = False = Not Valid, See definition of Green Sensor Delay Criteria (B1S1) in Supporting Tables tab. ≥ 40 seconds = Valid (the heater resistance has learned since NVM reset, see	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.
						enable conditions for "HO2S Heater Resistance DTC's")		
					Engine Coolant	> 50 ºC		
					IAT	> -40 ºC		
					Engine run Accum	> 120 seconds		
					Time since any AFM status change	> 0.0 seconds		
					Time since Purge On to Off change	> 0.0 seconds		
					Time since Purge Off to On change	> 0.0 seconds		
					Engine airflow	20 ≤ grams/second ≤ 55		
					Engine speed	1,200 <= RPM <= 3,000		
					Fuel Condition	< 87 % Ethanol		
					Baro	> 70 kpa		
					Air Per Cylinder	≥ 200 mGrams		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					LTM fuel cell	= Enabled		
					Transient Fuel Mass	≤ 100.0 mgrams		
					Baro	= Not Defaulted		
					Fuel Control State	not = Power Enrichment		
					Fuel State	DFCO not active		
					Commanded Proportional Gain	≥ 0.0 %		
					==========	==========		
					All of the above met for	> 3.5 seconds		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Insufficient Activity Bank 1 Sensor 1	P0134	This DTC determines if the O2 sensor circuit is open.	Oxygen Sensor Signal	> 1,700 mvolts	No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Fuel Condition	TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA 10.0 < Volts < 32.0 = All Cylinders active = Complete > 5 seconds > 225 seconds ≤ 87 % Ethanol	200 failures out of 250 samples. Frequency: Continuous 100 msec loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Performance Bank 1 Sensor 1	P0135	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	Heater Current outside of the expected range of	0.3 < Amps < 3.1	No Active DTC's System Voltage Heater Warm-up delay O2S Heater device control B1S1 O2S Heater Duty Cycle All of the above met for	ECT_Sensor_FA 10.0 < Volts < 32.0 = Complete = Not active > zero > 120 seconds	8 failures out of 10 samples Frequency: 1 tests per trip 5 seconds delay between tests and 1 second execution rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Low Voltage Bank 1 Sensor 2	P0137	This DTC determines if the O2 sensor circuit is shorted to low.	Oxygen Sensor Signal	< 50 mvolts	No Active DTC's AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Diag Equivalence Ratio Air Per Cylinder Fuel Control State Closed Loop Active All Fuel Injectors for active Cylinders Fuel Condition Fuel State All of the above met for	TPS_ThrottleAuthority DefaultedMAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA = Not active = Not active = Not active = Not active 10.0 < Volts < 32.0 = Not active = Not active = Not active = Not active = False 0.9922 ≤ ratio ≤ 1.0137 50 ≤ mgrams ≤ 700 = Closed Loop = TRUE Enabled (On) Ethanol <= 87 %DFCO not active > 2.0 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 Low Fuel Condition Diag Fuel Condition Initial delay after Open Test Criteria met (cold start condition) Initial delay after Open Test Criteria met (not cold start condition) Equivalence Ratio Air Per Cylinder Fuel Control State	========== TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA 10.0 < Volts < 32.0 = All Cylinders active = Complete > 5 seconds ≤ 87 %Ethanol ========== MAP_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA = False ≤ 87 % Ethanol > 85.0 seconds when engine soak time > 28,800 seconds > 85.0 seconds when engine soak time ≤ 28,800 seconds 0.9922 ≤ ratio ≤ 1.0137 50 ≤ mgrams ≤ 700 not = Power Enrichment	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Slow Response Rich to Lean Bank 1 Sensor 2	P013A	This DTC determines if the post catalyst O2 sensor has Slow Response in a predefined Rich to Lean voltages range during Rich to Lean transition. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	The EWMA of the Post O2 sensor normalized integral value OR The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 8.3 units > 75.0 grams (upper voltage threshold is 500 mvolts and lower voltage threshold is 200 mvolts)	No Active DTC's 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 ========== After above conditions are met: DFCO mode is	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013B, P013E, P013F, P2270 or P2271 10.0 < Volts < 32.0 = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = Not Valid, See definition of Green Sensor Delay Criteria (B1S2) in Supporting Tables tab. = False = enabled P2270 (and P2272 if applicable) P013E (and P014A if applicable) ==========	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type A, 1 Trips EWMA

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Slow Response Lean to Rich Bank 1 Sensor 2	P013B	This DTC determines if the post catalyst O2 sensor has Slow Response in a predefined Lean to Rich voltages range during Lean to Rich transition. The diagnostic is an intrusive test which increases the delivered A/F ratio to achieve the required rich threshold.	The EWMA of the Post O2 sensor normalized integral value OR The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 8.3 units > 150 grams (lower voltage threshold is 350 mvolts and upper voltage threshold is 650 mvolts)	No Active DTC's B1S2 DTC's Not Active this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition 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, P013E, P013F, P2270 or P2271 10.0 < Volts < 32.0 = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = Not Valid, See definition of Green Sensor Delay Criteria (B1S2) in Supporting Tables tab. = False = enabled P2270 (and P2272 if applicable) P013E (and P014A if applicable) P013A (and P013C if applicable) P2271 (and P2273 if applicable) P013F (and P014B if	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					========== After above conditions are met: Fuel Enrich mode continued. ========== During this test the following must stay TRUE or the test will abort: 0.95 ≤ Fuel EQR ≤ 1.10	applicable) ==========		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Slow Response Rich to Lean Bank 2 Sensor 2	P013C	This DTC determines if the post catalyst O2 sensor has Slow Response in a predefined Rich to Lean voltages range during Rich to Lean transition. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	The EWMA of the Post O2 sensor normalized integral value OR The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 8.3 units > 75.0 grams (upper voltage threshold is 500 mvolts and lower voltage threshold is 200 mvolts)	No Active DTC's B2S2 DTC's Not Active this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Post fuel cell DTC's Passed ========== After above conditions are met:	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013D, P014A, P014B, P2272 or P2273 10.0 < Volts < 32.0 = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = Not Valid, See definition of Green Sensor Delay Criteria (B2S2) in Supporting Tables tab. = False = enabled P2270 (and P2272 if applicable) P013E (and P014A if applicable) ==========	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					DFCO mode is continued (wo driver initiated pedal input).			

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Slow Response Lean to Rich Bank 2 Sensor 2	P013D	This DTC determines if the post catalyst O2 sensor has Slow Response in a predefined Lean to Rich voltages range during Lean to Rich transition. The diagnostic is an intrusive test which increases the delivered A/F ratio to achieve the required rich threshold.	The EWMA of the Post O2 sensor normalized integral value OR The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 8.3 units > 150 grams (lower voltage threshold is 350 mvolts and upper voltage threshold is 650 mvolts)	No Active DTC's B2S2 DTC's Not Active this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition 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 P013C, P014A, P014B, P2272 or P2273 10.0 < Volts < 32.0 = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = Not Valid, See definition of Green Sensor Delay Criteria (B2S2) in Supporting Tables tab. = False = enabled P2270 (and P2272 if applicable) P013E (and P014A if applicable) P013A (and P013C if applicable) P2271 (and P2273 if applicable)	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type A, 1 Trips EWMA

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					========== After above conditions are met: Fuel Enrich mode continued. ========== During this test the following must stay TRUE or the test will abort: 0.95 ≤ Fuel EQR ≤ 1.10	P013F (and P014B if applicable) ========== 		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Delayed Response Rich to Lean Bank 1 Sensor 2	P013E	This DTC determines if the post catalyst O2 sensor has an initial delayed response to an A/F change from Rich to Lean. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	Post O2 sensor voltage AND The Accumulated mass air flow monitored during the Delayed Response Test under DFCO DFCO begins after: 1) Catalyst has been rich for a minimum of AND 2) Catalyst Rich Accumulation Air Flow is greater or equal to	> 500 mvolts > 80 grams > 0 secs > 10 grams	No Active DTC's B1S2 DTC's Not Active this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Post fuel cell DTC's Passed Number of fueled cylinders ========== After above conditions are met: DFCO mode entered	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 Green Sensor Delay Criteria (B1S2) in Supporting Tables tab. = False = enabled P2270 (and P2272 if applicable) ≤ 6 cylinders ==========	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Delayed Response Lean to Rich Bank 1 Sensor 2	P013F	This DTC determines if the post catalyst O2 sensor has an initial delayed response to an A/F change from Lean to Rich. The diagnostic is an intrusive test which increases the delivered A/F ratio to achieve the required rich threshold.	Post O2 sensor voltage AND The Accumulated mass air flow monitored during the Delayed Response Test	< 350 mvolts > 1,185 grams	No Active DTC's B1S2 DTC's Not Active this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Post fuel cell DTC's Passed Number of fueled cylinders	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013B, P013E, P2270 or P2271 10.0 < Volts < 32.0 = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = Not Valid, See definition of Green Sensor Delay Criteria (B1S2) in Supporting Tables tab. = False = enabledP2270 (and P2272 if applicable) P013E (and P014A if applicable) P013A (and P013C if applicable) P2271 (and P2273 if applicable) ≥ 2 cylinders	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					========== After above conditions are met: Fuel Enrich mode entered. ========== During this test the following must stay TRUE or the test will abort: 0.95 ≤ Fuel EQR ≤ 1.10	==========		

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

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 > 3.1	No Active DTC's System Voltage Heater Warm-up delay O2S Heater device control B1S1 O2S Heater Duty Cycle All of the above met for	ECT_Sensor_FA 10.0 < Volts < 32.0 = Complete = Not active > zero > 120 seconds	8 failures out of 10 samples Frequency: 1 tests per trip 5 seconds delay between tests and 1 second execution rate.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Delayed Response Rich to Lean Bank 2 Sensor 2	P014A	This DTC determines if the post catalyst O2 sensor has an initial delayed response to an A/F change from Rich to Lean. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	Post O2 sensor voltage AND The Accumulated mass air flow monitored during the Delayed Response Test under DFCO DFCO begins after: 1) Catalyst has been rich for a minimum of AND 2) Catalyst Rich Accumulation Air Flow is greater or equal to	> 500 mvolts > 80 grams > 0 secs > 10 grams	No Active DTC's B2S2 DTC's Not Active this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Post fuel cell DTC's Passed Number of fueled cylinders ========== After above conditions are met: DFCO mode entered	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013C, P013D, P014B, P2272 or P2273 10.0 < Volts < 32.0 = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = Not Valid, See definition of Green Sensor Delay Criteria (B2S2) in Supporting Tables tab. = False = enabled P2270 (and P2272 if applicable) ≤ 6 cylinders ==========	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Delayed Response Lean to Rich Bank 2 Sensor 2	P014B	This DTC determines if the post catalyst O2 sensor has an initial delayed response to an A/F change from Lean to Rich. The diagnostic is an intrusive test which increases the delivered A/F ratio to achieve the required rich threshold.	Post O2 sensor AND The Accumulated mass air flow monitored during the Delayed Response Test	< 350 mvolts > 1,185 grams.	No Active DTC's B2S2 DTC's Not Active this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Post fuel cell DTC's Passed Number of fueled	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FAFuelInjectorCircuit_FAFuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013C, P013D, P014A, P2272 or P2273 10.0 < Volts < 32.0 = Valid (the heater resistance has learned since NVM reset, see enable conditions for "HO2S Heater Resistance DTC's") = Not Valid = Not Valid, See definition of Green Sensor Delay Criteria (B2S2) in Supporting Tables tab. = False = enabled P2270 (and P2272 if applicable) P013E (and P014A if applicable) P013A (and P013C if applicable) P2271 (and P2273 if applicable)	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					cylinders ========== After above conditions are met: Fuel Enrich mode entered. ========== During this test the following must stay TRUE or the test will abort: 0.95 ≤ Fuel EQR ≤ 1.10	≥ 2 cylinders ==========		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Low Voltage Bank 2 Sensor 1	P0151	This DTC determines if the O2 sensor circuit is shorted to low.	Oxygen Sensor Signal	< 50 mvolts	No Active DTC's AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Diag Equivalence Ratio Air Per Cylinder Fuel Control State Closed Loop Active All Fuel Injectors for active Cylinders Fuel Condition Fuel State All of the above met for	TPS_ThrottleAuthority DefaultedMAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA = Not active = Not active = Not active = Not active 10.0 < Volts < 32.0 = Not active = Not active = Not active = Not active = False 0.9922 ≤ equiv. ratio ≤ 1.0137 50 ≤ APC ≤ 700 mgrams = Closed Loop = TRUE Enabled (On) ≤ 87 % Ethanol DFCO not active > 2.0 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 2 Sensor 1	P0152	This DTC determines if the O2 sensor circuit is shorted to high.	Oxygen Sensor Signal	> 1,050 mvolts	== Open Test Criteria == No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Fuel Condition ========== No Active DTC's Low Fuel Condition Diag Fuel Condition Initial delay after Open Test Criteria met (cold start condition) Initial delay after Open Test Criteria met (not cold start condition) Equivalence Ratio Air Per Cylinder	========== TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA 10.0 < Volts < 32.0 = All Cylinders active = Complete > 5 seconds > 225 seconds <= 87 % Ethanol ========== MAP_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA = False ≤ 87 % Ethanol > 85.0 seconds when engine soak time > 28,800 seconds > 85.0 seconds when engine soak time ≤ 28,800 seconds 0.9922 ≤ ratio ≤ 1.0137 50 ≤ mgrams ≤ 700	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Slow Response Bank 2 Sensor 1	P0153	This DTC determines if the O2 sensor response time is degraded.	The average response time is caluclated over the test time, and compared to the threshold. Refer to P0153 - O2S Slow Response Bank 2 Sensor 1 "Pass/Fail Threshold table in the Supporting Tables tab.		No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA EthanolCompositionSensor_FA EngineMisfireDetected_FA	Sample time is 60 seconds Frequency: Once per trip	Type B, 2 Trips
					Bank 2 Sensor 1 DTC's not active	= P0151, P0152 or P0154		
					System Voltage	10.0 < Volts < 32.0		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Green O2S Condition	= Not Valid, See definition of Green Sensor Delay Criteria (B2S1) in Supporting Tables tab.		
					O2 Heater on for	≥ 40 seconds		
					Learned Htr resistance	= Valid (the heater resistance has learned since NVM reset, see		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						enable conditions for "HO2S Heater Resistance DTC's")		
					Engine Coolant	> 50 ºC		
					IAT	> -40 ºC		
					Engine run Accum	> 120 seconds		
					Time since any AFM status change	> 0.0 seconds		
					Time since Purge On to Off change	> 0.0 seconds		
					Time since Purge Off to On change	> 0.0 seconds		
					Engine airflow	20 ≤ grams/second ≤ 55		
					Engine speed	1,200 ≤ RPM ≤ 3,000		
					Fuel Condition	< 87 % Ethanol		
					Baro	> 70 kpa		
					Air Per Cylinder	>= 200 mGrams		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					LTM fuel cell	= Enabled		
					Transient Fuel Mass	≤ 100.0 mgrams		
					Baro	= Not Defaulted		
					Fuel Control State	not = Power Enrichment		
					Fuel State	DFCO not active		
					Commanded Proportional Gain	≥ 0.0 %		
					==========	==========		
					All of the above met for	> 3.5 seconds		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Insufficient Activity Bank 2 Sensor 1	P0154	This DTC determines if the O2 sensor circuit is open.	Oxygen Sensor Signal	> 1,700 mvolts	No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Fuel Condition	TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA 10.0 < Volts < 32.0 = All Cylinders active = Complete > 5 seconds > 225 seconds ≤ 87 % Ethanol	200 failures out of 250 samples. Frequency: Continuous 100 msec loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Performance Bank 2 Sensor 1	P0155	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	Heater Current outside of the expected range of	0.3 > amps > 3.1	No Active DTC's System Voltage Heater Warm-up delay O2S Heater device control B1S1 O2S Heater Duty Cycle All of the above met for	ECT_Sensor_FA 10.0 < Volts < 32.0 = Complete = Not active > zero > 120 seconds	8 failures out of 10 samples Frequency: 1 tests per trip 5 seconds delay between tests and 1 second execution rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit Low Voltage Bank 2 Sensor 2	P0157	This DTC determines if the O2 sensor circuit is shorted to low.	Oxygen Sensor Signal	< 50 mvolts	No Active DTC's AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Diag Equivalence Ratio Air Per Cylinder Fuel Control State Closed Loop Active All Fuel Injectors for active Cylinders Fuel Condition Fuel State All of the above met for	TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA = Not active = Not active = Not active = Not active 10.0 < Volts < 32.0 = Not active = Not active = Not active = Not active = False 0.9922 ≤ ratio ≤ 1.0137 50 ≤ mgrams ≤ 700 = Closed Loop = TRUE Enabled (On) ≤ 87 % Ethanol DFCO not active > 2.0 seconds	430 failures out of 540 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Circuit High Voltage Bank 2 Sensor 2	P0158	This DTC determines if the O2 sensor circuit is shorted to high.	Oxygen Sensor Signal	> 1,050 mvolts	== Open Test Criteria == No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Fuel Condition ========== No Active DTC's Low Fuel Condition Diag Fuel Condition Initial delay after Open Test Criteria met (cold start condition) Initial delay after Open Test Criteria met (not cold start condition) Equivalence Ratio Air Per Cylinder Fuel Control State	========== TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA 10.0 < Volts < 32.0 = All Cylinders active = Complete > 5 seconds > 225 seconds ≤ 87 % Ethanol ========== MAP_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA = False ≤ 87 % Ethanol > 85.0 seconds when engine soak time > 28,800 seconds > 85.0 seconds when engine soak time ≤ 28,800 seconds 0.9922 ≤ ratio ≤ 1.0137 50 ≤ mgrams ≤ 700 not = Power Enrichment	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Heater Performance Bank 2 Sensor 2	P0161	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	Heater Current outside of the expected range of	0.3 > amps > 2.9	No Active DTC's System Voltage Heater Warm-up delay O2S Heater device control B1S1 O2S Heater Duty Cycle All of the above met for	ECT_Sensor_FA 10.0 < Volts < 32.0 = Complete = Not active > zero > 120 seconds	8 failures out of 10 samples Frequency: 1 tests per trip 5 seconds delay between tests and 1 second execution rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel System Too Lean Bank 1	P0171	Determines if the fuel control system is in a lean condition, based on the filtered long-term and short-term fuel trim.	The filtered long-term fuel trim metric AND The filtered short-term fuel trim metric (a value < 0.95 effectively nullifies the short-term fuel trim criteria)	>= 1.245 >= 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.	375 <rpm< 7,000 > 70 kPa -40 <°C< 150 10 <kPa< 255 -20 <°C< 150 1.0 <g/s< 510.0 > 10 % or if fuel sender is faulty > 33.0 seconds of data must accumulate on each trip, with at least 23.0 seconds of data in the current fuel trim cell before a pass or fail decision can be made. (Please see "P0171/172/174/175 Long-Term Fuel Trim Cell Usage" in Supporting Tables for a list of cells utilized for diagnosis) Enabled Enabled (Please see "Closed Loop Enable Criteria" and "Long Term FT Enable Criteria" in Supporting Tables.) > 0.1 liters of fuel consumed after a fuel fill event ("Virtual Flex Fuel Sensor applications only) Intrusive Test Not Active	Frequency: 100 ms Continuous Loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Catalyst Diag. Post O2 Diag. Device Control EVAP Diag. No active DTC:	Intrusive Test Not Active Intrusive Test Not Active Not Active “tank pull down” Not Active IAC_SystemRPM_FA MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR System FA EvapExcessPrgePsbl_FA Ethanol Comp Snsr FA FuelInjectorCkt_FA EngMisfireDetected_FA EGRValvePerf_FA EGRValveCkt_FA MAP_EngVacuumStatus AmbPresDfltdStatus TC_BoostPresSnsrFA O2Snsr_B1_Snsr_1_FA		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel System Too Rich Bank 1	P0172	Determines if the fuel control system is in a rich condition, based on the filtered long-term fuel trim metric. There are two methods to determine a Rich fault. They are Passive and Intrusive. A Passive Test decision 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 <= 0.715 , 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 > 0.715 , the test passes without checking the filtered Non-Purge Long Term Fuel Trim metric. Performing intrusive tests too frequently may also affect EVAP and EPAIII emissions, and the execution frequency of other diagnostics.	**Passive Test:** The filtered Non-Purge Long Term Fuel Trim metric AND The filtered Short Term Fuel Trim metric (a value > 1.05 effectively nullifies the short-term fuel trim criteria) **Intrusive Test:** For 3 out of 5 intrusive segments, the filtered Purge Long Term Fuel Trim metric AND The filtered Non-Purge Long Term Fuel Trim metric AND The filtered Short Term Fuel Trim metric (a value > 1.05 effectively nullifies the short-term fuel trim criteria) **Segment Def'n:** Segments can last up to 30 seconds and are separated by the lesser of 20 seconds of purge-on time or enough time to purge 16 grams of vapor.	<= 0.710 <= 2.000 <= 0.715 <= 0.710 <= 2.000		Secondary Parameters and Enable Conditions are identical to those for P0171, with the exception that fuel level is not considered.	Frequency: 100 ms Continuous Loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			A maximum of 5 completed segments or 20 attempts are allowed for each intrusive test. After an intrusive test report is completed, another intrusive test cannot occur for 300 seconds to allow sufficient time to purge excess vapors from the canister. During this period, fuel trim will pass if the filtered Purge-on Long Term fuel trim > 0.715 for at least 200 seconds, indicating that the canister has been purged.					

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel System Too Lean Bank 2	P0174	Determines if the fuel control system is in a lean condition, based on the filtered long-term and short-term fuel trim.	The filtered long-term fuel trim metric AND The filtered short-term fuel trim metric (a value < 0.95 effectively nullifies the short-term fuel trim criteria)	>= 1.245 >= 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.	375 <rpm< 7,000 > 70 kPa -40 <°C< 150 10 <kPa< 255 -20 <°C< 150 1.0 <g/s< 510.0 > 10 % or if fuel sender is faulty > 33.0 seconds of data must accumulate on each trip, with at least 23.0 seconds of data in the current fuel trim cell before a pass or fail decision can be made. (Please see "P0171/172/174/175 Long-Term Fuel Trim Cell Usage" in Supporting Tables for a list of cells utilized for diagnosis) Enabled Enabled (Please see "Closed Loop Enable Criteria" and "Long Term FT Enable Criteria" in Supporting Tables.) > 0.1 liters of fuel consumed after a fuel fill event ("Virtual Flex Fuel Sensor applications only) Intrusive Test Not Active	Frequency: 100 ms Continuous Loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Catalyst Diag. Post O2 Diag. Device Control EVAP Diag. No active DTC:	Intrusive Test Not Active Intrusive Test Not Active Not Active “tank pull down” Not Active IAC_SystemRPM_FA MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR System FA EvapExcessPrgePsbl_FA Ethanol Comp Snsr FA FuelInjectorCkt_FA EngMisfireDetected_FA EGRValvePerf_FA EGRValveCkt_FA MAP_EngVacuumStatus AmbPresDfltdStatus TC_BoostPresSnsrFA O2Snsr_B2_Snsr_1_FA		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel System Too Rich Bank 2	P0175	Determines if the fuel control system is in a rich condition, based on the filtered long-term fuel trim metric. There are two methods to determine a Rich fault. They are Passive and Intrusive. A Passive Test decision 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 <= 0.715 , 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 > 0.715 , the test passes without checking the filtered Non-Purge Long Term Fuel Trim metric. Performing intrusive tests too frequently may also affect EVAP and EPAIII emissions, and the execution frequency of other diagnostics.	**Passive Test:** The filtered Non-Purge Long Term Fuel Trim metric AND The filtered Short Term Fuel Trim metric (a value > 1.05 effectively nullifies the short-term fuel trim criteria) **Intrusive Test:** For 3 out of 5 intrusive segments, the filtered Purge Long Term Fuel Trim metric AND The filtered Non-Purge Long Term Fuel Trim metric AND The filtered Short Term Fuel Trim metric (a value > 1.05 effectively nullifies the short-term fuel trim criteria) **Segment Def'n:** Segments can last up to 30 seconds and are separated by the lesser of 20 seconds of purge-on time or enough time to purge 16 grams of vapor.	<= 0.710 <= 2.000 <= 0.715 <= 0.710 <= 2.000		Secondary Parameters and Enable Conditions are identical to those for P0174, with the exception that fuel level is not considered.	Frequency: 100 ms Continuous Loop	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			A maximum of 5 completed segments or 20 attempts are allowed for each intrusive test. After an intrusive test report is completed, another intrusive test cannot occur for 300 seconds to allow sufficient time to purge excess vapors from the canister. During this period, fuel trim will pass if the filtered Purge-on Long Term fuel trim > 0.715 for at least 200 seconds, indicating that the canister has been purged.					

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Injector 1 (PFI only)	P0201	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	>= 11 Volts >= 5 seconds	8 failures out of 10 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.
Injector 2 (PFI only)	P0202	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	>= 11 Volts >= 5 seconds	8 failures out of 10 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.
Injector 3 (PFI only)	P0203	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	>= 11 Volts >= 5 seconds	8 failures out of 10 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.
Injector 4 (PFI only)	P0204	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	>= 11 Volts >= 5 seconds	8 failures out of 10 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.
Injector 5 (PFI only)	P0205	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	>= 11 Volts >= 5 seconds	8 failures out of 10 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.
Injector 6 (PFI only)	P0206	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	>= 11 Volts >= 5 seconds	8 failures out of 10 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.
Injector 7 (PFI only)	P0207	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	>= 11 Volts >= 5 seconds	8 failures out of 10 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.
Injector 8 (PFI only)	P0208	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	>= 11 Volts >= 5 seconds	8 failures out of 10 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.
TPS2 Circuit Low	P0222	Detects a continuous or intermittent short or open in TPS2 circuit	TPS2 Voltage <	0.250		Run/Crank voltage > 6.41 No 5V reference error or fault for # 4 5V reference circuit (P06A3)	79 / 159 counts; 57 counts continuous; 3.125 ms /count in the ECM main processor	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Random Misfire Detected Cylinder 1 Misfire Detected Cylinder 2 Misfire Detected Cylinder 3 Misfire Detected Cylinder 4 Misfire Detected If cylinders present: Cylinder 5 Misfire Detected Cylinder 6 Misfire Detected Cylinder 7 Misfire Detected Cylinder 8 Misfire Detected	P0300 P0301 P0302 P0303 P0304 P0305 P0306 P0307 P0308	These DTC's will determine if a random or a cylinder specific misfire is occurring by monitoring various terms derived from crankshaft velocity. The rate of misfire over an interval is compared to both emissions and catalyst damaging thresholds. The pattern of crankshaft acceleration after the misfire is checked to differentiate between real misfire and other sources of crank shaft noise.	Deceleration Value vs. Engine Speed and Engine load The equation used to calculate deceleration value is tailored to specific vehicle operating conditions. Tables used are 1st tables encountered that are not max of range. Undetectable region at a given speed/load point is where all tables are max of range point. see Algorithm Description Document for additional details. Misfire Percent Emission Failure Threshold Misfire Percent Catalyst Damage When engine speed and load are less than the FTP cals (3) catalyst damage exceedences are allowed.	[(>Idle_SCD_dt AND > Idle_SCD_ddt) OR (>SCD_dt AND > SCD_ddt) OR (>Idle_Cyl_Mode_dt AND > Idle_Cyl_Mode_ddt) OR (>Cyl Mode dt AND > Cyl Mode ddt) OR (>Rev Mode Table) OR (> AFM Table in Cyl Deactivation mode)] - see details on Supporting Tables Tab (P0300 Section) ≥ 0.81 % P0300 > "Catalyst_Damaging Misfire_Percentage" Table whenever secondary conditions are met. ≤ 0 FTP rpm AND ≤ 0 FTP % load	Engine Run Time Engine Coolant Temp Or If ECT at startup Then ECT System Voltage + Throttle delta - Throttle delta Early Termination option: (used on plug ins that may not have enough engine run time at end of trip for normal interval to complete.) (at low speed/loads, one cylinder may not cause cat damage) Engine Speed Engine Load Misfire counts	> 2 crankshaft revolution -7 ºC < ECT < 130 ºC < -7 ºC 21 ºC < ECT < 130 ºC 9.00 < volts < 32.00 < 85.00 % per 25 ms < 85.00 % per 25 ms Not Enabled > 1,200 rpm AND > 20 % load AND < 180 counts on one cylinder	Emission Exceedence = any (5) failed 200 rev blocks out of (16) 200 rev block tests Failure reported for (1) Exceedence in 1st (16) 200 rev block tests, or (4) Exceedences thereafter. OR when Early Termination Reporting = Enabled and engine rev > 1,000 revs and < 3,200 revs at end of trip any Catalyst Exceedence = (1) 200 rev block as data supports for catalyst damage. Failure reported with (1 or 3) Exceedences in FTP, or (1) Exceedence outside FTP.	Type B, 2 Trips (Mil Flashes with Catalyst Damaging Misfire)

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							Continuous	
					Engine Speed	350 < rpm < ((Engine Over Speed Limit) - 400 Engine speed limit is a function of inputs like Gear and temperature see Engine OverSpeed Limit in supporting tables	4 cycle delay	
				disable conditions:	No active DTCs:	TPS_FA EnginePowerLimited MAF_SensorTFTKO MAP_SensorTFTKO IAT_SensorTFTKO ECT_Sensor_Ckt_TFTKO 5VoltReferenceB_FA CrankSensorTFTKO CrankSensorFA CamLctnIntFA CamLctnExhFA CamSensorAnyLctnTFTKO AnyCamPhaser_FA AnyCamPhaser_TFTKO AmbPresDfltdStatus	4 cycle delay	
					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	4 cycle delay	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						diagnostic running		
					Fuel System Status	≠ Fuel Cut	4 cycle delay	
					Active FuelManagement	Transition in progress	7 cycle delay	
					Undetectable engine speed and engine load region	invalid speed load range in decel index tables	4 cycle delay	
					Abusive Engine Over Speed	> 8,192 rpm	0 cycle delay	
					Below zero torque (except CARB approved 3000 rpm to redline triangle.)	< ZeroTorqueEngineLoad in Supporting Tables	4 cycle delay	
					Below zero torque: TPS Veh Speed	≤ 1 % > 30 mph	4 cycle delay	
					EGR Intrusive test	Active	0 cycle delay	
					Manual Trans	Clutch shift	4 cycle delay	
					Throttle Position AND Automatic transmission shift	> 95.00 %	7 cycle delay	
					Driveline Ring Filter active After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early. Filter Driveline ring: Stop filter early:	> "Ring Filter" # of engine cycles after misfire in Supporting Tables > "Number of Normals" # of engine cycles after		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						misfire in Supporting Tables tab		
					Abnormal engine speed oscillations: (Rough road etc) Off Idle, number of consecutive decelerating cylinders after "misfire": (Number of decels can vary with misfire detection equation)			
					TPS	> 3 %		
					Engine Speed	> 950 rpm		
					Veh Speed	> 3 mph		
					Consecutive decels while in SCD Mode	> Abnormal SCD Mode		
					Cyl Mode	> Abnormal Cyl Mode		
					Rev Mode	> Abnormal Rev Mode in Supporting Tables		
					Misfire Crankshaft Pattern Recognition checks each "misfire" candidate in 100 engine Cycle test to see if it looks like real misfire, or some disturbance like rough road. The check is based on a multiplier times the ddt_jerk value used to detect misfire at that speed and load. At the end of 100 engine cycle test, the ratio of unrecog/recognized is checked to confirm if real misfire is present.			
					Pattern Recog Enabled:	Enabled		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Engine Speed	900 < rpm < 3,000		
					Veh Speed	> 0.6 mph		
					"misfire" unrecognized if:			
					Crankshaft snap after:			
					isolated "misfire"	> "min pattern multiplier"		
					repetative "misfire"	>"max pattern multiplier" in Supporting Tables		
					Ratio of Unrecog/Recog	> 0.60	discard test	
					Rough Road:			
					Non-Crankshaft based:	Enabled		
					Rough Road Source	Wheel Speed processed in ABS		
					IF Rough Road Source = WheelSpeedInECM			
					ABS/TCS		discard test	
					Wheel speed noise	active		
					VSES	> WSSRoughRoadThres active		
					IF Rough Road Source = "FromABS"			
					ABS/TCS		discard test	
					RoughRoad	active		
					VSES	detected active		
					IF Rough Road Source = "TOSS"			
					TOSS dispersion	>TOSSRoughRoadThres	discard test	
					AND No Active DTCs	Transmission Output Shaft Angular Velocity Validity TransmissionEngagedState_FA (Auto Trans only) Clutch Sensor FA	4 cycle delay	

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

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Knock Sensor (KS) Performance Per Cylinder	P0324	This diagnostic checks for knock sensor performance out of the normal expected range on a per cylinder basis due to: 1. Excessive knock or 2. Abnormal engine noise or 3. Flat signal	Common Enable Criteria (Applies to all 3 parts of the performance diag)		Diagnostic Enabled? Engine Run Time Engine Speed Engine Air Flow ECT IAT	Yes ≥ 2.0 seconds ≤ 8,500 RPM ≥ 10 mg/cylinder and ≤ 2,000 mg/cylinder ≥ -40 deg's C ≥ -40 deg's C		Type B, 2 Trips
			Specific Enable Criteria and Thresholds for 3 individual parts of the performance diag:				First Order Lag Filters with Weight Coefficients	
			1. Excessive Knock Diag: Filtered Knock Intensity VaKNKD_k_PerfCylKnock IntFilt (where 'Knock Intensity' = 0 with no knock; and > 0 & proportional to knock magnitude with knock)	> 1.70 (no units)	Engine Speed Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle)	≥ 1,500 RPM ≥ 84 Revs	Weight Coefficient = 0.0480 Updated each engine event	
			2. Abnormal Noise Diag: Filtered FFT Intensity (where 'FFT Intensity' = Non-knocking, background noise)	< Abnormal Noise Threshold (see Supporting Tables)	Engine Speed Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle)	≥ 2,500 RPM ≥ 84 Revs	Weight Coefficient = 0.0480 Updated each engine event	
			3. Flat Signal Diag:	< 0.008 (no units)	Engine Speed	≥ 8,500 RPM		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Filtered Signal Delta (Current FFT Intensity - Ave_Intensity_No-Knock) VaKNKD_k_PerfCylFlatFiltInt		Cumlative Number of Engine Revs Above Min Eng Speed (per keycycle)	≥ 400 Revs	Weight Coefficient = 0.010 Updated each engine event	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Knock Sensor (KS) Circuit Bank 1	P0325	This diagnostic checks for an open in the knock sensor circuit	Filtered FFT Output	> OpenCktThrshMin and < OpenCktThrshMax See Supporting Tables for OpenCktThrshMin & OpenCktThrshMax	Diagnostic Enabled? Engine Run Time Engine Speed Cumlative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above) Engine Air Flow ECT IAT	Yes ≥ 2.0 seconds ≥ 400 RPM and ≤ 8,500 RPM ≥ 100 revs ≥ 10 mg/cylinder and ≤ 2,000 mg/cylinder ≥ -40 deg's C ≥ -40 deg's C	First Order Lag Filter with Weight Coefficient Weight Coefficient = 0.0100 Updated each engine event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Knock Sensor (KS) Performance Bank 1	P0326	This diagnostic checks for knock sensor performance out of the normal expected range, on a per sensor basis, due to 1. Excessive knock or 2. Abnormal engine noise or 3. Flat signal	Common Enable Criteria (Applies to all 3 parts of the performance diag)		Diagnostic Enabled? Engine Run Time Engine Speed Engine Air Flow ECT IAT	Yes ≥ 2.0 seconds ≤ 8,500 RPM ≥ 10 mg/cylinder and ≤ 2,000 mg/cylinder ≥ -40 deg's C ≥ -40 deg's C		Type B, 2 Trips
			Specific Enable Criteriaand Thresholds for 3 individual parts of the performance diag:				First Order LagFilters with WeightCoefficients	
			1. Excessive Knock Diag: Filtered Knock Intensity (where 'Knock Intensity' = 0 with no knock; and > 0 & proportional to knock magnitude with knock)	> 1.50 (no units)	Engine Speed Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle)	≥ 1,500 RPM ≥ 167 Revs	Weight Coefficient = 0.0060 Updated each engine event	
			2. Abnormal Noise Diag: Filtered FFT Intensity: (where 'FFT Intensity' = Non-knocking, background noise)	< Abnormal Noise Threshold (see Supporting Tables)	Engine Speed Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle)	≥ 2,500 RPM ≥ 167 Revs	Weight Coefficient = 0.0060 Updated each engine event	
			3. Flat Signal Diag:	< 0.008 (no units)	Engine SpeedCumlative	≥ 8,500 RPM		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Filtered Signal Delta (Current FFT Intensity - Ave_Intensity_No-Knock)		Number of Engine Revs Above Min Eng Speed (per keycycle)	≥ 100 Revs	WeightCoefficient = 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.
Knock Sensor (KS) Circuit Bank 2	P0330	This diagnostic checks for an open in the knock sensor circuit	Filtered FFT Output	> OpenCktThrshMin and < OpenCktThrshMax See Supporting Tables for OpenCktThrshMin & OpenCktThrshMax	Diagnostic Enabled? Engine Run Time Engine Speed Cumlative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above) Engine Air Flow ECT IAT	Yes ≥ 2.0 seconds ≥ 400 RPM and ≤ 8,500 RPM 100 revs ≥ 10 mg/cylinder and ≤ 2,000 mg/cylinder ≥ -40 deg's C ≥ -40 deg's C	First Order Lag Filter with Weight Coefficient Weight Coefficient = 0.0100 Updated each engine event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Knock Sensor (KS) Performance Bank 2	P0331	This diagnostic checks for knock sensor performance out of the normal expected range, on a per sensor basis, due to 1. Excessive knock or 2. Abnormal engine noise on a per bank basis or 3. Flat signal	Common Enable Criteria (Applies to all 3 parts of the performance diag)		Diagnostic Enabled? Engine Run Time Engine Speed Engine Air Flow ECT IAT	Yes ≥ 2.0 seconds ≤ 8,500 RPM ≥ 10 mg/cylinder and ≤ 2,000 mg/cylinder ≥ -40 deg's C ≥ -40 deg's C		Type B, 2 Trips
			Specific Enable Criteriaand Thresholds for 3 individual parts of the performance diag:				First Order Lag Filters with Weight Coefficients	
			1. Excessive Knock Diag: Filtered Knock Intensity (where 'Knock Intensity' = 0 with no knock; and > 0 & proportional to knock magnitude with knock)	> 1.50 (no units)	Engine Speed Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle)	≥ 1,500 RPM ≥ 167 Revs	Weight Coefficient = 0.0060 Updated each engine event	
			2. Abnormal Noise Diag: Filtered FFT Intensity: (where 'FFT Intensity' = Non-knocking, background noise)	< Abnormal Noise Threshold (see Supporting Tables)	Engine Speed Cumlative Number of Engine Revs Above Min Eng Speed (per key cycle)	≥ 2,500 RPM ≥ 167 Revs	Weight Coefficient = 0.0060 Updated each engine event	
			3. Flat Signal Diag: Filtered Signal Delta (Current FFT Intensity -	< 0.008 (no units)	Engine SpeedCumlative Number of Engine Revs Above Min Eng Speed	≥ 8,500 RPM≥ 100 Revs		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Ave_Intensity_No-Knock)		(per keycycle)		WeightCoefficient = 0.010 Updated each engine event	

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

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

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Crankshaft Position (CKP) Sensor A Performance	P0336	Determines if a performance fault exists with the crank position sensor signal	Time in which 10 or more crank re-synchronizations occur	< 10.0 seconds	Engine Air Flow Cam-based engine speed No DTC Active:	>= 3.0 grams/second > 450 RPM 5VoltReferenceB_FA P0335	Continuous every 250 msec	Type B, 2 Trips
			No crankshaft synchronization gap found	>= 0.4 seconds	Engine is Running Starter is not engaged No DTC Active:	 5VoltReferenceB_FA	Continuous every 12.5 msec	
			Time since starter engaged without detecting crankshaft synchronization gap	>= 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 P0340 P0341	8 failures out of 10 samples One sample per engine revolution	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor A	P0340	Determines if a fault exists with the cam position bank 1 sensor A signal	Time since last camshaft position sensor pulse received OR Time that starter has been engaged without a camshaft sensor pulse	>= 5.5 seconds >= 4.0 seconds	Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow	 = FALSE = FALSE = FALSE > 3.0 grams/second))	Continuous every 100 msec	Type B, 2 Trips
			Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Engine is running Starter is not engaged No DTC Active:	 5VoltReferenceA_FA	Continuous every 100 msec	
			No camshaft pulses received during first 24 MEDRES events (There are 24 MEDRES events per engine cycle		Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	 5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Continuous every MEDRES event	
			The number of camshaft pulses received during 100 engine cycles	= 0	Crankshaft is synchronized No DTC Active:	 5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor A	P0341	Determines if a performance fault exists with the cam position bank 1 sensor A signal	The number of camshaft pulses received during first 24 MEDRES events is OR (There are 24 MEDRES events per engine cycle)	< 4 > 8	Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensorFA	Continuous every MEDRES event	Type B, 2 Trips
			The number of camshaft pulses received during 100 engine cycles OR	< 398 > 402	Crankshaft is synchronized No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensorFA	8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #1 CIRCUIT	P0351	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 1 (Cylinders 1 and 4 for V6 with waste spark)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	 > 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #2 CIRCUIT	P0352	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 2 (Cylinders 2 and 5 for V6 with waste spark)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	 > 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #3 CIRCUIT	P0353	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 3 (Cylinders 3 and 6 for V6 with waste spark)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	 > 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #4 CIRCUIT	P0354	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 4 (if applicable)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	 > 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #5 CIRCUIT	P0355	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 5 (if applicable)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	 > 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #6 CIRCUIT	P0356	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 6 (if applicable)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	 > 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #7 CIRCUIT	P0357	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 7 (if applicable)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	 > 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
IGNITION CONTROL #8 CIRCUIT	P0358	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 8 (if applicable)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	 > 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Catalyst System Low Efficiency Bank 1	P0420	NOTE: The information below applies to applications that use the Decel Catalyst Monitor Algorithm Oxygen StorageThe catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and O2 during lean A/F excursions to store the excess oxygen (I.e. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H2 to release this stored oxygen (I.e. Cerium Reduction). This is referred to as the Oxygen Storage Capacity, or OSC. CatMon's strategy is to "measure" the OSC of the catalyst through forced Rich (intrusive rich) and Lean (decel fuel cutoff) A/F excursions Normalized Ratio OSC Value Calculation Information and Definitions = 1. Raw OSC Calculation = (post cat O2 Resp time - pre cat O2 Resp time) 2. BestFailing OSC value from a calibration	Normalized Ratio OSC Value (EWMA filtered)	< 0.35	All enable criteria associated with P0420 can be found under P2270 - (O2 Sensor Signal Stuck Lean Bank 1 Sensor 2) Rapid Step Response (RSR) feature will initiate multiple tests: If the difference between current EWMA value and the current OSC Normalized Ratio value is and the current OSC Normalized Ratio value is Maximum number of RSR tests to detect failure when RSR is enabled. General Enable Criteria In addition to the p-codes listed under P2270, the following DTC's shall also not be set:	> 0.75 < 0.10 6 O2S_Bank_1_Sensor_1_FA O2S_Bank_1_Sensor_2_FA O2S_Bank_2_Sensor_1_FA O2S_Bank_2_Sensor_2_FA	1 test attempted per valid decel period Minimum of 1 test per trip Maximum of 2 tests per trip Frequency: Fueling Related : 12.5 ms OSC Measurements: 100 ms Temp Prediction: 12.5ms	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Catalyst System Low Efficiency Bank 2	P0430	Note: The information below applies to applications that use the Decel Catalyst Monitor Algorithm Oxygen StorageThe catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and O2 during lean A/F excursions to store the excess oxygen (I.e. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H2 to release this stored oxygen (I.e. Cerium Reduction). This is referred to as the Oxygen Storage Capacity, or OSC. CatMon's strategy is to "measure" the OSC of the catalyst through forced Rich (intrusive rich) and Lean (decel fuel cutoff) A/F excursions Normalized Ratio OSC Value Calculation Information and Definitions = 1. Raw OSC Calculation = (post cat O2 Resp time - pre cat O2 Resp time) 2. BestFailing OSC value from a calibration	Normalized Ratio OSC Value (EWMA filtered)	< 0.35	All enable criteria associated with P0430 can be found under P2272 - (O2 Sensor Signal Stuck Lean Bank 2 Sensor 2) Rapid Step Response (RSR) feature will initiate multiple tests: If the difference between current EWMA value and the current OSC Normalized Ratio value is and the current OSC Normalized Ratio value is Maximum number of RSR tests to detect failure when RSR is enabled. General Enable Criteria In addition to the p-codes listed under P2272, the following DTC's shall also not be set:	> 0.74 < 0.10 6 O2S_Bank_1_Sensor_1_FA O2S_Bank_1_Sensor_2_FA O2S_Bank_2_Sensor_1_FA O2S_Bank_2_Sensor_2_FA	1 test attempted per valid decel period Minimum of 1 test per trip Maximum of 2 tests per trip Frequency: Fueling Related : 12.5 ms OSC Measurements: 100 ms Temp Prediction: 12.5ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		table (based on temp and exhaust gas flow) 3. WorstPassing OSC value (based on temp and exhaust gas flow) Normalized Ratio Calculation = (1-2) / (3-2) A Normalized Ratio of 1 essentially represents a good part and a ratio of 0 essentially represents a very bad part. The Catalyst Monitoring Test is completed during a decel fuel cutoff event. This fuel cutoff event occurs following a rich instrusive fueling event initiated by the O2 Sensor Signal Stuck Lean Bank 2 Sensor 2 test (P2272). Several conditions must be met in order to execute this test. These conditions and their related values are listed in the "Secondary Parameters" and "Enable Conditions" section of this document for P2272 (O2 Sensor Signal Stuck Lean Bank 2 Sensor 2)						

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission (EVAP) System Small Leak Detected (Not Sealed Fuel System)	P0442	This DTC will detect a small leak (≥ 0.020”) in the EVAP system between the fuel fill cap and the purge solenoid. On some applications a small leak is defined as ≥ 0.025”, 0.030”, or 0.150”. The engine off natural vacuum method (EONV) is used. EONV is an evaporative system leak detection diagnostic that runs when the vehicle is shut off when enable conditions are met. Prior to sealing the system and performing the diagnostic, the fuel volatility is analyzed. In an open system (Canister Vent Solenoid [CVS] open) high volatility fuel creates enough flow to generate a measurable pressure differential relative to atmospheric.After the volatility check, the vent solenoid will close. After the vent is closed, typically a build up of pressure from the hot soak begins (phase-1). The pressure typically will peak and then begin to decrease as the fuel cools. When	The total delta from peak pressure to peak vacuum during the test is normalized against a calibration pressure threshold table that is based upon fuel level and ambient temperature. (See P0442: EONV Pressure Threshold Table on Supporting Tables Tab). The normalized value is calculated by the following equation: 1 - (peak pressure - peak vacuum) / pressure threshold. The normalized value is entered into EWMA (with 0= perfect pass and 1= perfect fail). When EWMA is the DTC light is illuminated. The DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 3 additional consecutive trips.	 > 0.70 (EWMA Fail Threshold), ≤ 0.35 (EWMA Re-Pass Threshold)	Fuel Level Drive Time Drive length ECT Baro Odometer Engine not run time before key off must be Time since last complete test if normalized result and EWMA is passing OR Time since last complete test if normalized result or EWMA is failing Estimated ambient temperature at end of drive Estimate of Ambient Air Temperature Valid ****************************** Conditions for Estimate of Ambient Air Temperature to be valid: 1. Cold Start Startup delta deg C (ECT-	10 % ≤ Percent ≤ 90 % ≥ 900 seconds ≥ 9.7 miles ≥ 70 °C ≥ 70 kPa ≥ 10.0 miles ≤ refer to "P0442: Engine Off Time Before Vehicle Off Maximum as a Function of Estimated Ambient Temperature table" in Supporting Tables. ≥ 17 hours ≥ 10 hours 0 °C≤Temperature≤ 34 °C ****************************** ≤ 8 °C	Once per trip, during hot soak (up to 2,400 sec.). No more than 2 unsuccessful attempts between completed tests.	Type A, 1 Trips EWMA Average run length is 8 to 12 under normal condition s Run length is 3 to 6 trips after code clear or non-volatile reset

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		the pressure drops (-62.27) Pa from peak pressure, the vent is then opened for 60 seconds to normalize the system pressure. The vent is again closed to begin the vacuum portion of the test (phase-2). As the fuel temperature continues to fall, a vacuum will begin forming. The vacuum will continue until it reaches a vacuum peak. When the pressure rises 62.27 Pa from vacuum peak, the test then completes. If the key is turned on while the diagnostic test is in progress, the test will abort.			IAT) OR 2. Short Soak and Previous EAT Valid Previous time since engine off OR 3. Less than a short soak and Previous EAT Not Valid Previous time since engine off AND Vehicle Speed AND Mass Air Flow Must expire Estimate of Ambient Temperature Valid Conditioning Time. "P0442: Estimate of Ambient Temperature Valid Conditioning Time" in Supporting Tables Tab. OR 4. Not a Cold Start and greater than a Short Soak Previous time since engine off AND Vehicle Speed AND Mass Air Flow Must expire maximum	≤ 7,200 seconds ≤ 7,200 seconds ≥ 10.0 mph ≥ 10 g/sec > 7,200 seconds ≥ 10.0 mph ≥ 10 g/sec		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					value in Estimate of Ambient Temperature Valid Conditioning Time. Please see "P0442: Estimate of Ambient Temperature Valid Conditioning Time" in Supporting Tables Tab. 1. High Fuel Volatility During the volatility phase, pressure in the fuel tank is integrated vs. time. If the integrated pressure is then test aborts and unsuccessful attempts is incremented. OR 2. Vacuum Refueling Detected See P0454 Fault Code for information on vacuum refueling algorithm. OR 3. Fuel Level Refueling Detected See P0464 Fault Code for information on fuel level refueling. OR 4. Vacuum Out of Range and No Refueling	< -5		

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P0449 P0452 P0453 P0455 P0496		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission (EVAP) Canister Purge Solenoid Valve Circuit (ODM) (Not Sealed Fuel System)	P0443	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		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 (EVAP) Vent System Performance (Not Sealed Fuel System)	P0446	This DTC will determine if a restriction is present in the vent solenoid, vent filler, vent hose or EVAP canister. This test runs with normal purge and vent valve is open.	Vent Restriction Prep Test: Vented Vacuum for OR Vented Vacuum for Vent Restriction Test: Tank Vacuum for before Purge Volume After setting the DTC for the first time, 2 liters of fuel must be consumed before setting the DTC for the second time.	 < -623 Pa 60 seconds > 1,245 Pa 60 seconds > 2,989 Pa 5 seconds ≥ 14 liters	Fuel Level System Voltage Startup IAT Startup ECT BARO No active DTCs:	10 % ≤ Percent ≤ 90 % 11 volts ≤ Voltage ≤ 32 volts 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C ≥ 70 kPa MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454	Once per Cold Start Time is dependent on driving conditions Maximum time before test abort is 1,000 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission (EVAP) Vent Solenoid Control Circuit (ODM) (Not Sealed Fuel System)	P0449	This DTC checks the circuit for electrical integrity during operation. If the P0449 is active, an intrusive test is performed with the vent solenoid commanded closed for 15 seconds.	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 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 (Not Sealed Fuel System)	P0451	The DTC will be set if the fuel tank vacuum sensor is out of range when it tries to re-zero prior to the phase-1 or phase-2 portions of the engine-off natural vacuum small leak test.	The tank vacuum sensor voltage is compared to a window about the nominal sensor voltage offset (~1.5 volts) Upper voltage threshold (voltage addition above the nominal voltage) Lower voltage threshold (voltage subtraction below the nominal voltage) The difference between tank vacuum sensor voltage and the nominal offset voltage is then normalized against the appropriate threshold listed above to produce a ratio between 0.0 and 1.0. This normalized re-zero ratio is then filtered with a EWMA (with 0= perfect pass and 1=perfect fail). When EWMA is the DTC light is illuminated. The DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 3 additional consecutive trips.	 0.2 volts 0.2 volts > 0.73 (EWMA Fail Threshold), ≤ 0.40 (EWMA Re-Pass Threshold)	This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off natural vacuum small leak test. The number of times that it executes can range from zero to two per engine-off period.The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete.	Type A, 1 Trips EWMA Average run length: 6 Run length is 2 trips after code clear or non-volatile reset

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Tank Pressure (FTP) Sensor Circuit Low Voltage (Not 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 (~1245 Pa) to 4.5 volts (~ -3736 Pa).	< 0.15 volts (3.0 % of Vref or ~ 1,681 Pa)	Time delay after sensor power up for sensor warm-up is	0.10 seconds	640 failures out of 800 samples 12.5 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Tank Pressure (FTP) Sensor Circuit High Voltage (Not 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 (~1245 Pa) to 4.5 volts (~ -3736 Pa).	> 4.85 volts (97 % of Vref or ~ -4,172 Pa)	Time delay after sensor power up for sensor warm-up is	0.10 seconds	640 failures out of 800 samples 12.5 ms / sample	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Tank Pressure (FTP) Sensor Circuit Intermittent (Not Sealed Fuel System)	P0454	This DTC will detect intermittent tank vacuum sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event.	If an abrupt change in tank vacuum is detected the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that a refueling event occurred. If a refueling is confirmed, then the test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem. An abrupt change is defined as a change in vacuum: in the span of 1.0 seconds. But in 12.5 msec. A refueling event is confirmed if the fuel level has a persistent change of for 30 seconds.	> 112 Pa < 249 Pa 10 %	This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes and the canister vent solenoid is closed		This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period.The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete.The test will report a failure if 2 out of 3 samples are failures. 12.5 ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission (EVAP) System Large Leak Detected (Not Sealed Fuel System)	P0455	This DTC will detect a weak vacuum condition (large leak or purge blockage) in the EVAP system. Purge valve is controlled (to allow purge flow) and vent valve is commanded closed.	Purge volume while Tank vacuum After setting the DTC for the first time, 2 liters of fuel must be consumed before setting the DTC for the second time. Weak Vacuum Follow-up Test (fuel cap replacement test) Weak Vacuum Test failed. Passes if tank vacuum Note: Weak Vacuum Follow-up Test can only report a pass.	> 64 liters ≤ 2,740 Pa ≥ 2,740 Pa	Fuel Level System Voltage BARO Purge Flow No active DTCs: Cold Start Test If ECT > IAT, Startup temperature delta (ECT-IAT): Cold Test Timer Startup IAT Startup ECT Weak Vacuum Follow-up Test This test can run following a weak vacuum failure or on a hot restart.	10 % ≤ Percent ≤ 90 % 11 volts ≤ Voltage ≤ 32 volts ≥ 70 kPa ≥ 3.75 % MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454 ≤ 8 °C ≤ 1,000 seconds 4 °C≤Temperature≤ 30 °C ≤ 35 °C	Once per cold start Time is dependent on driving conditions Maximum time before test abort is 1,000 seconds Weak Vacuum Follow-up Test With large leak detected, the follow-up test is limited to 1,300 seconds. Once the MIL is on, the follow-up test runs indefinitely.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 1 Performance (For use on vehicles with a single fuel tank)	P0461	This DTC will detect a fuel sender stuck in range in the primary fuel tank.	Delta fuel volume change over an accumulated 87 miles.	< 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.
Fuel Level Sensor 1 Circuit Intermittent (Not Sealed Fuel System)	P0464	This DTC will detect intermittent fuel level sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event.	If a change in fuel level is detected, the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that an actual refueling event occurred. If a refueling event is confirmed, then the test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem. An intermittent change in fuel level is defined as: The fuel level changes by and does not remain for 30 seconds during a 600 second refueling rationality test.	 10 % > 10 %	This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period.The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete.The test will report a failure if 2 out of 3 samples are failures. 100 ms / sample	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Evaporative Emission (EVAP) System Flow During Non-Purge (Not Sealed Fuel System)	P0496	This DTC will determine if the purge solenoid is leaking to engine manifold vacuum. This test will run with the purge valve closed and the vent valve closed.	Tank Vacuum for Test time	> 2,491 Pa 5 seconds ≥ refer to "P0496: Purge Valve Leak Test Engine Vacuum Test Time (Cold Start) as a Function of Fuel Level table" in Supporting Tables Tab.	Fuel Level System Voltage BARO Startup IAT Startup ECT Engine Off Time No active DTCs:	10 % ≤ Percent ≤ 90 % 11 volts ≤ Voltage ≤ 32 volts ≥ 70 kPa 4 °C≤Temperature≤ 30 °C ≤ 35 °C ≥ 28,800.0 seconds MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454	Once per cold start Cold start: max time is 1,000 seconds	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Low Engine Speed Idle System	P0506	This DTC will determine if a low idle exists	Filtered Engine Speed Error	> 89.00 rpm	Baro	> 70 kPa	Diagnostic runs in every 12.5 ms loop	Type B, 2 Trips
			filter coefficient	0.00275	Coolant Temp	> 60 °C and < 125 °C Must verify KfECTI_T_EngCoolHotLo Thresh is less than KfECTI_T_EngCoolHotHi Thresh	Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	
					Engine run time	≥ 60 sec		
					Ignition voltage	32 ≥ volts ≥ 11		
					Time since gear change	≥ 3 sec		
					Time since a TCC mode change	> 3 sec		
					IAT	> -20 °C		
					Vehicle speed	≤ 1.67 kph		
					Commanded RPM delta	≤ 25 rpm		
					Idle time	> 10 sec		
					For manual transmissions: Clutch Pedal Position or Clutch Pedal Position	 > 88.00 pct < 20.00 pct		
						PTO not active		

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

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
High Engine Speed Idle System	P0507	This DTC will determine if a high idle exists	Filtered Engine Speed Error	< -178.00 rpm	Baro	> 70 kPa	Diagnostic runs in every 12.5 ms loop	Type B, 2 Trips
			filter coefficient	0.00275	Coolant Temp	> 60 °C and < 125 °C Must verify KfECTI_T_EngCoolHotLo Thresh is less than KfECTI_T_EngCoolHotHi Thresh	Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	
					Engine run time	≥ 60 sec		
					Ignition voltage	32 ≥ volts ≥ 11		
					Time since gear change	≥ 3 sec		
					Time since a TCC mode change	> 3 sec		
					IAT	> -20 °C		
					Vehicle speed	≤ 1.67 kph		
					Commanded RPM delta	≤ 25 rpm		
					For manual transmissions: Clutch Pedal Position or Clutch Pedal Position	 > 88.00 pct < 20.00 pct		
						PTO not active		
						Transfer Case not in 4WD LowState		

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

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Oil Pressure (EOP) Sensor Performance	P0521	Determines if the Engine Oil Pressure (EOP) Sensor is stuck or biased in range	If enabled: To pass a currently failing test: The filtered, weighted difference between measured EOP and predicted EOP (a function of engine speed and engine oil temp.): To fail a currently passing test: The filtered, weighted difference between measured EOP and predicted EOP (a function of engine speed and engine oil temp.):	 < -50.0 kPa OR > 50.0 kPa > -47.0 kPa AND < 47.0 kPa	Diagnostic enabled/ disabled Oil Pressure Sensor In Use Filtered engine oil pressure test weighting (function of engine speed, engine oil temperature, predicted oil pressure, and engine load stability). (RPM_Weighting_Factor * Oil_Temp_Weighting_Factor * Eng_Load_Stability_Weighting_Factor * Eng_Oil_Pred_Weighting_Factor) with a first order filter coefficient of 0.01 Details on Supporting Tables Tab No active DTC's	Enabled Present >= 0.30 weighting Fault bundles: EngOilPressureSensorCktFA CrankSensorFA ECT_Sensor_FA MAF_SensorFA IAT_SensorFA	Performed every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Oil Pressure (EOP) Sensor Circuit Low Voltage	P0522	Determines if the Engine Oil Pressure (EOP) Sensor circuit voltage is too low	(Engine Oil Pressure Sensor Circuit Voltage) / 5 Volts	< 5.00 percent	Engine Speed Enable Engine Speed Disable Sensor Present Diagnostic enabled/ disabled	> 400 rpm < 350 rpm Present Enabled	50 failures out of 63 samples Performed every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Engine Oil Pressure (EOP) Sensor Circuit High Voltage	P0523	Determines if the Engine Oil Pressure (EOP) Sensor circuit voltage is too high	(Engine Oil Pressure Sensor Circuit Voltage) / 5 Volts	> 85.00 percent	Sensor Present Diagnostic enabled/ disabled	Present Enabled	204 failures out of 255 samples Performed every 100 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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	MIL: Type C, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Resume Circuit	P0567	Detects a failure of the cruise resume switch in a continously applied state	Cruise Control Resume switch remains applied for greater than a calibratable period of time for architecture where cruise switch states are received over serial data		CAN cruise switch diagnostic enable in ECM	TRUE 1.00	fail continuously for greater than 90.000 seconds	MIL: Type C, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Cruise Control Set Circuit	P0568	Detects a failure of the cruise set switch in a continously applied state	Cruise Control Set switch remains applied for greater than a calibratable period of time for architecture where cruise switch states are received over serial data		CAN cruise switch diagnostic enable in ECM	TRUE 1.00	fail continuously for greater than 90.000 seconds	MIL: Type C, 1 Trips

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	MIL: Type C, 1 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 >	0.47088 s			When dual store updates occur.	

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

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

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

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			controller initialization. Counter >=					
			Checks for ECC (error correcting code) circuit test errors reported by the hardware for RAM memory circuit. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5 (results in MIL and remedial action)		KeMEMD_b_RAM_ECC_ CktTestEnbl == 1 Value of KeMEMD_b_RAM_ECC_ CktTestEnbl is: 1 . (If 0, this test is disabled)	variable, depends on length of time to write flash to RAMvariable, depends on length of time to write flash to RAM	
			MAIN processor DMA transfer from Flash to RAM has 1 failure			KePISD_b_DMA_XferTest Enbld == 1 Value of KePISD_b_DMA_XferTest Enbld is: 0 . (If 0, this test is disabled)	variable, depends on length of time to write flash to RAM	

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	This DTC checks for a shorted low circuit while the device is commanded on.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		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	This DTC checks for an open and shorted high circuit while the device is commanded off.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		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)	P0650	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Remote Vehicle Start is not active	Voltage ≥ 11 volts	20 failures out of 25 samples 250 ms / sample	Type B, 2 Trips 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)	P0685	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		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	Stuck Test: 100 ms/ sample 50.00 failures out of 63.00	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Knock Sensor Processor 1 Performance	P06B6	This diagnostic checks for a fault with the internal test circuit used only for the '20 kHz' method of the Open Circuit Diagnostic	FFT Diagnostic Output	> OpenTestThreshLo and < OpenTestThreshHi See Supporting Tables	Diagnostic Enabled? Engine Run Time Engine Speed Cumlative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above) Engine Air Flow	Yes ≥ 2.0 seconds > 400 RPM and < 3,500 RPM ≥ 200 Revs ≥ 10 mg/cylinder and ≤ 2,000 mg/cylinder	First Order Lag Filter with Weight Coefficient Weight Coefficient = 0.0100 Updated each engine event	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Knock Sensor Processor 2 Performance	P06B7	This diagnostic checks for a fault with the internal test circuit used only for the '20 kHz' method of the Open Circuit Diagnostic	FFT Diagnostic Output	> OpenTestThreshLo and < OpenTestThreshHi See Supporting Tables	Diagnostic Enabled? Engine Run Time Engine Speed Cumlative Number of Engine Revs (per key cycle) within min/max Engine Speed enable (above) Engine Air Flow	Yes ≥ 2.0 seconds > 400 RPM and < 3,500 RPM ≥ 200 Revs ≥ 10 mg/cylinder and ≤ 2,000 mg/cylinder	First Order Lag Filter with Weight Coefficient Weight Coefficient = 0.0100 Updated each engine event	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Inlet Airflow System Performance (naturally aspirated)	P1101	Determines if there are multiple air induction problems affecting airflow and/or manifold pressure.	Filtered Throttle Model Error AND (ABS(Measured Flow – Modeled Air Flow) Filtered OR ABS(Measured MAP – MAP Model 1) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered	<= 300 kPa*(g/s) > 20 grams/sec > 20.0 kPa) > 20.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) No Active DTCs:	>= 465 RPM <= 4,600 RPM > -7 Deg C < 125 Deg C > -20 Deg C < 100 Deg C >= 0.00 Filtered Throttle Model Error multiplied by TPS Residual Weight Factor based on RPM Modeled Air Flow Error multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Est MAP Model 1 Error multiplied by MAP1 Residual Weight Factor based on RPM MAP Model 2 Error multiplied by MAP2 Residual Weight Factor based on RPM See "Residual Weight Factor" tables. MAP_SensorCircuitFA EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA	Continuous Calculation are performed every 12.5 msec	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 table named "P1133 - O2S HC L to R Switches Limit Bank 1 Sensor 1" Pass/Fail Threshold table & "P1133 - O2S HC R to L Switches Limit Bank 1 Sensor 1" Pass/Fail Threshold table 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 Low Fuel Condition Diag Green O2S Condition O2 Heater on for Learned Htr resistance	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefaultMAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_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 Green Sensor Delay Criteria (B1S1) in Supporting Tables tab. ≥ 40 seconds = Valid (the heater resistance has learned since NVM reset, see	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.
						enable conditions for "HO2S Heater Resistance DTC's")		
					Engine Coolant	> 50 ºC		
					IAT	> -40 ºC		
					Engine run Accum	> 120 seconds		
					Time since any AFM status change	> 0.0 seconds		
					Time since Purge On to Off change	> 0.0 seconds		
					Time since Purge Off to On change	> 0.0 seconds		
					Engine airflow	20 ≤ gps ≤ 55		
					Engine speed	1,200 ≤ RPM ≤ 3,000		
					Fuel	< 87 % Ethanol		
					Baro	> 70 kpa		
					Air Per Cylinder	≥ 200 mgrams		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					LTM fuel cell	= Enabled		
					Transient Fuel Mass	≤ 100.0 mgrams		
					Baro	= Not Defaulted		
					Fuel Control State	not = Power Enrichment		
					Fuel State	DFCO not active		
					Commanded Proportional Gain	≥ 0.0 %		
					==========	==========		
					All of the above met for Time	> 3.5 seconds		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2S Insufficient Switching Bank 2 Sensor 1	P1153	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.	H/C L/R switches < Threshold, or H/C R/L switches < Threshold, (refer to table named "P1153 - O2S HC L to R Switches Limit Bank 2 Sensor 1" Pass/Fail Threshold table & "P1153 - O2S HC R to L Switches Limit Bank 2 Sensor 1" Pass/Fail Threshold table in Supporting tables tab)	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA EthanolCompositionSensor_FA EngineMisfireDetected_FA	Sample time is 60 seconds Frequency: Once per trip	Type B, 2 Trips
			OR					
			Slope Time L/R Switches	< 3				
			OR					
			Slope Time R/L Switches	< 3				
					Bank 2 Sensor 1 DTC's not active	= P0151, P0152 or P0154		
					System Voltage	10.0 < Volts < 32.0		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Green O2S Condition	= Not Valid, See definition of Green Sensor Delay Criteria (B2S1) in Supporting Tables tab.		
					O2 Heater on for	≥ 40 seconds		
					Learned Htr resistance	= Valid (the heater resistance has learned since NVM reset, see		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						enable conditions for "HO2S Heater Resistance DTC's")		
					Engine Coolant	> 50 ºC		
					IAT	> -40 ºC		
					Engine run Accum	> 120 seconds		
					Time since any AFM status change	> 0.0 seconds		
					Time since Purge On to Off change	> 0.0 seconds		
					Time since Purge Off to On change	> 0.0 seconds		
					Engine airflow	20 ≤ gps ≤ 55		
					Engine speed	1,200 ≤ RPM ≤ 3,000		
					Fuel Condition	< 87 % Ethanol		
					Baro	> 70 kpa		
					Air Per Cylinder	≥ 200 mGrams		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					LTM fuel cell	= Enabled		
					Transient Fuel Mass	≤ 100.0 mgrams		
					Baro	= Not Defaulted		
					Fuel Control State	not = Power Enrichment		
					Fuel State	DFCO not active		
					Commanded Proportional Gain	≥ 0.0 %		
					==========	==========		
					All of the above met for	> 3.5 seconds		

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
ABS Rough Road malfunction IF KeMSFD_b_ MonitorRoughRoad and not GetRRDR_b_TOS_BasedRoughRoad	P1380	This diagnostic detects if the ABS controller is indicating a fault, and misfire is present. When this occurs, misfire will continue to run.	GMLan Message: "Wheel Sensor Rough Road Magnitude Validity"	= FALSE	Vehicle Speed Engine Speed Engine LoadRunCrankActive Active DTC	VSS ≥ 5 mph rpm < 8,192 load < 60 = TRUE P0300, MIL Request	40 failures out of 80 samples 250 ms /sample Continuous	Type C, 1 Trips "Special Type C"

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

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 OR PT Relay Ignition voltage > 5.50) AND Run/Crank voltage > 5.50 .	240 / 480 counts or 0.1750 sec continuous; 12.5 ms/count in main processor	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Internal Control Module Redundant Memory Performance	P16F3	Detect Processor Calculation faults due to RAM corruptions, ALU failures and ROM failures For all of the following cases: If the individual diagnostic threshold is equal to 2048 ms, this indivudual case is not applicable. If any of the following cases are X out of Y diagnostics and the fail (x) is greater than the sample (Y), this individual case is also not applicable.	Desired Throttle Area calculated does not equal its redundant calculation	N/A	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	Type A, 1 Trips
			Equivance Ratio torque compensation exceeds threshold	-100.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Absolute difference between Equivance Ratio torque compensation and its dual store out of bounds given by threshold	100.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of Accessory torque and its redundant calculation is out of bounds given by threshold range	100.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Absolute difference of Filtered Air-per-cylinder and its redundant calculation is out of bounds given by threshold range	118.03 mg	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference between the previous Final Advance and the current Final Advance not Adjusted for Equivalence Ratio is out of bounds given by threshold range	8.09 degrees		Engine speed >0rpm	Up/down timer 158 ms continuous, 0.5 down time multipier	
			Torque Learn offset is out of bounds given by threshold range	High Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				Low Threshold 0.00 Nm			multipier	
			One step ahead calculation of air-per-cylinder and two step ahead is greater than threshold	80.00 mg		Engine speed > 515 rpm	Up/down timer 458 ms continuous, 0.5 down time multipier	
			Difference between Unmanaged Spark and PACS Spark is greater than threshold	8.10 degrees	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Commanded Predicted Engine Torque and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time	

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							multipier	
			Arbitrated Air-Per-Cylinder filter coefficient is out of bounds given by threshold range	High Threshold 1.000 Low Threshold 0.074	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Launch spark is active but the launch spark redundant path indicates it should not be active	N/A		Engine speed < 7,900.00 or 8,000.00 rpm (hysteresis pair)	Up/down timer 158 ms continuous, 0.5 down time multipier	
			Rate limited vehicle speed and its dual store do not equal	N/A		Time since first CAN message with vehicle speed >= 0.500 sec	10 / 20 counts; 25.0msec/count	

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			range	T/C Range Hi 0.10 T/C Range Lo Low Threshold: 1.10 T/C Range Hi 0.10 T/C Range Lo				
			TOS to wheel speed conversion factor and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	255 / 6 counts; 25.0msec/count	
			Cylinders active greater than commanded	2 cylinders		Engine run flag = TRUE > 2.00 s Number of cylinder events since engine run > 24 ~~No fuel injector faults~~	Up/down timer 158 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						active		
			Transfer case neutral request from four wheel drive logic does not match with operating conditions	N/A	Ignition State	Accessory, run or crank Transfer case range valid and not over-ridden FWD Apps only	32 / 0 counts; 25.0msec/count	
			Transfer case neutral and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	8 / 16 counts; 25.0msec/count	
			Driver progression mode and its dual store do not equal	N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Positive Torque Offset is greater than its redundant calculation plus threshold OR Positive Torque Offset is less than its redundant calculation minus threshold	100.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Commanded Predicted Engine Request is greater than its redundant calculation plus threshold	100.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

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

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

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Commanded Immediate Engine Request is greater than its redundant calculation plus threshold	100.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			PTO Torque Request exceeds allowed rate limited PTO Torque Request	12.50 Nm/25ms	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing (event based) calculation does not equal its redundant	N/A		Engine speed greater than 0rpm	Up/down timer 158 ms continuous, 0.5	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			calculation				down time multipier	
			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 158 ms continuous, 0.5 down time multipier	
			Idle speed control calculated predicted minimum torque request exceeds calculated torque limit	Table, f(Engine, Oil Temp). See supporting tables + 100.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Idle speed control calculated predicted minimum torque without reserves exceeds calculated torque limit	Table, f(Engine, Oil Temp). See supporting tables + 100.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Difference between Driver Requested Immediate Torque primary path and its secondary exceeds threshold	1,503.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Driver Immediate Request is less than its redundant calculation minus threshold	1,503.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded Immediate Request is greater than its redundant calculation plus threshold OR Commanded Immediate	1,503.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Request is less than its redundant calculation minus threshold					
			Commanded Immediate Response Type is set to Inactive	N/A	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			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 multipier	
			Difference between Cruise Axle Torque Arbitrated Request and Cruise Axle Torque Request exceeds	187.88 Nm		Cruise has been engaged for more than 4.00 seconds	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.
			threshold				multipier	
			Desired engine torque request greater than redundant calculation plus threshold	99.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Engine min capacity above threshold	100.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 75 ms continuous, 0.5 down time multipier	
			No fast unmanaged retarded spark above the applied spark plus the threshold	Table, f(Erpm). See supporting tables		Engine speed greater than 0rpm	Up/down timer 158 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Absolute difference of adjustment factor based on temperature and its dual store above threshold	2.76 m/s	Ignition State	Accessory, run or crank	Up/down timer 104 ms continuous, 0.5 down time multipier	
			1. Absolute difference of redundant calculated engine speed above threshold	500 RPM		Engine speed greater than 0 RPM	Up/down timer 158 ms continuous, 0.5 down time multipier	
			After throttle blade pressure and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Speed Control's Preditcted Torque Request and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
							multipier	
			Engine oil temperature and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 250 ms continuous, 0.5 down time multipier	
			Desired throttle position greater than redundant calculation plus threshold	8.41 percent	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of the rate limited pre-throttle pressure and its redundant calculation greater than threshold	0.06 kpa	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Throttle desired torque	100.00	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.
			above desired torque plus threshold	Nm			475 ms continuous, 0.5 down time multipier	
			Desired filtered throttle torque exceeds the threshold plus the higher of desired throttle torque or modeled throttle torque	100.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Torque feedback proportional term is out of allowable range or its dual store copy does not match	High Threshold 50.00 Nm Low Threshold -50.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

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 93.75 Nm Low Threshold -100.00 Nm Rate of change threshold 6.25 Nm/loop	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of Final Torque feedback proportional plus integral term and its redundant calculation is out of bounds given by threshold range	High Threshold 100.00 Nm Low Threshold - 100.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Difference of torque desired throttle area and its redundant calculation is out of bounds given by threshold range	High Threshold 0.50 % Low Threshold - 0.50 %	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of torque model coefficients and its redundant calculation is out of bounds given by threshold range	High Threshold 0.0001266 Low Threshold - 0.0001266	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Difference of base friction torque and its redundant calculation is out of bounds given by threshold range	High Threshold 100.00 Nm Low Threshold	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			AC friction torque is greater than commanded by AC control software or less than threshold limit	High Threshold 55.00 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of Oil temperature delta friction torque and its redundant calculation is out of bounds given by threshold range	High Threshold 100.00 Nm Low Threshold - 100.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Generator friction torque is out of bounds given by threshold range	High Threshold 100.00 Nm Low Threshold	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
				6.25 Nm/loop				
			Torque error compensation is out of bounds given by threshold range	High Threshold 100.00 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Delta Torque Baro compensation is out of bounds given by threshold range	High Threshold 10.92 Nm Low Threshold 0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			1. Difference of reserve torque value and its redundant calculation exceed threshold OR 2. Reserve request does not agree with operating conditions or Difference of final predicted torque and its redundant calculation exeed threshold OR 3. Rate of change of reserve torque exceeds threshold, increasing direction only OR 4. Reserve engine torque above allowable capacity threshold	1. 99.00 Nm 2. N/A 3. 99.00 Nm 4. 99.00 Nm	3. & 4.: Ignition State	1. & 2.: Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 100.00 Nm 3. & 4.: Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Engine Vacuum and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of the	Table, f(Engine		Engine speed >0rpm	Up/down timer	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			calculated Intake Manifold Pressure during engine event versus during time event is greater than threshold	Torque). See supporting tables			158 ms continuous, 0.5 down time multipier	
			Min. Axle Torque Capacity is greater than threshold	0.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Driver Predicted Request is greater than its redundant calculation plus threshold OR Driver Predicted Request is less than its redundant calculation minus threshold	1,503.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Cold Delta Friction Torque and its dual store do not match	N/A	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Predicted torque for zero pedal determination is greater than calculated limit.	Table, f(Engine, Oil Temp). See supporting tables + 100.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Commanded Predicted Axle Torque and its dual store do not match	1 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Steady State Estimated Engine Torque and its dual store are not equal	N/A		AFM not changing from Active to Inactive and preload torque not	Up/down timer 1,988 ms continuous,	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						changing and one loop after React command Engine speed >0rpm	0.5 down time multipier	
			Difference of Weighting factor for number of cylinders fueled and its redundant calculation is above threshold	0.26		Engine run flag = TRUE > 10.00 s	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Difference of minimum spark advance limit and its redundant calculation is out of bounds given by threshold range	8.09 degrees	Ignition State	Accessory, run or crank	Up/down timer 158 ms continuous, 0.5 down time multipier	
			Difference of commanded spark advance and adjusted delivered is out of bounds given by threshold range	8.09 degrees		Engine speed >0rpm	Up/down timer 158 ms continuous, 0.5 down time multipier	

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Absolute difference of Engine Capacity Minimum Running Immediate Brake Torque Excluding Cylinder Sensitivity and its redundant calculation is out of bounds given by threshold range	100.00 Nm		Engine speed >0rpm	Up/down timer 175 ms continuous, 0.5 down time multipier	
			One step ahead calculation of air-per-cylinder greater than two step ahead calculation by threshold for time	Threshold: Dynamically calculated based on current engine conditions Fault Pending Threshold: 100 ms		Engine speed > 515 rpm	Up/down timer 458 ms continuous, 0.5 down time multipier	
			Rate limited cruise axle torque request and its dual store do not match within a threshold	187.88 Nm	Ignition State	Accessory, run or crank	Up/down timer 163 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			1. Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions and its redundant calculation is out of bounds given by threshold range OR 2. Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions and its dual store do not equal OR 3. Absolute difference of Calculated accelerator pedal position and its dual store do not equal	1. 5.00 % 2. N/A 3. N/A	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			~~Commanded axle torque~~	~~1,503.00~~	~~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.
			is greater than its redundant calculation by threshold	Nm			475 ms continuous, 0.5 down time multipier	
			Commanded axle torque is less than its redundant calculation by threshold	-65,535.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			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 multipier	
			Preload timer and its redundant calculation do not equal	N/A	Ignition State	Accessory, run or crank AFM apps only	Up/down timer 2,048 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			AC friction torque is greater than commanded by AC control software	55.00 Nm	Ignition State	Accessory, run or crank	Up/down timer 2,048 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing (time based) calculation does not equal its redundant calculation	N/A		Engine speed >0rpm	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of the calculated spark offset for equivalence ratio and its redundant cacluation is greater than a threshold	8.09 degrees		Engine speed >0rpm	Up/down timer 158 ms continuous, 0.5 down time multipier	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Transmission Torque Request cacluations do not equal their dual stores	N/A		Run or Crank = TRUE > 0.50 s	6 / 10 counts; 25.0msec/count	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Control Module Throttle Actuator Position Performance	P2101	1) Detect a throttle positioning error2) Throttle control is driving the throttle in the incorrect direction3) Throttle control exceeds the reduced power limit	Difference between measured throttle position and modeled throttle position > OR Difference between modeled throttle position and measured throttle position >	8.41 percent 8.41 percent	TPS minimum learn is not active and Throttle is being Controlled and (Engine Running or Ignition Voltage > or Ignition Voltage >) Ignition voltage failure is false (P1682)	Run/Crank voltage > 6.41 Ignition voltage failure is false (P1682) TPS minimum learn is not active and Throttle is being Controlled AND ((Engine Running AND Ignition Voltage > 5.50) OR Ignition Voltage > 11.00)	15 counts; 12.5 ms/count in the primary processor	Type A, 1 Trips
			Throttle Position >	39.26 percent		Powertrain Relay voltage > 6.41 TPS minimum learn is active	11 counts; 12.5 ms/count in the primary processor	
			Throttle Position >	38.26 percent		Powertrain Relay voltage > 6.41 Reduced Power is True	11 counts; 12.5 ms/count in the primary processor	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Throttle return to default	P2119	Throttle unable to return to default throttle position after de-energizing ETC motor.	(Normalized TPS1 Voltage > AND Normailzed TPS2 Voltage > On the main processor) OR (Normalized TPS1 Voltage < AND Normailzed TPS2 Voltage < On the main processor)	1.6890 1.7890 1.1150 1.0150		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, 1 Trips
			(Normalized TPS1 Voltage > AND Normailzed TPS2 Voltage > On the main processor) OR (Normalized TPS1 Voltage < AND Normailzed TPS2 Voltage < On the main processor)	1.6890 1.7890 1.1150 1.0150		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	

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

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

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

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Throttle Position (TP) Sensor 1-2 Correlation	P2135	Detects a continuous or intermittent correlation fault between TPS sensors #1 and #2 on Main processor	Difference between TPS1 displaced and TPS2 displaced >	6.999 % offset at min. throttle position with a linear threshold to 9.673 % at max. throttle position		Run/Crank voltage > 6.41 No TPS sensor faults (P0122, P0123, P0222, P0223) No 5V reference error or fault for # 4 5V reference circuit (P06A3)	79 / 159 counts or 58 counts continuous; 3.125 ms/count in the main processor	Type A, 1 Trips
			Difference between (normalized min TPS1) and (normalized min TPS2) >	5.000 % Vref		Run/Crank voltage > 6.41 No TPS sensor faults (P0122, P0123, P0222, P0223) No 5V reference error or fault for # 4 5V reference circuit (P06A3)	79 / 159 counts or 58 counts continuous; 3.125 ms/count in the main processor	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Accelerator Pedal Position (APP) Sensor 1-2 Correlation	P2138	Detects a continuous or intermittent correlation fault between APP sensors #1 and #2 on Main processor	Difference between APP1 displaced and APP2 displaced >	8.073 % offset at min. pedal position with a linear threshold to 10.004 % at max. pedal position		Run/Crank voltage > 6.41 No APP sensor faults (P2122, P2123,P2127, P2128) No 5V reference errors or faulst for # 3 & # 4 5V reference circuits (P06A3, P0697)	19 / 39 counts intermittent or 15 counts continuous, 12.5 ms/count in the main processor	Type A, 1 Trips
			Difference between (normalized min APP1) and (normalized min APP2) >	5.000 % Vref		Run/Crank voltage > 6.41 No APP sensor faults (P2122, P2123,P2127, P2128) No 5V reference errors or faulst for # 3 & # 4 5V reference circuits (P06A3, P0697)	19 / 39 counts intermittent or 15 counts continuous, 12.5 ms/count in the main processor	

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

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)	Engine Coolant Temp (ECT) is ≤ commanded temperature minus 11 Deg C and normalized ratio is ≤ than 1.75 . When above is present for more than 5 seconds, fail counts start. Engine total airgrams is accumulated when 17 ≤ AirFlow ≤ 450 grams per second. == Ratio Definition:=== Current temp difference between ECT and RCT minus PwrUp difference divided by total airgrams. Note: Minimum total airgrams is 500.0 grams.		No Active DTC's Engine not run time Engine run time Fuel Condition ECT at Power Up IAT min T-Stat Heater duty cycle commanded Airflow	MAF_SensorFA IAT_SensorFA THMR_RCT_Sensor_Ckt _FA THMR_ECT_Sensor_Ckt _FA ≥ 1,800 seconds 90 ≤ Time ≤ 1,370 seconds Ethanol ≤ 87 % -7.0 ≤ ECT ≤ 70.0 °C -7 °C ≤ IAT ≤ 55 °C. ≤ 0 % 17.0 ≤ Airflow ≤ 450.0 gps	30 failures out of 90 samples 1 sec/ sample Once per ignition key cycle	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Bank 1 Air-Fuel Ratio Imbalance	P219A	This monitor determines if a cylinder-to-cylinder air-fuel ratio imbalance is present on bank 1.	Filtered Ratio > Note: The input to this metric is the pre catalyst oxygen sensor voltage. This voltage is used to generate a Variance metric that represents the statistical variation of the O2 sensor voltage over a given engine cycle. This metric is proportional to the air-fuel ratio imbalance (variance is higher with an imbalance than without). Multiple samples are collected in making a decision. The observed Variance is dependant on engine speed and load and so each result is normalized for speed and load by comparing it to a known "good system" result for that speed and load, and generating a Ratio metric. The Ratio metric is calculated by selecting a threshold calibration from a 17x17 table (Supporting Table KtFABD_U_VarThresh1) and subtracting it from the measured Variance. The result is then divided by a normalizer calibration from another 17 x 17 table (Supporting Table	0.50	System Voltage Fuel Level Engine Coolant Temperature Cumulative engine run time Diagnostic enabled at Idle (regardless of other operating conditions) Engine speed Engine speed delta during a short term sample period Mass Airflow (MAF) Cumulative delta MAF during a short term sample period Filtered MAF delta between samples Note: first order lag filter coefficient applied to MAF = 0.050 Air Per Cylinder (APC) APC delta during short term sample period Filtered APC delta between samples	no lower than 11.0 Volts for more than 0.2 seconds > 10.0 percent AND no fuel level sensor fault > -20 degrees C > 120.0 seconds No 875 to 3,250 RPM < 100 rpm 10 to 1,000 g/s < 3 g/s < 1.00 g/s 200 to 680 mg/cylinder < 25 mg/cylinder < 8.00 percent	Minimum of 1 test per trip, up to 8 tests per trip during RSR or FIR. The front O2 sensor voltage is sampled once per cylinder event. Therefore, the time required to complete a single test (when all enable conditions are met) decreases as engine speed increases. For example, 7.20 seconds of data is required at 1000 rpm while double this time is required at 500 rpm and half this time is required at 2000 rpm. This data is collected only when enable conditions are met, and as such significantly more operating time is required than is indicated above. Generally, a report will be	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			KtFABD_U_Normalizer1). This quotient is then multiplied by a quality factor calibration from a 17 x 17 table (Supporting Table KtFABD_K_QualFactor1). This result is referred to as the Ratio. Note that the quality factor ranges between 0 and 1 and represents robustness to false diagnosis in the current operating region. Regions with low quality factors are not used. Finally, a EWMA filter is applied to the Ratio metric to generate the Filtered Ratio malfunction criteria metric. Generally, a normal system will result in a negative Filtered Ratio while a failing system will result in a positive Filtered Ratio. The range of the Filtered Ratio metric is application specific since both the emissions sensitivity and relationship between imbalance and the Variance metric are application specific.		Note: first order lag filter coefficient applied to APC = 0.050 Spark Advance Throttle Area (percent of max) Intake Cam Phaser Angle Exhaust Cam Phaser Angle Quality Factor (QF) QF calibrations are located in a 17x17 lookup table versus engine speed and load (Supporting Table KtFABD_K_QualFactor1). Quality factor values less than “1” indicate that we don’t have 4sigma/2sigma robustness in that region. The quality of the data is determined via statistical analysis of Variance data. Fuel Control Status Closed Loop and Long Term FT Enabled for AIR pump not on CASE learn not active EGR - no device control, no intrusive diagnostics	 0 to 40 degrees 2 to 200 percent 0 to 25 degrees 0 to 25 degrees >= 0.99 >= 2.0 seconds Please see "Closed Loop Enable Criteria" and "Long Term FT Enable Criteria" in Supporting Tables.	made within 5 minutes of operation. For RSR or FIR, 24 tests must complete before the diagnostic can report.	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					EVAP - no device control, no intrusive diagnostics Engine OverSpeed 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:	>= 0.50 >= 0.94 0.00 0.00 EngineMisfireDetected_FA MAP_SensorFA MAF_SensorFA ECT_Sensor_FA TPS_ThrottleAuthorityDefaulted FuelInjectorCircuit_FA AIR System FA EvapExcessPurgePsbl_FA		

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Bank 2 Air-Fuel Ratio Imbalance	P219B	This monitor determines if a cylinder-to-cylinder air-fuel ratio imbalance is present on bank 2.	Filtered Ratio > Note: The input to this metric is the pre catalyst oxygen sensor voltage. This voltage is used to generate a Variance metric that represents the statistical variation of the O2 sensor voltage over a given engine cycle. This metric is proportional to the air-fuel ratio imbalance (variance is higher with an imbalance than without). Multiple samples are collected in making a decision. The observed Variance is dependant on engine speed and load and so each result is normalized for speed and load by comparing it to a known "good system" result for that speed and load, and generating a Ratio metric. The Ratio metric is calculated by selecting a threshold calibration from a 17x17 table (Supporting Table KtFABD_U_VarThresh2) and subtracting it from the measured Variance. The result is then divided by a normalizer calibration from another 17 x 17 table (Supporting Table	0.34	See Bank 1 (P219A) Secondary Parameters and Enable Conditions. Quality Factor (QF) QF calibrations are located in a 17x17 lookup table versus engine speed and load (Supporting Table KtFABD_K_QualFactor2). Quality factor values less than “1” indicate that we don’t have 4sigma/2sigma robustness in that region. The quality of the data is determined via statistical analysis of Variance data. **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	 >= 0.99 >= 0.34 >= 0.49 0.00	See Bank 1 info	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			KtFABD_U_Normalizer2). This quotient is then multiplied by a quality factor calibration from a 17 x 17 table (Supporting Table KtFABD_K_QualFactor2). This result is referred to as the Ratio. Note that the quality factor ranges between 0 and 1 and represents robustness to false diagnosis in the current operating region. Regions with low quality factors are not used. Finally, a EWMA filter is applied to the Ratio metric to generate the Filtered Ratio malfunction criteria metric. Generally, a normal system will result in a negative Filtered Ratio while a failing system will result in a positive Filtered Ratio. The range of the Filtered Ratio metric is application specific since both the emissions sensitivity and relationship between imbalance and the Variance metric are application specific.		filtered ratio is reset to:	0.00		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure (BARO) Sensor Performance (naturally aspirated)	P2227	Compares baro sensor to the calculated baro estimate (part throttle calculation or unthrottled MAP)	Difference between baro sensor reading and estimated baro when distance since last estimated baro update OR Difference between baro sensor reading and estimated baro when distance since last estimated baro update	> 15.0 kPa <= 0.06 miles > 20.0 kPa > 0.06 miles	Engine Run Time No Active DTCs:	> 0.00 seconds AmbPresSnsrCktFA ECT_Sensor_Ckt_FA IAT_SensorFA MAF_SensorFA AfterThrottlePressureFA TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA	320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips
			Barometric Pressure OR Barometric Pressure	< 50.0 kPa > 115.0 kPa	Time between current ignition cycle and the last time the engine was running Engine is not rotating No Active DTCs: No Pending DTCs:	> 409.6 seconds EngineModeNotRunTimer Error MAP_SensorFA TC_BoostPresSnsrCktFA AAP2_SnsrFA MAP_SensorCircuitFP AAP_SnsrCktFP AAP2_SnsrCktFP	4 failures out of 5 samples 1 sample every 12.5 msec	

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure (BARO) Sensor Circuit Low (non-boosted applications)	P2228	Detects a continuous short to low or open in either the signal circuit or the BARO sensor.	BARO Voltage	< 40.0 % of 5 Volt Range (2.0 Volts = 51.0 kPa)	Engine Run Time	> 0.00 seconds	320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure (BARO) Sensor Circuit High (non-boosted applications)	P2229	Detects an open sensor ground or continuous short to high in either the signal circuit or the BARO sensor.	BARO Voltage	> 90.0 % of 5 Volt Range (4.5 Volts = 115.1 kPa)	Engine Run Time	> 0.00 seconds	320 failures out of 400 samples 1 sample every 12.5 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Barometric Pressure (BARO) Sensor Circuit Intermittent	P2230	Detects a noisy or erratic barometric pressure input	String Length Where: "String Length" = sum of "Diff" calculated over And where: "Diff" = ABS(current BARO reading - BARO reading from 12.5 milliseconds previous)	> 40 kPa 5 consecutive BARO samples	No Active DTCs:	AmbPresSnsrCktFA ECT_Sensor_Ckt_FA IAT_SensorFA MAF_SensorFA AfterThrottlePressureFA TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA	10 failures out of 15 samples	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Signal Stuck Lean Bank 1 Sensor 2	P2270	This DTC determines if the post catalyst O2 sensor is stuck in a normal lean voltage range and thereby can no longer be used for post oxygen sensor fuel control or for catalyst monitoring. The diagnostic is an intrusive test (during coast) which increases the delivered fuel to achieve the required rich threshold.	Post O2 sensor signal AND The Accumulated mass air flow monitored during the Stuck Lean Voltage Test	< 825 mvolts > 183 grams	No Active DTC's B1S2 DTC's Not active this key cycle System Voltage ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Pedal position Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled) Engine Airflow Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled) Closed loop integral Closed Loop Active	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013B, P013E, P013F, P2270 or P2271 10.0 < Volts < 32.0 = Not Valid = Not Valid, See definition of Green Sensor Delay Criteria (B1S2) in Supporting Tables tab. = False ≤ 100.0 % 1,100 ≤ RPM ≤ 2,500 1,050 ≤ RPM ≤ 2,650 3 ≤ gps ≤ 20 40.4 ≤ MPH ≤ 82.0 36.0 ≤ MPH ≤ 87.0 0.74 ≤ C/L Int ≤ 1.08 = TRUE	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 2.0 seconds, and then the Force Cat Rich intrusive stage is requested. ========== During Stuck Lean test the following must stay TRUE or the test will abort: 0.95 ≤ Fuel EQR ≤ 1.10	not in control of purge not in estimate mode = enabled = not active = not active ≥ 80.0 sec 600 ≤ ºC ≤ 900 = DFCO possible ==========		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Signal Stuck Rich Bank 1 Sensor 2	P2271	This DTC determines if the post catalyst O2 sensor is stuck in a normal rich voltage range and thereby can no longer be used for post oxygen sensor fuel control or for catalyst monitoring. The diagnostic is an intrusive test which requests the DFCO mode to achieve the required lean threshold.	Post O2 sensor signal AND The Accumulated mass air flow monitored during the Stuck Rich Voltage Test	> 150 mvolts > 82 grams	No Active DTC's B1S2 DTC's Not Active this key cycle System Voltage ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Engine Speed Engine Airflow Vehicle Speed Closed loop integral Closed Loop Active Evap Ethanol Post fuel cell Power Take Off EGR Intrusive diagnostic All post sensor heater delays O2S Heater (post sensor) on Time	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013B, P013E, P013F or P2270 10.0 < Volts < 32.0 = Not Valid = Not Valid, See definition of Green Sensor Delay Criteria (B1S2) in Supporting Tables tab. = False 1,100 ≤ RPM ≤ 2,500 3 ≤ gps ≤ 20 40.4 ≤ MPH ≤ 82.0 0.74 ≤ C/L Int ≤ 1.08 = TRUE not in control of purge not in estimate mode = enabled = not active = not active = not active ≥ 80.0 sec	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Predicted Catalyst temp Fuel State DTC's Passed ========== After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).	600 ≤ ºC ≤ 900 DFCO possible = P2270 (and P2272 if applicable) = P013E (and P014A if applicable) = P013A (and P013C if applicable) ==========		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
O2 Sensor Signal Stuck Lean Bank 2 Sensor 2	P2272	This DTC determines if the post catalyst O2 sensor is stuck in a normal lean voltage range and thereby can no longer be used for post oxygen sensor fuel control or for catalyst monitoring. The diagnostic is an intrusive test (during coast) which increases the delivered fuel to achieve the required rich threshold.	Post O2 sensor signal AND The Accumulated mass air flow monitored during the Stuck Lean Voltage Test	< 825 mvolts > 183 grams.	No Active DTC's B2S2 DTC's Not Active this key cycle System Voltage ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Pedal position Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled) Engine Airflow Vehicle Speed to initially enable test Vehicle Speed range to keep test enabled (after initially enabled) Closed loop integral Closed Loop Active	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013C, P013D, P014A, P014B, P2272 or P2273 10.0 < Volts < 32.0 = Not Valid = Not Valid, See definition of Green Sensor Delay Criteria (B2S2) in Supporting Tables tab. = False ≤ 100.0 % 1,100 ≤ RPM ≤ 2,500 1,050 ≤ RPM ≤ 2,650 3 ≤ gps ≤ 20 40.4 ≤ MPH ≤ 82.0 36.0 ≤ MPH ≤ 87.0 0.74 ≤ C/L Int ≤ 1.08 = TRUE	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc = FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					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 2.0 seconds, and then the Force Cat Rich intrusive stage is requested. ========== During Stuck Lean test the following must stay TRUE or the test will abort: 0.95 ≤ Fuel EQR ≤ 1.10	not in control of purge not in estimate mode = enabled = not active = not active ≥ 80.0 sec 600 ≤ ºC ≤ 900 = DFCO possible ==========		

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Fuel State DTC's Passed ========== After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).	= 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.
Transmission Control Torque Request Circuit	P2544	Determines if the torque request from the TCM is valid	Protect error - Serial Communication message - ($199 - PTEI3) OR Rolling count error - Serial Communication message ($199 - PPEI3) rolling count value OR Range Error - Serial Communication message - ($199 - PTEI3) TCM Requested Torque Increase OR Multi-transition error - Trans torque intervention type request change	Message <> two's complement of message Message <> previous message rolling count value + one > 450 Nm Requested torque intervention type toggles from not increasing request to increasing request	Diagnostic enabled/ disabled Power Mode Engine Running Run/Crank Active No Serial communication loss to TCM (U0101)	Enabled = Run = True > 0.50 Sec No loss of communication	>= 16 Protect errors during key cycle. Performed on every received message >= 6 Rolling count errors out of 10 samples. Performed on every received message >= 6 range errors out of 10 samples. Performed on every received message >= 3 multi-transitions out of 5 samples. Performed every 200 msec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
ECM/PCM Internal Engine Off Timer Performance 11.12.41 and beyond	P2610	This DTC determines if the hardware timer does not initialize or count properly. There are two tests to ensure proper functioning of the timer: Count Up Test (CUT) and Range Test (RaTe). Count Up Test (CUT): Verifies that the HWIO timer is counting up with the proper increment. Range Test (RaTe): When the run/crank is not active both the hardware and mirror timers are started. The timers are compared when ECM shutdown is initiated or run/crank becomes active.	Count Up Test: Time difference between the current read and the previous read of the timer Range Test: The variation of the HWIO timer and mirror timer is	> 1.50 seconds > 25 %.			Count Up Test: 4 failures out of 20 samples 1 sec / sample Continuous while run/crank is not active and until controller shutdown is initiated. Range Test: Once per trip when controller shutdown is initiated or run/ crank becomes active.	Type B, 2 Trips

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

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With TCM	U0101	This DTC monitors for a loss of communication with the transmission control module	Message is not received from controller for Message $0C7 or Message $0F9 or Message $199 or Message $1F5	 ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds ≥ 10.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line or Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds Power Mode is in	 Not Active on Current Key Cycle Enabled Not Active Not Active >= 11.00 or >= 6.41 = run = 0 (1 indicates enabled) = Active > 11.00	Diagnostic runs in 12.5 ms loop	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Body Control Module	U0140	This DTC monitors for a loss of communication with the Body Control Module.	Message is not received from controller for	≥ 10.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line or Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds	 Not Active on Current Key Cycle Enabled Not Active Not Active >= 11.00 or >= 6.41 = run = 0 (1 indicates enabled) = Active > 11.00	Diagnostic runs in 12.5 ms loop	Type C, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for 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.
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	Energy is accumulated after the first conbustion event using Range #1 or #2 below: Thermostat type is divided into normal (non-heated) and electrically heated. For this application the "type" cal (KeTHMG_b_TMS_ElecThstEquipped) = 0 If the type cal is equal to one, the application has an electrically heated t-stat, if equal to zero the the application has an non heated t-stat. See appropiate section below. ********** Type cal above = 1 (Electrically heated t-stat) == == == == Range #1 (Primary) ECT reaches Commanded temperature minus 11 °C when Ambient min is < 52 °C and ≥ 10 °C. Note: Warm up target for range #1 will be at least 64 °C == == == == Range #2 (Alternate) ECT reaches Commanded temperature minus 11 °C when Ambient min is < 10 °C and ≥ -7 °C. Note: Warm up target for range #2 will be at least	See “P0128: Maximum Accumulated Energy for Start-up ECT conditions“ in the Supporting tables section This diagnostic models the net energy into and out of the cooling system during the warm-up process. The five energy terms are: Heat from combustion, heat from after-run, heat loss to enviroment, heat loss to cabin and heat loss to DFCO.	No Active DTC's Engine not run time Engine run time Fuel Condition T-Stat Heater duty commanded cycle Time over duty cycle limit ECT at start run	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 ≥ 1,800 seconds 10 ≤ Eng Run Tme ≤ 1,400 seconds Ethanol ≤ 80 % ≤ 20.0 % duty cycle < 5.0 seconds -10 ≤ ECT ≤ 60 °C	1 failure to set DTC 1 sec/ sample Once per ignition key cycle	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			64 °C ********** Type cal above = 0 (non - heated t-stat) == == == == Range #1 (Primary) ECT reaches 64 °C when Ambient min is < 52 °C and ≥ 10 °C. == == == == Range #2 (Alternate) ECT reaches 64 °C when Ambient min is < 10 °C and ≥ -7 °C. **********					

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 1 Performance (For use on vehicles with electric transfer pump dual fuel tanks)	P0461	This DTC will detect a fuel sender stuck in range in the primary fuel tank.	Fuel Level in Primary and Secondary Tanks Remains in an Unreadable Range too Long If fuel volume in primary tank is and fuel volume in secondary tank is and remains in this condition for OR During Fuel Transfer During fuel transfer, when the enable conditions are met, at least 3.0 liters of fuel will be transferred from the secondary tank and 3.0 liters of fuel will be transferred into the primary tank within 300 seconds. There is a short delay of 20 seconds to allow fuel slosh to settle before the fail timer begins. If the secondary tank volume does decrease by the cal amount but the primary volume does not increase by the cal amount after the fail timer has expired, then P0461 sets.	≥ 1,024.0 liters < 0.0 liters 124 miles.	Engine Running No active DTCs: Transfer Pump is commanded on No device control for the transfer pump Fuel Volume in Secondary Tank Vehicle Speed	VehicleSpeedSensor_FA < 136 liters < 0 mph	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.
			OR Distance Traveled without a Primary Fuel Level Change Delta fuel volume change over an accumulated 72 miles.	 < 3 liters				

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Pedal Position Sensor Circuit Low	P057C	detects short to ground for brake pedal position sensor	If x of y samples are observed below failure threshold, default brake pedal position to zero percent.	5.00	Brake Pedal Position Sensore Low Voltage Diagnostic Enable	TRUE 1.00	20 / 32.00 counts	MIL: Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Brake Pedal Position Sensor Circuit High	P057D	detects open circuit for brake pedal position sensor	If x of y samples are observed above failure threshold, default brake pedal position to zero percent and set DTC	95.00	Brake Pedal Position Sensore High Voltage Diagnostic Enable	TRUE 1.00	20.00 / 32.00 counts	MIL: Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Fuel Level Sensor 2 Performance (For use on vehicles with electric transfer pump dual fuel tanks)	P2066	This DTC will detect a fuel sender stuck in range in the secondary fuel tank.	********** Fuel Level in Primary and Secondary Tanks Remains in an Unreadable Range too Long ********** If fuel volume in primary tank is and fuel volume in secondary tank is and remains in this condition for OR ********** During fuel transfer ********** When the enable conditions are met, 3.0 liters of fuel will be transferred from the secondary tank and 3.0 liters of fuel will be transferred into the primary tank within 300 seconds. There is a short delay of 20 seconds to allow fuel slosh to settle before the fail timer begins. If the secondary tank volume does not decrease by the cal amount but the primary	≥ 1,024.0 liters < 0.0 liters 124 miles	Engine Running No active DTCs: Transfer Pump is commanded on No device control for the transfer pump Fuel volume in secondary tank Vehicle Speed	VehicleSpeedSensor_FA < 136 liters < 0.0 mph	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.
			volume does increase by the cal amount after the fail timer has expired, then P2066 sets. OR ********** After a Refuel Event ********** If the primary fuel volume changes by 1,024 liters from engine “off” to engine “on” the secondary volume should change by 3 liters. Otherwise, P2066 will set. OR ********** Distance Traveled without a Secondary Fuel Level Change ********** If the vehicle is driven a distance of 103 miles without the secondary fuel level changing by 3 liters, then the sender must be stuck. OR The secondary fuel sender is stuck in the dead band AND If the vehicle is driven a distance of 103 miles without the secondary fuel level changing by 3 liters, then the sender must be stuck.	> 136 liters.	Volume in secondary tank Volume in secondary tank Secondary Fuel Transfer Pump On Time	≥ 7 liters < 136 liters ≥ 1,200 seconds		

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

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication With Anti-Lock Brake System (ABS) Control Module	U0121	This DTC monitors for a loss of communication with the Anti-Lock Brake System 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 or Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000 seconds	 Not Active on Current Key Cycle Enabled Not Active Not Active >= 11.00 or >= 6.41 = run = 1 (1 indicates enabled) = Active > 11.00	Diagnostic runs in 12.5 ms loop	Type C, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for U0121 Anti-Lock Brake System Control Module	> 0.4000 seconds Not Active on Current Key Cycle is present on the bus		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Transfer Case Speed Sensor Output (TCSS)	P2160	No activity in the TCSS Signal circuit	TCSS Raw Speed	≤ 50 RPM	Engine Torque Throttle Position Transmission gear Garage Shift PTO EngineTorqureInaccurate	60.0 ≤ N-M ≤ 8,191.8 8 ≤ % ≤ 99 Not in Park or Neutral Not active Not active Not a hybrid vehicle FALSE	≥ 5.0 sec	Type B, 2 Trips

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Four Wheel Drive Low Switch Circuit	P2771	Fail Case 1: Continuous Open (Stuck Off) in the Four Wheel Drive Low Switch CircuitFail Case 2: Ground (Stuck On) in the Four Wheel Drive Low Switch Circuit	4WD Low Switch Transfer case gear ratio 4WD Low Switch Transfer case gear ratio	= TRUE ≥ 2.400 and ≤ 3.000 = FALSE ≥ 0.800 and ≤ 1.200	Engine Torque Engine Speed Ignition voltage Throttle position Transmission Temperature Engine Run time Vehicle Speed TPS_FA VehicleSpeedSensor_FA EngineTorqureInaccurate Transmission gear P0502, P0503, P0722, P0723, P215C, P2160, P2161, U0101 Clutch Transmission Input Speed Signal	30.0 ≤ N-M ≤ 8,191.8 1,000 ≤ RPM ≤ 5,500 9.0 ≤ Volts ≤ 32.00 3.0 ≤ % ≤ 99.0 -40.0 ≤ ºC ≤ 130.0 >= 10.0 Sec >= 5.00 Mph False False FALSE Not in Park, Reverse, or Neutral Not Fault Active Engaged (Manual transmission only) Valid (Automatic transmission only)	≥ 2.0 sec≥ 7.0 sec	Type B, 2 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Lost Communication with Transfer Case Control Module	U0102	This DTC monitors for a loss of communication with the Transfer case Control Module	Message is not received from controller for Message $1CB or Message $1CC	 ≥ 10.0 seconds ≥ 10.0 seconds	General Enable Criteria: U0073 Normal CAN transmission on Bus A Device Control High Voltage Virtual Network Management Ignition Voltage Criteria: Ignition voltage Power Mode Off Cycle Enable Criteria: KeCAND_b_OffKeyCycle DiagEnbl Ignition Accessory Line or Battery Voltage General Enable Criteria and either Ignition Voltage Criteria or Off Cycle Enable Criteria met for > 3.0000	 Not Active on Current Key Cycle Enabled Not Active Not Active >= 11.00 or >= 6.41 = run = 1 (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.
					seconds Power Mode is in accessory or run or crank and High Voltage Virtual Network Management is not active for U0102 Transfer Case 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.
Catalyst System Low Efficiency Bank 1	P0420	NOTE: The information contained below applies to applications that use the Idle Catalyst Monitor Algorithm The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and O2 during lean A/F excursions to store the excess oxygen (I.e. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H2 to release this stored oxygen (I.e. Cerium Reduction). This is referred to as the Oxygen Storage Capacity, or OSC. CatMon's strategy is to "measure" the OSC of the catalyst through forced Lean and Rich A/F excursions Normalized Ratio OSC Value Calculation Information and Definitions = 1. Raw OSC Calculation = (post cat O2 Resp time - pre cat O2 Resp time) 2. BestFailing OSC value from a calibration table (based on temp and exhaust gas flow)	Normalized Ratio OSC Value (EWMA filtered)	< 0.35	There must be a valid idle period. The criteria are: Driver must be off the accel pedal. This checks that the final accel pedal position (comprehending deadband and hysteresis) is essentially zero. Idle Speed Control System Is Active Vehicle Speed Engine speed Engine run time Tests attempted this trip The catalyst diagnostic has not yet completed for the current trip. Catalyst Idle Conditions Met Criteria is satified which includes the General Enable met and the Valid Idle Period Criteria met, as well as: Green Converter Delay	 < 1.24 MPH > 975 RPM for a minimum of 20 seconds since end of last idle period. > MinimumEngineRunTime, This is a function of Coolant Temperature, please see Supporting Tables < 255	1 test attempted per valid idle period Minimum of 1 test per trip Maximum of 8 tests per trip Frequency: Fueling Related : 12.5 ms OSC Measurements: 100 ms Temp Prediction: 12.5ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		3. WorstPassing OSC value (based on temp and exhaust gas flow) Normalized Ratio Calculation = (1-2) / (3-2) A Normalized Ratio of 1 essentially represents a good part and a ratio of 0 essentially represents a very bad part.The Catalyst Monitoring Test is done during idle. Several conditions must be meet in order to execute this test. These conditions and their related values are listed in the secondary parameters area of this document.			Induction Air Intrusive test(s): Fueltrim Post O2 EVAP EGROther vehicle functions: Power Take Off RunCrank Voltage Ethanol Estimation ECT Barometric Pressure Idle Time before going intrusive is Idle time is incremented if Vehicle speed Short Term Fuel Trim Predicted catalyst temp	Not Active > -20 ° C < 250 ° C Not Active Not Active > 10.90 Volts NOT in Progress > 40 ° C < 129 ° C > 70 KPA < 50 Seconds < 1.24 MPH and the drivers foot is off accel pedal and the idle speed control system is active as identified in the Valid Idle Period Criteria section. > 0.90 < 1.21 > 420.00 degC		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					AND			
					Engine Airflow	> MinAirflowToWarmCatalyst table (g/s) (refer to "Supporting Tables" tab) (Based on engine coolant at the time the WarmedUpEvents counter resets to 0.)		
					for at least	30 seconds		
					with a closed throttle time	< 180 seconds consecutively (closed throttle consideration involves having the driver off the accel pedal as stated in the Valid Idle Period Criteria Section) .		
					Also, in order to increment the WarmedUpEvents counter, either the vehicle speed must exceed the vehicle speed cal or the driver must NOT be off the accel pedal as stated in the Valid Idle Period Criteria section above.			
					Closed loop fueling (Please see "Closed Loop Enable Criteria" section of the "Supporting Tables" tab for details.)			
					PRNDL	Enabled in Drive Range		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						on an Auto Transmission vehicle.		
					Idle Stable Criteria:	Must hold true from after Catalyst Idle Conditions Met to the end of test		
					MAF	> 4.00 g/s < 20.00 g/s		
					Predicted catalyst temperature	< 850 degC		
					Engine Fueling Criteria at Beginning of Idle Period The following fueling related must also be met from between 4 and 7 seconds after the Catalyst Idle Conditions Met Criteria has been met for at least 4 seconds prior to allowing intrusive control:			
					Number of pre-O2 switches	>= 2		
					Short Term Fuel Trim Avg	> 0.96 < 1.04		
					Rapid Step Response (RSR) feature will initiate multiple tests:			
					If the difference between current EWMA value and the current OSC Normalized Ratio value is	> 0.62		
					and the current OSC Normalized Ratio value is	< 0.10		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Maximum RSR tests to detect failure when RSR is enabled. Green Converter Delay Criteria This is part of the check for the Catalyst Idle Conditions Met Criteria section The diagnostic will not be enabled until the following has been met: Predicted catalyst temperature for Note: this feature is only enabled when the vehicle is new and cannot be enabled in service PTO General Enable DTC's Not Set	24 > 0 ° C 0 seconds non-continuously. Not Active MAF_SensorFA MAF_SensorTFTKO AmbPresDfltdStatus IAT_SensorCircuitFA IAT_SensorCircuitTFTKO ECT_Sensor_FA O2S_Bank_1_Sensor_1_FA O2S_Bank_1_Sensor_2_FA O2S_Bank_2_Sensor_1_FA		

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Catalyst System Low Efficiency Bank 2	P0430	Note: The information below applies to applications that use the Idle Catalyst Monitor Algorithm The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and O2 during lean A/F excursions to store the excess oxygen (I.e. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H2 to release this stored oxygen (I.e. Cerium Reduction). This is referred to as the Oxygen Storage Capacity, or OSC. CatMon's strategy is to "measure" the OSC of the catalyst through forced Lean and Rich A/F excursions Normalized Ratio OSC Value Calculation Information and Definitions = 1. Raw OSC Calculation = (post cat O2 Resp time - pre cat O2 Resp time) 2. BestFailing OSC value from a calibration table (based on temp and exhaust gas flow) 3. WorstPassing OSC	Normalized Ratio OSC Value (EWMA filtered)	< 0.35	There must be a valid idle period. The criteria are: Driver must be off the accel pedal. This checks that the final accel pedal position (comprehending deadband and hysteresis) is essentially zero. Idle Speed Control System Is Active Vehicle Speed Engine speed Engine run time Tests attempted this trip The catalyst diagnostic has not yet completed for the current trip. Catalyst Idle Conditions Met Criteria is satified which includes the General Enable met and the Valid Idle Period	< 1.24 MPH > 975 RPM for a minimum of 20 seconds since end of last idle period. > MinimumEngineRunTime, This is a function of Coolant Temperature, please see Supporting Tables < 255	1 test attempted per valid idle period Minimum of 1 test per trip Maximum of 8 tests per trip Frequency: Fueling Related : 12.5 ms OSC Measurements: 100 ms Temp Prediction: 12.5ms	Type A, 1 Trips

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		value (based on temp and exhaust gas flow) Normalized Ratio Calculation = (1-2) / (3-2) A Normalized Ratio of 1 essentially represents a good part and a ratio of 0 essentially represents a very bad part.The Catalyst Monitoring Test is done during idle. Several conditions must be meet in order to execute this test. These conditions and their related values are listed in the secondary parameters area of this document.			Criteria met, as well as: Green Converter Delay Induction Air Intrusive test(s): Fueltrim Post O2 EVAP EGROther vehicle functions: Power Take Off RunCrank Voltage Ethanol Estimation ECT Barometric Pressure Idle Time before going intrusive is Idle time is incremented if Vehicle speed Short Term Fuel Trim Predicted catalyst temp	 Not Active > -20 ° C < 250 ° C Not Active Not Active > 10.90 Volts NOT in Progress > 40 ° C < 129 ° C > 70 KPA < 50 Seconds < 1.24 MPH and the drivers foot is off accel pedal and the idle speed control system is active as identified in the Valid Idle Period Criteria section. > 0.90 < 1.21 > 420.00 degC		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					AND			
					Engine Airflow	> MinAirflowToWarmCatalyst table (g/s) (refer to "Supporting Tables" tab) (Based on engine coolant at the time the WarmedUpEvents counter resets to 0.)		
					for at least	30 seconds		
					with a closed throttle time	< 180 seconds consecutively (closed throttle consideration involves having the driver off the accel pedal as stated in the Valid Idle Period Criteria Section) .		
					Also, in order to increment the WarmedUpEvents counter, either the vehicle speed must exceed the vehicle speed cal or the driver must NOT be off the accel pedal as stated in the Valid Idle Period Criteria section above.			
					Closed loop fueling (Please see "Closed Loop Enable Criteria" section of the "Supporting Tables" tab for details.)			
					PRNDL	Enabled in Drive Range on an Auto Transmission vehicle.		
					Idle Stable Criteria:	Must hold true from after		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						Catalyst Idle Conditions Met to the end of test		
					MAF	> 4.00 g/s < 20.00 g/s		
					Predicted catalyst temperature	< 850 degC		
					Engine Fueling Criteria at Beginning of Idle Period The following fueling related must also be met from between 4 and 7 seconds after the Catalyst Idle Conditions Met Criteria has been met for at least 4 seconds prior to allowing intrusive control:			
					Number of pre-O2 switches	>= 2		
					Short Term Fuel Trim Avg	> 0.96 < 1.04		
					Rapid Step Response (RSR) feature will initiate multiple tests:			
					If the difference between current EWMA value and the current OSC Normalized Ratio value is	> 0.62		
					and the current OSC Normalized Ratio value is	< 0.10		
					Maximum RSR tests to	24		

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					detect failure when RSR is enabled. Green Converter Delay Criteria This is part of the check for the Catalyst Idle Conditions Met Criteria section The diagnostic will not be enabled until the following has been met: Predicted catalyst temperature for Note: this feature is only enabled when the vehicle is new and cannot be enabled in service PTO General Enable DTC's Not Set	> 0 ° C 0 seconds non-continuously. Not Active MAF_SensorFA MAF_SensorTFTKO AmbPresDfltdStatus IAT_SensorCircuitFA IAT_SensorCircuitTFTKO ECT_Sensor_FA O2S_Bank_1_Sensor_1_FA O2S_Bank_1_Sensor_2_FA O2S_Bank_2_Sensor_1_FA		

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Traction Control Torque Request Circuit	P0856	Determines if torque request from the EBTCM is valid	Serial Communication 2's complement message - ($140 for PPEI2 or $1C9 for PPEI3, $1CA/$1C6 for Hybrid))	Message <> 2's complement of message	Serial communication to EBTCM (U0108) Power Mode Engine Running Status of traction in GMLAN message ($4E9)	No loss of communication = Run = True = Traction Present	Count of 2's complement values not equal >= 20 Performed on every received message	Type C, 1 Trips
			OR Serial Communication message ($140 for PPEI2 or $1C9 for PPEI3, $1CA/ $1C6 for Hybrid)) rolling count value	Message rolling count value <> previous message rolling count value plus one			8 rolling count failures out of 10 samples Performed on every received message	
			OR Too many minimum limit torque request transitions occur from TRUE to FALSE to TRUE within a time period	Requested torque intervention type toggles from not increasing request to increasing request			>= 5 multi-transitions out of 5 samples. Performed every 200 ms	
			Torque request greater than torque request diagnostic maximum threshold	> 250 Nm for engine based traction torque system, OR > 4,000 Nm for axle based traction torque system			>= 4 out of 10 samples Performed on every received message	

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
ABS System Rough Road Detection Communication Fault IF KeMSFD_b_MonitorRoughRoad and not GetRRDR_b_TOS_BasedRoughRoad	P1381	This diagnostic detects if the rough road information is no longer being received from the ABS controller, and misfire is present. When this occurs, misfire will continue to run.	Loss of GMLan Message: "Wheel Sensor Rough Road Magnitude"	= FALSE	Vehicle Speed Engine Speed Engine Load RunCrankActive Active DTC	VSS ≥ 5 mph rpm < 8,192 load < 60 = TRUE P0300, MIL Request	40 failures out of 80 samples 250 ms /sample Continuous	Type C, 1 Trips "Special Type C"

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)	< -32.00 KJ/s (high RPM failure mode) > 4.70 KJ/s (low RPM failure mode)	To enable the diagnostic, the Cold Start Emission Reduction Strategy must be Active per the following: Catalyst Temperature AND Engine Coolant AND Engine Coolant AND Barometric Pressure The Cold Start Emission Reduction strategy must not be exiting. The strategy will exit per the following: Catalyst Temperature AND Engine Run Time OR Engine Run Time OR Barometric Pressure Other Enable Criteria:	< 300.00 degC > 17.00 degC <= 40.00 degC >= 75.00 KPa >= 600.00 degC >= 1.00 seconds > "Extended Engine Exit Time" This Extended Engine Exit time is a function of percent ethanol and Catmons NormRatioEWMA. Refer to "Supporting Tables" for details. < 75.00 KPa	Runs once per trip when the cold start emission reduction strategy is active Frequency: 100ms Loop Test completes after 10 seconds of accumulated qualified data.	Type A, 1 Trips

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					The diagnostic will delay calculation of the residual value and potentially weight the residual calculation differently based on engine run time. This is to ensure the diagnostic is operating in idle speed control as well as during the peak catalyst light off period. The **"Time Weighting Factor" must be :** General Enable: DTC's Not Set:	> 0 These are scalar values that are a function of engine run time. Refer to "Supporting Tables" for details. 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_Flt TransmissionEngagedState_FA EngineTorqueInaccurate		

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	< 135 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, 1 Trips

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

Component/ System	Fault Code	Monitor Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
Replicated Transmission Output Speed (RTOS) Sensor	P150B	RTOS Signal Circuit Intermittent	RTOS Sensor Loop-to-Loop speed change	≥ 350 RPM	Raw Output Speed Positive Output Speed change Transmission output speed angular velocity Engine Speed Vehicle Speed Ignition voltage	≥ 300 RPM for ≥ 2.0 sec ≤ 150 RPM for ≥ 2.0 sec ≥ 500 RPM 200 ≤ RPM ≤ 7,500 for ≥ 5.0 seconds ≤ 511.99 MPH for ≥ 5.0 sec 9.0 ≤ Volts ≤ 32.0	≥ 3.0 sec	Type B, 2 Trips

Engine run time greater than
KtFSTA_t_ClosedLoopAutostart (HYBRID ONLY)

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

and
KtFSTA_t_ClosedLoopTime

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

and pre converter 02 sensor voltage less than
KfFULC_U_O2_SensorReadyThrsh
Lo

Voltage < *XXXX* milliVolts

for
KcFULC_O2_SensorReadyEvents

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

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

Long Term FT Enable Criteria

Closed Loop Enable and
Coolant greater than
KfFCLL_T_AdaptiveLoCoolant

Coolant	> *XXXX*Celcius

or less than
KfFCLL_T_AdaptiveHiCoolant

Coolant	< *XXXX*Celcius

and
KtFCLL_p_AdaptiveLowMAP_Limit

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

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

Secondary Fuel Trim Enable Criteria

Closed Loop Enable and
KfFCLP_U_O2ReadyThrshLo

Voltage	< *XXXX*milliVolts

for
KcFCLP_Cnt_O2RdyCyclesThrsh

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

Long Term Secondary Fuel Trim Enable Criteria

KtFCLP_t_PostIntglDisableTime

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

Plus

KtFCLP_t_PostIntglRampInTime

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

and

KeFCLP_T_IntegrationCatalystMax

Modeled Catalyst Temperature < *XXXX*Celcius

and

KeFCLP_T_IntegrationCatalystMin

Modeled Catalyst Temperature > *XXXX*Celcius

and

PO2S_Bank_1_Snsr_2_FA and

PO2S_Bank_2_Snsr_2_FA = False

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

Notes:

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

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

Notes:

y/x	5.00	10.00	15.00	20.00	25.00	30.00	35.00	40.00	100.00
1.00	15.43	19.72	25.32	26.87	36.79	45.05	255.00	255.00	255.00

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

Notes:

y/x	600.00	1,400.00	2,200.00	3,000.00	3,800.00	4,600.00	5,400.00	6,200.00	7,000.00
1.00	25.00	60.00	100.00	140.00	180.00	220.00	250.00	280.00	300.00

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

Notes:

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

Description: The Run/Crank voltages required to pull in the PT relay as a function of induction air temperature.					
Notes:					
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: The max time for the Last Seed Timeout as a function of operating loop time sequence.

Notes:

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:

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

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:

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

Description: Engine Sync based and Time based delta pressure threshold above which Torque Security error is reported.						
Notes:						
y/x	0.00	50.00	100.00	150.00	200.00	300.00
1.00	18.69	18.69	18.69	18.69	18.69	18.69

Description: Specifies the external load table for SPDR torque security as a function of engine oil temperature and engine RPM.

Notes:

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

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:

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

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

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

Notes:

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

Description: Cam Position Error Limit for performance diagnostic

Notes:

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

Description:

Notes:

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

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

Notes: Axis is the coolant and the output is the min engine run time

y/x	40	50	60	70	80
1	100	100	100	100	100

Description: This is a 1x3 table with the axis being engine coolant temperature. The implementation of this cal value as a table also included some changes to the way that the WarmedUpEvents counter increments and resets. To summarize, whenever WarmedUpEvents resets to 0 (this could be either at startup, if the closed throttle time exceeds a cal value, or if the predicted exhaust temperature falls below the ExhWarmMin cal value), the appropriate MinAirflowToWrmupCat value is chosen from the table based on engine coolant at the time the WarmedUpEvents counter reset to 0. This cal value is used along with the min exhaust temp to increment the WarmedUpEvents counter.

Notes: Axis is the engine coolant and the output is the minimum airflow required to warmup the catalyst.

y/x	0	45	90
1	20	18	18

Description: Abnormal Noise Threshold

Notes: Used for P0324, P0326 and P0331; X-axis = Engine Air Flow (mg per cylinder) see "APC Breakpoints" (KnKNKD_m_APC_Axis) table; Y-axis = Engine Speed (RPM)

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.290	0.290	0.290	0.290	0.290	0.380	0.440	0.520	0.590	0.540	0.630	0.660	0.660	0.660	0.660	0.660	0.660

Description: KtKNKD_k_OpenMin20K: When using the 20 kHz method (KtKNKD_e_OpenMethod = 1), to set an Open Circuit DTC (P0325 or P0330) the filtered diagnostic FFT Output must be greater than KtKNKD_k_OpenMin20K and less than KtKNKD_k_OpenMax20K.

Notes: X-axis = Engine Speed (RPM)

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	12.7773	12.8477	12.5645	12.1777	12.1191	10.0938	8.9297	9.0586	9.4688	7.9785	6.4531	6.4492	6.4492	6.4492	6.4492	6.4492	6.4492

Description: KtKNKD_k_OpenMax20K: When using the 20 kHz method (KtKNKD_e_OpenMethod = 1), to set an Open Circuit DTC (P0325 or P0330) the filtered diagnostic FFT Output must be greater than KtKNKD_k_OpenMin20K and less than KtKNKD_k_OpenMax20K.

Notes: X-axis = Engine Speed (RPM)

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	43.1348	42.6289	42.0293	41.0059	40.6895	35.9766	33.5293	30.9180	31.5039	26.7090	22.8516	20.3320	18.0234	15.9980	14.3320	13.0996	12.3770

Description: KtKNKD_k_OpenMinNN: When using the Normal Noise method (KtKNKD_e_OpenMethod = 2), to set an Open Circuit DTC (P0325 or P0330) the filtered diagnostic FFT Output must be greater than KtKNKD_k_OpenMinNN and less than KtKNKD_k_OpenMaxNN.

Notes: X-axis = Engine Speed (RPM)

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

Description: KtKNKD_k_OpenMaxNN: When using the Normal Noise method (KtKNKD_e_OpenMethod = 2), to set an Open Circuit DTC the filtered diagnostic FFT Output must be greater than KtKNKD_k_OpenMinNN and less than KtKNKD_k_OpenMaxNN.

Notes: X-axis = Engine Speed (RPM)

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

Description: KtKNKD_k_OpenTestCktMin: When using the 20 kHz method (KtKNKD_e_OpenMethod = 1), to set an OpenTestCkt DTC (P06B6 or P06B7) the filtered diagnostic FFT Output must be greater than KtKNKD_k_OpenTestCktMin and less than KtKNKD_k_OpenTestCktMax.

Notes: X-axis = Engine Speed (RPM)

y/x	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
1	0.199	0.186	0.176	0.188	0.223	0.279	0.385	0.521	0.701	0.928	1.207	1.545	1.943	2.408	2.945	3.559	4.252

Description: KtKNKD_k_OpenTestCktMax: When using the 20 kHz method (KtKNKD_e_OpenMethod = 1), to set an OpenTestCkt DTC (P06B6 or P06B7) the filtered diagnostic FFT Output must be greater than KtKNKD_k_OpenTestCktMin and less than KtKNKD_k_OpenTestCktMax.

Notes: X-axis = Engine Speed (RPM)

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	0.689	0.689	0.689	0.689	0.725	0.980	1.363	1.887	2.563	3.406	4.432	5.650	7.076	8.727	10.611	12.744	15.141

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

Notes: Axis is Long Term Fuel Trim Cell I.D.

P0171/172/174/175 Long-Term Fuel Trim Cell Usage - Part 1				
y/x	CeFADR_e_Cell00_PurgOnAirMode5	CeFADR_e_Cell01_PurgOnAirMode4	CeFADR_e_Cell02_PurgOnAirMode3	CeFADR_e_Cell03_PurgOnAirMode2
1	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell
P0171/172/174/175 Long-Term Fuel Trim Cell Usage - Part 2				
y/x	CeFADR_e_Cell04_PurgOnAirMode1	CeFADR_e_Cell05_PurgOnAirMode0	CeFADR_e_Cell06_PurgOnIdle	CeFADR_e_Cell07_PurgOnDecel
1	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell
P0171/172/174/175 Long-Term Fuel Trim Cell Usage - Part 3				
y/x	CeFADR_e_Cell08_PurgOffAirMode5	CeFADR_e_Cell09_PurgOffAirMode4	CeFADR_e_Cell10_PurgOffAirMode3	CeFADR_e_Cell11_PurgOffAirMode2
1	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell
P0171/172/174/175 Long-Term Fuel Trim Cell Usage - Part 4				
y/x	CeFADR_e_Cell12_PurgOffAirMode1	CeFADR_e_Cell13_PurgOffAirMode0	CeFADR_e_Cell14_PurgOffIdle	CeFADR_e_Cell15_PurgOffDecel
1	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell

Description: P0101_P0106_P0121_P012B_P0236_P1101 TPS Residual Weight Factor based on RPM

Notes:

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

Description: P0101_P0106_P0121_P012B_P0236_P1101 MAF Residual Weight Factor based on RPM

Notes:

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

Description: P0101_P0106_P0121_P012B_P0236_P1101 MAP1 Residual Weight Factor based on RPM

Notes:

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

Description: P0101_P0106_P0121_P012B_P0236_P1101 MAP2 Residual Weight Factor based on RPM

Notes:

y/x	0	500	850	1,200	1,550	1,900	2,250	2,600	2,950	3,300	3,650	4,000	4,350	4,700	5,050	5,400	5,750
1	0.900	0.900	0.900	0.875	0.860	0.865	0.870	0.870	0.880	0.890	0.892	0.896	0.950	0.970	0.980	0.990	1.000

Description: Engine run time following an autostart, as a function of begin run coolant, which must be exceeded to enable CLOSED LOOP.

Notes: Time in seconds: Hybrid use Only

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

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

Notes: Time in seconds

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

Description: KtFCLL_p_AdaptiveLowMAP_Limit

Notes: MAP in KPa

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

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

Notes: Time in seconds

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

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

Notes: Time in seconds

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

Description: Lower limit checked against when determining if an oxygen sensor is in range	
Notes: Voltage in millivolts	
y/x	1
1	1,795

Description: Number of times an oxygen sensor value must be in range before declaring it ready	
Notes: Time (events * 12.5 milliseconds)	
y/x	1
1	10

Description: LTM learning is inhibited if the engine coolant temperature is below this calibration.	
Notes: Degrees Celcius	
y/x	1
1	39

Description: LTM learning is inhibited if the engine coolant temperature is above this calibration.	
Notes: Degrees Celcius	
y/x	1
1	140

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	10

Description: Maximum allowed estimated catalytic converter temperature for post O2 integral terms to be updated.	
Notes: Modeled catalyst Temperature in Celcius	
y/x	1
1	950

Description: Minimum allowed estimated catalytic converter temperature to begin using post O2 integration correction terms. Converter temperature must remain above this threshold to ramp-in the post O2 integration adjustments. Once the ramp-in has started, a converter temperature below this threshold will freeze the ramp-in multiplier. Post O2 integration will not be allowed below this converter temperature

Notes: Modeled catalyst Temperature in Celcius

y/x	1
1	500

Description: P0128: 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)							
y/x	-20	-5	10	30	45	60	75
1	2,100	1,800	1,500	1,200	900	600	300

Description: P0128: 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)

y/x	-20	-5	10	30	45	60	75
1	2,100	1,800	1,500	1,200	900	600	300

Description: KtEPSI_t_RtnHomeDlyLmt

Notes:

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

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 - Part 1

y/x	0	600	1,200	1,800	2,400	3,000	3,600	4,200	4,800	5,400	6,000	6,600	7,200	7,800	8,400	9,000	9,600
1	200	300	300	300	300	300	300	300	300	300	300	300	300	295	290	285	280

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

y/x	10,200	10,800	11,700	12,600	13,500	14,400	15,300	16,200	17,100	18,000	19,200	20,400	21,600	22,800	24,000	25,200	
1	275	270	265	260	255	250	245	240	235	230	225	220	215	210	205	200	

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

Notes: KtEONV_t_EngOffTimeBefVehOffMax

y/x	-10	-4	1	7	13	18	24	29	35	41	46	52	58	63	69	74	80
1	70	70	70	70	74	82	105	153	320	480	480	480	480	480	480	480	480

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

Notes: KtEVPD_t_PVLT_EngineVacTimeCold

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

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

Notes: KtFLVC_t_XferFuelPmpOnTmLim

y/x	0	3	6	9	13	16	19	22	25	28	31	34	38	41	44	47	50	53	56	59	63	66	69	72	75	78	81	84	88	91	94	97	100
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Description: Data is EONV Pressure Threshold in Pascals, X axis (horizontal) is fuel level in % and Y axis (vertical) is temperature in deg C

Notes: KtEONV_p_PressureThreshold

y/x	0.0000	6.2499	12.4998	18.7497	24.9996	31.2495	37.4994	43.7493	49.9992	56.2491	62.4990	68.7490	74.9989	81.2488	87.4987	93.7486	99.9985
-10.0000	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3
-4.3750	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3
1.2500	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3
6.8750	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3
12.5000	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3
18.1250	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3
23.7500	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3
29.3750	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3
35.0000	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3
40.6250	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3
46.2500	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3
51.8750	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3
57.5000	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3
63.1250	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3
68.7500	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3
74.3750	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3
80.0000	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3	-124.3

Description: This value is needed for LowFuelConditionDiagnostic flag which is located in Fault Bundle	
Notes: This value is needed for LowFuelConditionDiagnostic flag which is located in Fault Bundle	
y/x	1
1	10.0

Description: This value is needed for LowFuelConditionDiagnostic flag which is located in Fault Bundle	
Notes: This value is needed for LowFuelConditionDiagnostic flag which is located in Fault Bundle	
y/x	1
1	30.0

Description: This value is needed for Transfer Pump is Commanded On flag which is located in Fault Bundle	
Notes: This value is needed for Transfer Pump is Commanded On flag which is located in Fault Bundle	
y/x	1
1	0.0

Description: This value is needed for Transfer Pump is Commanded On flag which is located in Fault Bundle	
Notes: This value is needed for Transfer Pump is Commanded On flag which is located in Fault Bundle	
y/x	1
1	100.0

Description: This value is needed for Transfer Pump is Commanded On flag which is located in Fault Bundle	
Notes: This value is needed for Transfer Pump is Commanded On flag which is located in Fault Bundle	
y/x	1
1	0.0

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

Notes: Horizontal axis is RPM; Vertical Axis is Air Per Cylinder (APC) in mg/cylinder

y/x	250	500	750	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,500	4,000	4,500	5,000	6,000
40	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
80	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
120	500.00	500.00	500.00	19.50	19.50	25.50	20.75	8.75	19.25	22.00	7.50	9.75	9.75	500.00	500.00	500.00	500.00
160	500.00	500.00	500.00	19.50	19.50	25.50	20.75	8.75	19.25	22.00	7.50	9.75	9.75	500.00	500.00	500.00	500.00
200	500.00	500.00	500.00	30.00	30.00	63.50	24.25	22.50	24.75	29.75	8.25	6.00	6.00	500.00	500.00	500.00	500.00
240	500.00	500.00	500.00	33.75	33.75	50.75	38.75	46.50	57.75	44.50	9.75	8.00	8.00	500.00	500.00	500.00	500.00
280	500.00	500.00	500.00	78.50	78.50	55.50	37.50	60.00	76.00	50.50	19.00	10.00	10.00	500.00	500.00	500.00	500.00
320	500.00	500.00	500.00	64.50	64.50	67.75	71.00	114.50	78.25	75.75	20.00	12.50	12.50	500.00	500.00	500.00	500.00
360	500.00	500.00	500.00	55.00	55.00	89.00	81.00	76.00	82.25	110.25	24.50	10.75	10.75	500.00	500.00	500.00	500.00
400	500.00	500.00	500.00	55.00	55.00	131.00	79.50	80.75	85.50	127.50	42.00	9.75	9.75	500.00	500.00	500.00	500.00
440	500.00	500.00	500.00	80.00	80.00	96.00	90.00	96.00	117.00	122.25	25.75	9.75	9.75	500.00	500.00	500.00	500.00
480	500.00	500.00	500.00	96.75	96.75	87.75	86.25	91.25	111.00	111.00	18.50	18.50	18.50	500.00	500.00	500.00	500.00
520	500.00	500.00	500.00	122.25	122.25	92.75	95.25	88.00	123.25	103.75	54.25	26.50	26.50	500.00	500.00	500.00	500.00
560	500.00	500.00	500.00	135.00	135.00	101.00	97.25	96.00	106.50	84.25	82.25	55.50	55.50	500.00	500.00	500.00	500.00
640	500.00	500.00	500.00	155.00	155.00	115.50	90.50	82.50	111.75	91.00	82.75	43.00	43.00	500.00	500.00	500.00	500.00
720	500.00	500.00	500.00	155.00	155.00	115.50	90.50	82.50	111.75	91.00	82.75	43.00	43.00	500.00	500.00	500.00	500.00
800	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00

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

Notes: Horizontal axis is RPM; Vertical Axis is Air Per Cylinder (APC) in mg/cylinder

y/x	250	500	750	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,500	4,000	4,500	5,000	6,000
40	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
80	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
120	500.00	500.00	500.00	7.50	7.50	14.75	15.75	6.00	7.00	7.25	5.25	14.50	14.50	500.00	500.00	500.00	500.00
160	500.00	500.00	500.00	7.50	7.50	14.75	15.75	6.00	7.00	7.25	5.25	14.50	14.50	500.00	500.00	500.00	500.00
200	500.00	500.00	500.00	11.25	11.25	34.00	23.00	15.50	9.50	16.00	9.75	21.50	21.50	500.00	500.00	500.00	500.00
240	500.00	500.00	500.00	12.25	12.25	34.50	19.50	16.50	10.25	14.00	14.00	31.00	31.00	500.00	500.00	500.00	500.00
280	500.00	500.00	500.00	18.50	18.50	34.75	22.00	16.25	11.25	15.50	16.00	30.50	30.50	500.00	500.00	500.00	500.00
320	500.00	500.00	500.00	20.75	20.75	87.50	31.75	52.50	14.50	24.25	25.00	43.00	43.00	500.00	500.00	500.00	500.00
360	500.00	500.00	500.00	27.50	27.50	110.00	57.00	98.25	20.75	58.00	41.50	50.50	50.50	500.00	500.00	500.00	500.00
400	500.00	500.00	500.00	106.00	106.00	139.50	99.75	93.00	29.50	73.00	48.50	63.75	63.75	500.00	500.00	500.00	500.00
440	500.00	500.00	500.00	97.50	97.50	242.50	268.75	144.75	79.50	97.25	73.75	75.50	75.50	500.00	500.00	500.00	500.00
480	500.00	500.00	500.00	187.50	187.50	208.00	191.25	74.50	70.75	160.00	116.50	72.75	72.75	500.00	500.00	500.00	500.00
520	500.00	500.00	500.00	195.50	195.50	154.25	192.25	72.50	58.50	112.50	116.50	83.50	83.50	500.00	500.00	500.00	500.00
560	500.00	500.00	500.00	142.50	142.50	160.75	143.75	114.00	90.00	125.50	108.75	141.00	141.00	500.00	500.00	500.00	500.00
640	500.00	500.00	500.00	152.25	152.25	106.00	135.25	83.25	90.00	111.00	113.75	109.00	109.00	500.00	500.00	500.00	500.00
720	500.00	500.00	500.00	152.25	152.25	106.00	135.25	83.25	90.00	111.00	113.75	109.00	109.00	500.00	500.00	500.00	500.00
800	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00

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

Notes: Horizontal axis is RPM; Vertical Axis is Air Per Cylinder (APC) in mg/cylinder

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

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

Notes: Horizontal axis is RPM; Vertical Axis is Air Per Cylinder (APC) in mg/cylinder

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

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

Notes: Horizontal axis is RPM; Vertical Axis is Air Per Cylinder (APC) in mg/cylinder

y/x	250	500	750	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,500	4,000	4,500	5,000	6,000
40	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
80	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
120	500.00	500.00	500.00	70.00	70.00	75.00	83.25	70.00	62.25	48.75	30.00	30.00	30.00	500.00	500.00	500.00	500.00
160	500.00	500.00	500.00	70.00	70.00	75.00	83.25	70.00	62.25	48.75	30.00	30.00	30.00	500.00	500.00	500.00	500.00
200	500.00	500.00	500.00	84.75	84.75	74.50	109.00	80.50	118.50	65.25	41.00	32.50	32.50	500.00	500.00	500.00	500.00
240	500.00	500.00	500.00	117.75	117.75	131.50	99.50	65.25	91.50	88.00	53.25	32.25	32.25	500.00	500.00	500.00	500.00
280	500.00	500.00	500.00	93.50	93.50	111.50	109.25	70.00	89.25	108.00	54.00	45.00	45.00	500.00	500.00	500.00	500.00
320	500.00	500.00	500.00	110.50	110.50	98.50	86.50	80.00	88.00	92.75	80.00	62.75	62.75	500.00	500.00	500.00	500.00
360	500.00	500.00	500.00	132.25	132.25	89.25	84.00	94.00	85.75	74.75	88.00	83.25	83.25	500.00	500.00	500.00	500.00
400	500.00	500.00	500.00	134.00	134.00	51.75	91.00	112.00	85.50	94.00	84.00	107.75	107.75	500.00	500.00	500.00	500.00
440	500.00	500.00	500.00	110.00	110.00	113.75	105.50	89.00	61.50	77.75	98.25	112.50	112.50	500.00	500.00	500.00	500.00
480	500.00	500.00	500.00	106.25	106.25	123.25	109.75	91.00	64.00	64.00	105.50	105.50	105.50	500.00	500.00	500.00	500.00
520	500.00	500.00	500.00	103.00	103.00	122.50	106.00	89.50	40.75	57.75	86.00	100.25	100.25	500.00	500.00	500.00	500.00
560	500.00	500.00	500.00	93.00	93.00	125.50	112.00	73.75	52.50	74.75	71.50	49.00	49.00	500.00	500.00	500.00	500.00
640	500.00	500.00	500.00	78.00	78.00	104.50	107.00	75.75	41.75	62.25	56.75	49.00	49.00	500.00	500.00	500.00	500.00
720	500.00	500.00	500.00	78.00	78.00	104.50	107.00	75.75	41.75	62.25	56.75	49.00	49.00	500.00	500.00	500.00	500.00
800	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00

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

Notes: Horizontal axis is RPM; Vertical Axis is Air Per Cylinder (APC) in mg/cylinder

y/x	250	500	750	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750	3,000	3,500	4,000	4,500	5,000	6,000
40	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
80	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
120	500.00	500.00	500.00	29.00	29.00	35.25	54.75	33.00	20.50	20.00	19.00	34.25	34.25	500.00	500.00	500.00	500.00
160	500.00	500.00	500.00	29.00	29.00	35.25	54.75	33.00	20.50	20.00	19.00	34.25	34.25	500.00	500.00	500.00	500.00
200	500.00	500.00	500.00	122.00	122.00	136.25	69.75	38.00	34.00	45.00	28.00	43.50	43.50	500.00	500.00	500.00	500.00
240	500.00	500.00	500.00	160.50	160.50	215.75	76.00	53.50	64.50	106.00	57.50	59.75	59.75	500.00	500.00	500.00	500.00
280	500.00	500.00	500.00	170.00	170.00	220.75	94.75	66.75	75.00	84.25	79.75	110.00	110.00	500.00	500.00	500.00	500.00
320	500.00	500.00	500.00	209.75	209.75	155.75	114.75	106.00	126.50	102.75	84.00	94.75	94.75	500.00	500.00	500.00	500.00
360	500.00	500.00	500.00	191.25	191.25	138.50	176.00	139.50	158.25	141.50	118.00	139.00	139.00	500.00	500.00	500.00	500.00
400	500.00	500.00	500.00	169.00	169.00	162.50	192.50	173.00	216.00	150.75	195.50	148.50	148.50	500.00	500.00	500.00	500.00
440	500.00	500.00	500.00	204.00	204.00	150.00	144.00	144.00	168.50	125.75	145.75	116.25	116.25	500.00	500.00	500.00	500.00
480	500.00	500.00	500.00	124.75	124.75	110.00	144.75	217.00	220.75	120.00	118.75	116.00	116.00	500.00	500.00	500.00	500.00
520	500.00	500.00	500.00	120.50	120.50	154.00	139.00	215.00	239.00	115.75	120.25	105.00	105.00	500.00	500.00	500.00	500.00
560	500.00	500.00	500.00	183.25	183.25	152.25	164.50	125.75	145.75	100.00	97.25	80.00	80.00	500.00	500.00	500.00	500.00
640	500.00	500.00	500.00	169.75	169.75	189.50	163.25	155.00	149.00	130.50	69.50	67.25	67.25	500.00	500.00	500.00	500.00
720	500.00	500.00	500.00	169.75	169.75	189.50	163.25	155.00	149.00	130.50	69.50	67.25	67.25	500.00	500.00	500.00	500.00
800	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00

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

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

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

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

Notes: KtMISF_ddt_SCD_IdleMode

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

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

Notes: KtMISF_dt_SCD_OffIdleMode

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

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

Notes: KtMISF_ddt_SCD_OffIdleMode

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

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

Notes: KtMSFD_dt_IdleCylinderMode

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

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

Notes: KtMSFD_ddt_IdleCylinderMode

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

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

Notes: KtMISF_CylinderMode

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

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

Notes: KtMISF_ddt_CylinderMode

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

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

Notes: KtMISF_RevolutionMode

y/x	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	110	75	45	35	26	25	25	25	25
9	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	100	60	40	30	25	24	24	24	24
11	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	95	60	40	35	26	24	24	24	24
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	100	60	40	35	28	24	24	24	24
13	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	110	70	50	40	28	24	24	24	24
15	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	115	80	55	45	32	26	26	26	26
17	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	120	90	65	50	35	32	32	32	32
19	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	140	100	75	55	45	35	35	35	35
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	160	120	80	65	50	40	40	40	40
25	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	180	140	100	75	60	45	45	45	45
29	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	200	150	110	85	70	55	55	55	55
33	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	220	180	120	100	80	60	60	60	60
38	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	280	220	140	120	80	70	70	70	70
42	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	320	240	160	130	100	80	80	80	80
48	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	350	290	180	145	110	90	90	90	90
54	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	370	320	200	150	120	100	100	100	100
61	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	400	350	230	155	140	140	140	140	140

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

Notes: KtMISF_DoDCylinderMode

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500
8	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
9	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
11	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
12	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
13	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
15	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
17	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
19	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
22	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
25	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
29	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
33	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
38	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
42	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
48	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
54	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767
61	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767	32,767

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: KtMISF_ZeroTorqSpd

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
1	11.00	9.50	8.75	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.75	9.00	9.00	9.00	9.00	11.23	13.46	15.69	17.92	20.14	22.38	24.60	26.83

Description: adjusts zero torque for altitude

Notes: KtMSFD_K_ZeroTorqBaro

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

Description: Zero torque engine load while in Active Fuel Management

Notes: KtMSFD_ZeroTorqDoD

y/x	400	500	600	700	800	900	1,000	1,100	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
1	11.00	9.50	8.75	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.75	9.00	9.00	9.00	9.00	11.23	13.46	15.69	17.92	20.14	22.38	24.60	26.83

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

Notes: KtMSFD_Pct_CatalystMisfire

y/x	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000
0	10.6	10.6	10.6	10.0	4.8	4.8	4.8	4.8
10	10.6	10.6	10.6	10.0	4.8	4.8	4.8	4.8
20	10.6	10.6	10.6	10.0	4.8	4.8	4.8	4.8
30	10.6	10.6	9.8	8.1	4.8	4.8	4.8	4.8
40	10.6	10.6	8.1	8.1	4.8	4.8	4.8	4.8
50	8.1	8.1	6.8	4.8	4.8	4.8	4.8	4.8
60	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
70	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
80	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
90	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
100	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8

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

Notes: KtRRDI_a_RoughRoadThresh

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

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: KtRRDI_a_WhlSpdRoughRoadLim

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

Description: Number of consecutive number of decelerating cylinders after the misfire that would be considered abnormal. (Cylinder Mode Equation)									
Notes: KaMSFD_Cnt_CylAbnormal									
y/x	0	1	2	3	4	5	6	7	8
1	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00

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

Notes: KaMSFD_Cnt_SCD_CylAbnormal

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

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

Notes: KaMSFD_Cnt_RevAbnormal

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

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

Notes: KtMSFD_K_SCD_MinPttrnRecogMult

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

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

Notes: KtMSFD_K_SCD_MaxPttrnRecogMult

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

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: 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: KaMSFD_Cnt_NumOfNormalsFil

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

Description: Engine OverSpeed Limit versus gear

Notes: KaEOSC_n_EngOvrspdLimitGear

P0300 Engine OverSpeed Limit - Part 1

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

P0300 Engine OverSpeed Limit - Part 2

y/x	CeTGRR_e_TransGrEVT1	CeTGRR_e_TransGrEVT2	CeTGRR_e_TransGrNeut	CeTGRR_e_TransGrRvrs	CeTGRR_e_TransGrPark	
1	5,000	5,000	4,000	5,000	4,000	

Description: P0133 - O2S Slow Response Bank 1 Sensor 1 "Pass/Fail Threshold table"

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

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

Description: P0153 - O2S Slow Response Bank 2 Sensor 1 "Pass/Fail Threshold table"

Notes: X axis is Lean to Rich response time (in sec), Please see the table below named "KnEOSD_t_ST_LRC_LimRS2" for the 17 X axis table breakpoints. Y axis is Rich to Lean response time (sec), Please see the cal table below named "KnEOSD_t_ST_RLC_LimRS2" for the 17 Y axis table breakpoints. Z axis is the pass/fail result, Note: If the cell contains a "0" then the fault is indicated, if it contains a "1" a fault is not indicated.

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

Description: P1133 - O2S HC L to R Switches Limit Bank 1 Sensor 1 Threshold table

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 minumum switches, below which the fault is indicated.

y/x	0	10	20	50	80
0.0	33	33	33	33	33
6.3	34	34	34	34	34
12.5	35	35	35	35	35
18.8	36	36	36	36	36
25.0	37	37	37	37	37
31.3	38	38	38	38	38
37.5	39	39	39	39	39
43.8	39	39	39	39	39
50.0	40	40	40	40	40
56.3	41	41	41	41	41
62.5	42	42	42	42	42
68.8	43	43	43	43	43
75.0	44	44	44	44	44
81.3	45	45	45	45	45
87.5	46	46	46	46	46
93.8	46	46	46	46	46
100.0	47	47	47	47	47

Description: P1133 - O2S HC R to L Switches Limit Bank 1 Sensor 1 Threshold table

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 minumum switches, below which the fault is indicated.

y/x	0	10	20	50	80
0.0	33	33	33	33	33
6.3	34	34	34	34	34
12.5	35	35	35	35	35
18.8	36	36	36	36	36
25.0	37	37	37	37	37
31.3	38	38	38	38	38
37.5	39	39	39	39	39
43.8	39	39	39	39	39
50.0	40	40	40	40	40
56.3	41	41	41	41	41
62.5	42	42	42	42	42
68.8	43	43	43	43	43
75.0	44	44	44	44	44
81.3	45	45	45	45	45
87.5	46	46	46	46	46
93.8	46	46	46	46	46
100.0	47	47	47	47	47

Description: P1153 - O2S HC L to R Switches Limit Bank 2 Sensor 1 Threshold table

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 minumum switches, below which the fault is indicated.

y/x	0	10	20	50	80
0.0	33	33	33	33	33
6.3	34	34	34	34	34
12.5	35	35	35	35	35
18.8	36	36	36	36	36
25.0	37	37	37	37	37
31.3	38	38	38	38	38
37.5	39	39	39	39	39
43.8	39	39	39	39	39
50.0	40	40	40	40	40
56.3	41	41	41	41	41
62.5	42	42	42	42	42
68.8	43	43	43	43	43
75.0	44	44	44	44	44
81.3	45	45	45	45	45
87.5	46	46	46	46	46
93.8	46	46	46	46	46
100.0	47	47	47	47	47

Description: P1153 - O2S HC R to L Switches Limit Bank 2 Sensor 1 Threshold table

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 minumum switches, below which the fault is indicated.

y/x	0	10	20	50	80
0.0	33	33	33	33	33
6.3	34	34	34	34	34
12.5	35	35	35	35	35
18.8	36	36	36	36	36
25.0	37	37	37	37	37
31.3	38	38	38	38	38
37.5	39	39	39	39	39
43.8	39	39	39	39	39
50.0	40	40	40	40	40
56.3	41	41	41	41	41
62.5	42	42	42	42	42
68.8	43	43	43	43	43
75.0	44	44	44	44	44
81.3	45	45	45	45	45
87.5	46	46	46	46	46
93.8	46	46	46	46	46
100.0	47	47	47	47	47

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

Notes: Note: This feature is only enabled when the vehicle is new and cannot be enabled in service

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

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

Notes:

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

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

Notes:

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

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

Notes:

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

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

Notes:

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

Description: X Table Axis for P01133, P01153 (both L2R and R2L tables)					
Notes: Ethanol percentage breakpoints					
y/x	1	2	3	4	5
1	0	10	20	50	80

Description: EOT Sensor Cold Start Fast Fail Threshold

Notes: X Axis is defined as PowerUp Coolant Temperature

y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	80.0	80.0	80.0	60.0	60.0	40.0	40.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0

Description:																	
Notes:																	
y/x	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
1	15,000	14,000	13,000	12,000	11,000	10,000	9,000	8,000	7,000	6,000	5,000	4,000	5,000	4,000	3,000	3,000	3,000

Description: RPM_Weighting_Factor_X_Axis

Notes: Engine RPM Axis for KtEOPD_r_EngSpdWeight

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

Description: RPM_Weighting_Factor

Notes: X axis is Engine RPM defined by KnEOPD_n_EngSpdFilteredBpt

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

Description: Oil_Temp_Weighting_Factor_X_Axis

Notes:

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

Description: Oil_Temp_Weighting_Factor

Notes: X axis is Oil Temperature defined by KnEOPD_T_EngFilteredBpt

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

Description: Eng_Load_Stability_Weighting_Factor_X_Axis

Notes:

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

Description: Eng_Load_Stability_Weighting_Factor

Notes: X Axis is Engine Load Stability defined by KnEOPD_m_EngLoadStabilityBpt

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

Description: Oil_Pressure_Pred_Weighting_Factor_X_Axis

Notes:

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

Description: Oil_Pressure_Pred_Weighting_Factor

Notes: X Axis is Predicted Oil Pressure defined by KnEOPD_p_EngOilPredictedBpt

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

Description: Vehicle Speed Axis									
Notes:									
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

Notes:

y/x	1	2	3	4	5	6	7	8	9
1	-20	0	20	40	60	70	80	90	100

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

Notes: X Axis is defined by KnACCD_T_HSPRat_EngageTstAmb and Y Axis is defined by KnACCD_v_HSPRat_EngageTstVehSpd

y/x	-20	0	20	40	60	70	80	90	100
0	0.00	5.00	20.00	50.00	50.00	50.00	50.00	50.00	100.00
20	0.00	5.00	20.00	50.00	50.00	50.00	50.00	50.00	100.00
40	0.00	5.00	20.00	50.00	50.00	50.00	50.00	50.00	100.00
60	0.00	5.00	20.00	50.00	50.00	50.00	50.00	50.00	100.00
80	0.00	5.00	20.00	50.00	50.00	50.00	50.00	50.00	100.00
100	0.00	5.00	20.00	50.00	50.00	50.00	50.00	50.00	100.00
120	0.00	5.00	20.00	50.00	50.00	50.00	50.00	50.00	100.00
140	0.00	5.00	20.00	50.00	50.00	50.00	50.00	50.00	100.00
160	0.00	5.00	20.00	50.00	50.00	50.00	50.00	50.00	100.00

Description: Delta_Predicted_Weighting_Factor

Notes: X Axis is defined by KnACCD_T_HSPRat_EngageTstAmb and Y Axis is defined by KnACCD_v_HSPRat_EngageTstVehSpd

y/x	-20	0	20	40	60	70	80	90	100
0	0.00999	0.04999	0.20000	0.50000	0.50000	0.50000	0.50000	0.50000	0.99998
20	0.00999	0.04999	0.20000	0.50000	0.50000	0.50000	0.50000	0.50000	0.99998
40	0.00999	0.04999	0.20000	0.50000	0.50000	0.50000	0.50000	0.50000	0.99998
60	0.00999	0.04999	0.20000	0.50000	0.50000	0.50000	0.50000	0.50000	0.99998
80	0.00999	0.04999	0.20000	0.50000	0.50000	0.50000	0.50000	0.50000	0.99998
100	0.00999	0.04999	0.20000	0.50000	0.50000	0.50000	0.50000	0.50000	0.99998
120	0.00999	0.04999	0.20000	0.50000	0.50000	0.50000	0.50000	0.50000	0.99998
140	0.00999	0.04999	0.20000	0.50000	0.50000	0.50000	0.50000	0.50000	0.99998
160	0.00999	0.04999	0.20000	0.50000	0.50000	0.50000	0.50000	0.50000	0.99998

Description: Coolant _Weighting_Factor_X_Axis

Notes:

y/x	1	2	3	4	5	6	7	8	9
1	-20	0	20	40	60	70	80	90	100

Description: Coolant_Weighting_Factor

Notes: X Axis is Engine Coolant defined by KnACCD_T_HSPRat_EngageTstCool

y/x	-20	0	20	40	60	70	80	90	100
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:					
y/x	1	2	3	4	5
1	-20	0	20	60	100

Description: AC High Side Pressure Sensor Rationality On Test Threshold					
Notes: X Axis is defined by KnACCD_T_HSPRat_OnTestPresMin					
y/x	-20	0	20	60	100
1	300.0	350.0	400.0	450.0	500.0

Description: FanSpeed_Weighting_Factor_X_Axis

Notes:

y/x	1	2	3	4	5	6	7	8	9
1	0	5	20	50	60	70	80	90	100

Description: FanSpeed_Weighting_Factor

Notes: X Axis is Fan Speed as desfined by KnACCD_Pct_HSPRat_EngageTestFan

y/x	0	5	20	50	60	70	80	90	100
1	1	1	1	1	1	1	1	1	1

Description: Ambeint Temperature Axis for the Off Test					
Notes:					
y/x	1	2	3	4	5
1	-20	0	20	60	100

Description: AC High Side Pressure Sensor Rationality Off Test Threshold					
Notes: X Axis is defined by KnACCD_T_HSPRat_OffTestPresMax					
y/x	-20	0	20	60	100
1	300	350	400	450	500

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

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

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

P00C0, P00C1, P00C2
Bundle Name: CamLctnExhFA
P0017, P0019, P0365, P0366, P0390, P0391
Bundle Name: CamLctnIntFA
P0016, P0018, P0340, P0341, P0345, P0346
Bundle Name: CamSensor_FA
P0016, P0017, P0018, P0019, P0340, P0341, P0345, P0346, P0365, P0366, P0390, P0391
Bundle Name: CamSensor_TFTKO
P0016, P0017, P0018, P0019, P0340, P0341, P0345, P0346, P0365, P0366, P0390, P0391
Bundle Name: CamSensorAnyLctnTFTKO
P0016, P0017, P0018, P0019, P0340, P0341, P0345, P0346, P0365, P0366, P0390, P0391
Bundle Name: CamSensorAnyLocationFA
P0016, P0017, P0018, P0019, P0340, P0341, P0345, P0346, P0365, P0366, P0390, P0391
Bundle Name: CamSensorFA
P0016, P0017, P0018, P0019, P0340, P0341, P0345, P0346, P0365, P0366, P0390, P0391
Bundle Name: CamSensorTFTKO
P0016, P0017, P0018, P0019, P0340, P0341, P0345, P0346, P0365, P0366, P0390, P0391
Bundle Name: CatalystSysEfficiencyLoB1_FA
P0420
Bundle Name: CatalystSysEfficiencyLoB2_FA
P0430
Bundle Name: ClutchPstnSnsr FA
P0806, P0807, P0808
Bundle Name: ClutchPstnSnsrCktHi FA
P0808
Bundle Name: ClutchPstnSnsrCktLo FA
P0807
Bundle Name: ClutchPstnSnsrNotLearned
P080A
Bundle Name: CommBusAOff_VICM_FA
U0073
Bundle Name: CommBusBOff_VICM_FA
U0074
Bundle Name: CoolingFanSpeedTooHigh_FA
P0495
Bundle Name: CrankCamCorrelationTFTKO
P0016, P0017, P0018, P0019
Bundle Name: CrankExhaustCamCorrelationFA

P0017, P0019
Bundle Name: CrankExhaustCamCorrFA
P0017, P0019
Bundle Name: CrankIntakeCamCorrelationFA
P0016, P0018
Bundle Name: CrankIntakeCamCorrFA
P0016, P0018
Bundle Name: CrankSensor_FA
P0335, P0336
Bundle Name: CrankSensor_TFTKO
P0335, P0336
Bundle Name: CrankSensorFA
P0335, P0336
Bundle Name: CrankSensorFaultActive
P0335, P0336
Bundle Name: CrankSensorTestFailedTKO
P0335, P0336
Bundle Name: CrankSensorTFTKO
P0335, P0336
Bundle Name: CylDeacSystemTFTKO
P3400
Bundle Name: CylnderDeacDriverTFTKO
P3401, P3409, P3417, P3425, P3433, P3441, P3449
Bundle Name: ECT_Sensor_Ckt_FA
P0117, P0118, P0119
Bundle Name: ECT_Sensor_Ckt_FP
P0117, P0118
Bundle Name: ECT_Sensor_Ckt_High_FP
P0118
Bundle Name: ECT_Sensor_Ckt_Low_FP
P0117
Bundle Name: ECT_Sensor_Ckt_TFTKO
P0117, P0118, P0119
Bundle Name: ECT_Sensor_Ckt_TPTKO
P0117, P0118, P0019
Bundle Name: ECT_Sensor_DefaultDetected
P0117, P0118, P0116, P0125
Bundle Name: ECT_Sensor_FA

P0117, P0118, P0116, P0125, P0128
Bundle Name: ECT_Sensor_Perf_FA
P0116
Bundle Name: ECT_Sensor_TFTKO
P0117, P0118, P0116, P0125, P0119
Bundle Name: EGRValve_FP
P0405, P0406, P042E
Bundle Name: EGRValveCircuit_FA
P0403, P0404, P0405, P0406
Bundle Name: EGRValveCircuit_TFTKO
P0403, P0404, P0405, P0406
Bundle Name: EGRValvePerformance_FA
P0401, P042E
Bundle Name: EGRValvePerformance_TFTKO
P0401, P042E
Bundle Name: ELCP_PumpCircuit_FA
P2400, P2401, P2402
Bundle Name: ELCP_SwitchCircuit_FA
P2418, P2419, P2420
Bundle Name: ELCPCircuit_FA
P1459, P145A
Bundle Name: EngineMetalOvertempActive
P1258
Bundle Name: EngineMisfireDetected_FA
P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308
Bundle Name: EngineMisfireDetected_TFTKO
P0300, P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308
Bundle Name: EngineModeNotRunTimer_FA
P2610
Bundle Name: EngineModeNotRunTimerError
P2610
Bundle Name: EnginePowerLimited
P0068, P0122, P0123, P0222, P0223, P0606, P16F3, P1104, P2100, P2101, P2102, P2103, P160E, P160D, P0191, P0192, P0193, P00C8, P00C9
Bundle Name: EngineTorqueEstInaccurate
EngineMisfireDetected_FA, FuelInjedtorCircuit_FA, FuelInjedtorCircuit_TFTKO, FuelTrimSystemB1_FA, FuelTrimSystemB2_FA, MAF_SensorTFTKO, MAP_SensorTFTKO, EGRValuePerforamnce_FA
Bundle Name: EngModeNotRunTmErr
P2610

Bundle Name: EngOilModeledTempValid
ECT_Sensor_FA, IAT_SensorCircuitFA
Bundle Name: EngOilPressureSensorCktFA
P0522, P0523
Bundle Name: EngOilPressureSensorFA
P0521, P0522, P0523
Bundle Name: EngOilTempSensorCircuitFA
P0197, P0198
Bundle Name: Ethanol Composition Sensor FA
P0178, P0179, P2269
Bundle Name: EvapEmissionSystem_FA
P0455, P0446
Bundle Name: EvapExcessPurgePsbl_FA
Conventional fuel system, P0442, P0443, P0455, P0496
Bundle Name: EvapFlowDuringNonPurge_FA
P0496
Bundle Name: EvapPurgeSolenoidCircuit_FA
P0443
Bundle Name: EvapReducedPurgePsbl_FA
Only EREV sealed fuel system, P0443, P0446, P0449, P0459, P0497, P0499, P2419, P2422
Bundle Name: EvapSmallLeak_FA
P0442
Bundle Name: EvapVentSolenoidCircuit_FA
P0449
Bundle Name: ExhaustCamSensor_FA
P0017, P0019, P0365, P0366, P0390, P0391
Bundle Name: ExhaustCamSensor_TFTKO
P0017, P0019, P0365, P0366, P0390, P0391
Bundle Name: ExhaustCamSensorFA
P0017, P0019, P0365, P0366, P0390, P0391
Bundle Name: ExhaustCamSensorTFTKO
P0017, P0019, P0365, P0366, P0390, P0391
Bundle Name: FanOutputDriver_FA
P0480, P0481, P0482, P0691, P0692, P0693, P0694, P0695, P0696
Bundle Name: FHPD_b_HPC_PresErrNeg_FA
P228D
Bundle Name: FHPD_b_HPC_PresErrNeg_TFTKO
P228D

Bundle Name: FHPD_b_HPC_PresErrPos_FA
P228C
Bundle Name: FHPD_b_HPC_PresErrPos_TFTKO
P228C
Bundle Name: FHPD_b_HPC_Windup_ TFTKO
P0089
Bundle Name: FHPD_b_HPC_Windup_FA
P0089
Bundle Name: FHPD_b_PumpCurr_FA
P163A
Bundle Name: FHPD_b_PumpCurr_TFTKO
P163A
Bundle Name: FHPR_b_FRP_SnsrCkt_FA
P0192, P0193
Bundle Name: FHPR_b_FRP_SnsrCkt_TFTKO
P0192, P0193
Bundle Name: FHPR_b_FRP_SnsrPerfDiag_FA
P0191
Bundle Name: FHPR_b_FRP_SnsrPerfDiag_TFTKO
P0191
Bundle Name: FHPR_b_PumpCkt_FA
P0090, P0091, P0092, P00C8, P00C9, P00CA
Bundle Name: FHPR_b_PumpCkt_TFTKO
P0090, P0091, P0092, P00C8, P00C9, P00CA
Bundle Name: FTP_SensorCircuit_FA
P0452, P0453
Bundle Name: 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
Bundle Name: 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
Bundle Name: FuelLevelDataFault
P0461, P0462, P0463, P2066, P2067, P2068
Bundle Name: FuelTankPressureSnsrCkt_FA
P0452, P0453
Bundle Name: FuelTrimSystemB1_FA

P0171, P0172
Bundle Name: FuelTrimSystemB1_TFTKO
P0171, P0172
Bundle Name: FuelTrimSystemB2_FA
P0174, P0175
Bundle Name: FuelTrimSystemB2_TFTKO
P0174, P0175
Bundle Name: HumidityFA
P0097, P0098, P11C2, P11C3, P2227, P2228, P2229, P2230
Bundle Name: HumTempSnsrCktFA
P0097, P0098
Bundle Name: HumTempSnsrCktFP
P0097, P0098
Bundle Name: HumTempSnsrFA
P0096, P0097, P0098, P0099
Bundle Name: IAC_SystemRPM_FA
P0506, P0507
Bundle Name: IAT_ContCorrFA
P2199
Bundle Name: IAT_SensorCircuitFA
P0112, P0113
Bundle Name: IAT_SensorCircuitFP
P0112, P0113
Bundle Name: IAT_SensorCircuitTFTKO
P0112, P0113
Bundle Name: IAT_SensorFA
P0111, P0112, P0113, P0114
Bundle Name: IAT_SensorTFTKO
P0111, P0112, P0113, P0114
Bundle Name: IgnitionOffTimer_FA
P2610
Bundle Name: IgnitionOffTimeValid
P2610
Bundle Name: IgnitionOutputDriver_FA
P0351, P0352, P0353, P0354, P0355, P0356, P0357, P0358
Bundle Name: IntakeCamSensor_FA
P0016, P0018, P0340, P0341, P0345, P0346
Bundle Name: IntakeCamSensor_TFTKO

P0016, P0018, P0340, P0341, P0345, P0346
Bundle Name: IntakeCamSensorFA
P0016, P0018, P0340, P0341, P0345, P0346
Bundle Name: IntakeCamSensorTFTKO
P0016, P0018, P0340, P0341, P0345, P0346
Bundle Name: IntkCamPhaser_FA
P0010, P0011, P0020, P0021
Bundle Name: KS_Ckt_Perf_B1B2_FA
P0324, P0325, P0326, P0327, P0328, P0330, P0332, P0333, P06B6, P06B7
Bundle Name: Long Name
Short Name
Bundle Name: LostCommBCM_FA
U0140
Bundle Name: LostCommBusB_VICM_FA
U182D
Bundle Name: LowFuelConditionDiagnostic
Flag set to TRUE if the fuel level < KeFLVI_Pct_FuelLevelLowDiag (see supporting table for numeric value) % AND No Active DTCs: FuelLevelDataFault, P0462, P0463 for at least KeFLVI_t_FuelLevelLowTime (see supporting table for numeric value) seconds.
Bundle Name: MAF_SensorCircuitFA
P0102, P0103, P010C, P010D
Bundle Name: MAF_SensorCircuitTFTKO
P0102, P0103, P010C, P010D
Bundle Name: MAF_SensorFA
P0101, P0102, P0103, P010C, P010D
Bundle Name: MAF_SensorFP
P0102, P0103, P010C, P010D
Bundle Name: MAF_SensorPerfFA
P0101
Bundle Name: MAF_SensorPerfTFTKO
P0101
Bundle Name: MAF_SensorTFTKO
P0101, P0102, P0103, P010C, P010D
Bundle Name: MAF_SnsrCktFA
P121B, P121C
Bundle Name: MAF_SnsrCktTFTKO
P121B, P121C
Bundle Name: MAP_EngineVacuumStatus
P0106, P0107, P0108 Fault Active OR P0107, P0108 Fault Pending

Bundle Name: MAP_SensorCircuitFA
P0107, P0108
Bundle Name: MAP_SensorCircuitFP
P0107, P0108
Bundle Name: MAP_SensorFA
P0106, P0107, P0108
Bundle Name: MAP_SensorPerfFA
P0106
Bundle Name: MAP_SensorPerfTFTKO
P0106
Bundle Name: MAP_SensorTFTKO
P0106, P0107, P0108
Bundle Name: MnfdTempSensorCktFA
Turbocharged or Supercharged, with Humidity sensor: P112C, P112D. Turbocharged or Supercharged, without Humidity sensor: P0097, P0098. Naturally Aspirated: P0112, P0113.
Bundle Name: MnfdTempSensorCktFP
Turbocharged or Supercharged, with Humidity sensor: P112C, P112D. Turbocharged or Supercharged, without Humidity sensor: P0097, P0098. Naturally Aspirated: P0112, P0113.
Bundle Name: MnfdTempSensorCktTFTKO
Turbocharged or Supercharged, with Humidity sensor: P112C, P112D. Turbocharged or Supercharged, without Humidity sensor: P0097, P0098. Naturally Aspirated: P0112, P0113.
Bundle Name: MnfdTempSensorFA
Turbocharged or Supercharged, with Humidity sensor: P112B, P112C, P112D, P112E. Turbocharged or Supercharged, without Humidity sensor: P0096, P0097, P0098, P0099. Naturally Aspirated: P0111, P0112, P0113, P0114.
Bundle Name: MnfdTempSensorTFTKO
Turbocharged or Supercharged, with Humidity sensor: P112B, P112C, P112D, P112E. Turbocharged or Supercharged, without Humidity sensor: P0096, P0097, P0098, P0099. Naturally Aspirated: P0111, P0112, P0113, P0114.
Bundle Name: ModuleOffTime_FA
P2610
Bundle Name: no validity name is assigned to this fault bundle
Bundle Name: OAT_AmbientFilteredFA
ECM OAT: P0071, P0072, P0073, P0074, EngModeNotRunTmErr, VehicleSpeedSensor_FA, IAT_SensorFA, ECT_Sensor_DefaultDetected, MAF_SensorFA. VIMC OAT: P0072, P0073, EngModeNotRunTmErr, VehicleSpeedSensor_FA, ECT_Sensor_DefaultDetected. IAT-Based OAT: not applicable. All other cases: not applicable.
Bundle Name: OAT_AmbientSensorFA
ECM OAT: P0071, P0072, P0073, P0074. VIMC OAT: P0071, P0072, P0073, EngModeNotRunTmErr, VehicleSpeedSensor_FA, ECT_Sensor_DefaultDetected. IAT-Based OAT: not applicable. All other cases: not applicable.
Bundle Name: OAT_EstAmbTemp_FA
Only EREV sealed fuel system, P0071, P0072, P0073, P0502, P0503, P0722, P0723
Bundle Name: OAT_PtEstFiltFA
ECM OAT: P0071, P0072, P0073, P0074, EngModeNotRunTmErr, VehicleSpeedSensor_FA, IAT_SensorFA, ECT_Sensor_DefaultDetected, MAF_SensorFA. VIMC OAT: P0072, P0073, EngModeNotRunTmErr, VehicleSpeedSensor_FA, ECT_Sensor_DefaultDetected. IAT-Based OAT: VehicleSpeedSensor_FA, IAT_SensorFA, MAF_SensorFA. All other cases:

EngModeNotRunTmErr, VehicleSpeedSensor_FA, IAT_SensorFA, ECT_Sensor_DefaultDetected.
Bundle Name: OAT_PtEstRawFA
ECM OAT: P0071, P0072, P0073, P0074. VIMC OAT: P0071, P0072, P0073, EngModeNotRunTmErr, VehicleSpeedSensor_FA, ECT_Sensor_DefaultDetected. IAT-Based OAT: IAT_SensorFA. All other cases: IAT_SensorFA, ECT_Sensor_DefaultDetected.
Bundle Name: PowertrainRelayFault
P1682
Bundle Name: PowertrainRelayStateOn_Error
P0685
Bundle Name: PowertrainRelayStateOn_FA
P0685
Bundle Name: PPS1_OutOfRange
P2122, P2123
Bundle Name: PPS1_OutOfRange_Composite
P2122, P2123, P06A3
Bundle Name: PPS2_OutOfRange
P2127, P2128
Bundle Name: PPS2_OutOfRange_Composite
P2127, P2128, P0697
Bundle Name: SCIAP_SensorCircuitFA
P012C, P012D
Bundle Name: SCIAP_SensorCircuitFP
P012C, P012D
Bundle Name: SCIAP_SensorFA
P012B, P012C, P012D
Bundle Name: SCIAP_SensorPerfFA
P012B
Bundle Name: SCIAP_SensorPerfTFTKO
P012B
Bundle Name: SCIAP_SensorTFTKO
P012B, P012C, P012D
Bundle Name: SuperchargerBypassValveFA
P2261
Bundle Name: TC_BoostPresSnsrCktFA
P0237, P0238
Bundle Name: TC_BoostPresSnsrFA
P0236, P0237, P0238
Bundle Name: TCM_EngSpdReqCkt
P150C

Bundle Name: THMR_AHV_FA
P2681, P26A3, P26A6, P26A7, P26A9
Bundle Name: THMR_AWP_AuxPumpFA
B2920, B2923, B2922
Bundle Name: THMR_ECT_Sensor_Ckt_FA
P0116, P0117, P0118, P00B6
Bundle Name: THMR_Insuff_Flow_FA
P00B7
Bundle Name: THMR_RCT_Sensor_Ckt_FA
P00B3, P00B4
Bundle Name: THMR_SWP_Control_FA
P261D, P261A, P261C
Bundle Name: THMR_Therm_Control_FA
P0597, P0598, P0599
Bundle Name: ThrotTempSensorFA
Turbocharged or Supercharged, with Humidity sensor: P112B, P112C, P112D, P112E. Turbocharged or Supercharged, without Humidity sensor: P0096, P0097, P0098, P0099. Naturally Aspirated: P0111, P0112, P0113, P0114.
Bundle Name: ThrotTempSensorTFTKO
Turbocharged or Supercharged, with Humidity sensor: P112B, P112C, P112D, P112E. Turbocharged or Supercharged, without Humidity sensor: P0096, P0097, P0098, P0099. Naturally Aspirated: P0111, P0112, P0113, P0114.
Bundle Name: ThrottlePositionSnsrPerfFA
P0121
Bundle Name: ThrottlePositionSnsrPerfTFTKO
P0121
Bundle Name: TIAP_SensorPerfFA
P0236
Bundle Name: TPS_FA
P0122, P0123, P0222, P0223, P2135
Bundle Name: TPS_FaultPending
P0122, P0123, P0222, P0223, P2135
Bundle Name: TPS_Performance_FA
P0068, P0121, P1104, P2100, P2101, P2102, P2103
Bundle Name: TPS_Performance_TFTKO
P0068, P0121, P1104, P2100, P2101, P2102, P2103
Bundle Name: TPS_TFTKO
P0122, P0123, P0222, P0223, P2135
Bundle Name: TPS_ThrottleAuthorityDefaulted
P0068, P0122, P0123, P0222, P0223, P16F3, P1104, P2100, P2101, P2102, P2103, P2135

Bundle Name: TPS1_OutOfRange_Composite
P0122, P0123, P06A3
Bundle Name: TPS2_OutOfRange_Composite
P0222, P0223, P06A3
Bundle Name: Trans Output Rotations Rolling Count Validity
Bundle Name: Transfer Pump is Commanded On
Fuel Volume in Primary Fuel Tank < KeFLVC_V_PriFuelTankXferPmpEnbl (see supporting table for numeric value) liters AND Fuel Volume in Secondary Fuel Tank ≥ KeFLVC_V_SecFuelTankXferPmpEnbl (see supporting table for numeric value) liters AND Transfer Pump on Time < TransferPumpOnTimeLimit (see supporting table for numeric value) AND Transfer Pump had been Off for at least KeFLVC_t_XferFuelPmpMinOffTm (see supporting table for numeric value) seconds AND Evap Diagnostic (Purge Valve Leak Test, Large Leak Test, and Waiting for Purge) is not running AND Engine Running
Bundle Name: Transmission Actual Gear Validity
Bundle Name: Transmission Engaged State Validity
Bundle Name: Transmission Estimated Gear Validity
Bundle Name: Transmission Gear Ratio Validity
Bundle Name: Transmission Gear Selector Position Validity
Bundle Name: Transmission Oil Temperature Validity
Bundle Name: Transmission Output Shaft Angular Velocity Validity
Bundle Name: Transmission Overall Actual Torque Ratio Validity
Bundle Name: Transmission Overall Estimated Torque Ratio Validity
Bundle Name: Transmission Shift Lever Position Validity
Bundle Name: Transmission Turbine Angular Velocity Validity
Bundle Name: TransmissionEngagedState_FA
MYD/MYC/MYB:, P182E, P1915
Bundle Name: TransmissionGearDefaulted
MYD/MYC/MYB:, P182E, P1915
Bundle Name: VehicleSpeedSensor_FA
P0502, P0503, P0722, P0723

Bundle Name: VehicleSpeedSensorError
P0502, P0503, P0722, P0723
Bundle Name: VentCircuit_FA
P0449, P0498, P0499
Bundle Name: VICM_WakeupDiag_FA
P06E4
Bundle Name: VICM_WakeupDiag_TFTKO
P06E4

LD OBD Gasoline Monitoring Requirements Checklist											
Component/System	MONITORING REQUIREMENTS: List DTC of monitor that detects the following failure malfunction:										
Catalyst	(e)(1.2.2)										
	Conversion Efficiency										
	P0420, P0430	NA	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	NA
Misfire	(e)(3.2.1)	(e)(3.2.2)	(e)(3.2.2)								
	Catalyst damage misfire	FTP level misfire - First 1000 revs	FTP level misfire- 4 x 1000 revs								
	P0300	P0300	P0300	NA	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)							
	No purge flow	0.040 inch leak	0.020 inch leak	0.090 inch leak in lieu of 0.040 inch							
	P0455	P0442	P0442	P0455	NA	NA	NA	NA	NA	NA	NA
Secondary Air	(e)(5.2.3)	(e)(5.2.4)									
	Insufficient flow threshold	Insufficient flow functional in lieu of threshold									
	NA	NA	NA	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)					
	FTP emission threshold	Secondary fuel trim FTP emission threshold	Air-fuel ratio cylinder imbalance	Adaptive limits reached	Secondary fuel trim adaptive limits	Fails to enter closed loop					
	P0171, P0172, P0174, P0175	NA	P219A, P219B	P0171, P0172, P0174, P0175	NA	NA	NA	NA	NA	NA	NA
Upstream O2/Exhaust Gas Sensor Monitoring	(e)(7.2.1)(A)	(e)(7.2.1)(A)	(e)(7.2.1)(B)	(e)(7.2.1)(B)	(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)
	FTP emission threshold-slow response	FTP emission threshold-other characteristic	open circuit	out-of-range high	shorted high	out-of-range low	shorted low	Feedback: fails to enter, defaults out	Sufficient for other diagnostics	Heater Performance	Heater Circuit Continuity
	P0133, P0153	P1133, P1153	P0134, P0154	P0132, P0152	P0132, P0152	P0131, P0151	P0131, P0151	NA	P0131, P0151, P0132, P0152, P0134, P0154, P0133, P0153	P0053, P0059, P0135, P0155	P0030, P0050
Downstream O2/ Exhaust Gas Sensor Monitoring	(e)(7.2.2)(A)	(e)(7.2.2)(B)	(e)(7.2.2)(D)	(e)(7.2.2)(B)	(e)(7.2.2)(D)	(e)(7.2.2)(B)	(e)(7.2.2)(C)	(e)(7.2.3)(A)	(e)(7.2.3)(B)	(d)(2.2.3) & (e)(6.2.4)	
	Emissions threshold	open circuit	out-of-range high	shorted high	out-of-range low	shorted low	Sufficient for other diagnostics	Heater Performance	Heater Circuit Continuity	Feedback: fails to enter, defaults out	
	P013A, P013B, P013C, P013D, P013E, P013F, P014A, P014B	P0140, P0160	P2271, P2273	P0138, P0158	P2270, P2272	P0137, P0157	P013A, P013B, P013C, P013D, P013E, P013F, P014A, P014B, P2270, P2271, P2272, P2273	P0054, P0060, P0141, P0161	P0036, P0056	P0054, P0060, P0137, P0157, P0138, P0158, P0140, P0160, P0141, P0161, P013A, P013B, P013C, P013D, P013E, P013F, P014A, P014B, P2270, P2271, P2272, P2273	NA
	(e)(8.2.1)	(e)(8.2.1)	(e)(8.2.2)	(e)(8.2.2)							

EGR	Low Flow Threshold	High Flow Threshold	Low Flow Functional in lieu of Threshold	High Flow Functional in lieu of Threshold							
	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Crankcase Ventilation	(e)(9.2.2)										
	Disconnection										
	P0106, P0171, P0174, P0300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Engine Cooling System	(e)(10.2.1)	(e)(10.2.2)(A)	(e)(10.2.2)(A)	(e)(10.2.2)(A)	(e)(10.2.2)(A)	(e)(10.2.2)(A)	(e)(10.2.2)(B)	(e)(10.2.2)(C)	(e)(10.2.2)(D)		
	Time to reach threshold temp	open circuit	out-of-range high	shorted high	out-of-range low	shorted low	Time to reach closed loop	Stuck below the highest minimum enable temp	Stuck above the lowest maximum enable temp		
	P0128	P0118, P0119	P0118	P0118	P0117	P0117	NA	P0128	P0116	NA	NA
Cold Start Strategy	(e)(11.2.1)(A)	(e)(11.2.1)(B)	(e)(11.2.2)(A)	(e)(11.2.2)(B)							
	Threshold monitor	Functional monitor in lieu of threshold	Single element functional fail	Threshold monitor							
	P1400	P1400	P1400	P1400	NA	NA	NA	NA	NA	NA	NA
VVT System	(e)(13.2.1)	(e)(13.2.2)	(e)(13.2.3)								
	Target error threshold monitor	Slow Response threshold monitor	Target error or slow response functional monitor in lieu of threshold								
	P0011	P0011	P0011	NA	NA	NA	NA	NA	NA	NA	NA
Direct Ozone Reduction (DOR) System	(e)(14.2.1)	(e)(14.2.2)									
	Functional monitor for <50% std credit DOR systems	Threshold monitor for >50% std credit DOR systems									
	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

LD OBD Gasoline Monitoring Requirements Checklist											
List DTC of monitor used that detects the following failure mode:											
Monitor/System	Out-of-range Low	Circuit Low	Out-of-range High	Circuit High	Open Circuit	Rationality Low	Rationality High	Other Rationality	Functional #1	Functional #2	Other Functional
AC Refrigerant Pressure Sensor A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barometric Pressure	P2228	P2228	P2229	P2229	P2228	P2227	P2227	P2230	NA	NA	NA
Boost Control (Turbo)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Brake Booster Pressure	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cam Position Bank 1 Exhaust	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cam Position Bank 1 Intake	P0340	P0340	P0340	P0340	P0340	P0341	P0341	P0016	NA	NA	NA
Cam Position Bank 2 Exhaust	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cam Position Bank 2 Intake	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cam Position Output Signal	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Canister Purge Solenoid	NA	NA	NA	NA	P0443	NA	NA	NA	P0496	NA	P0443
Canister Vent Solenoid	NA	NA	NA	NA	P0449	NA	NA	NA	P0446	NA	P0449
Clutch Pedal Position	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Crank Position	P0335	P0335	P0335	P0335	P0335	P0336	P0336	NA	NA	NA	NA
Crank Position Output Signal	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ELCP Pressure Sensor	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ELCP Switching Valve	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ELCP Vacuum Pump	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Engine Oil Pressure	P0522	P0522	P0523	P0523	P0522, P0523	P0521	P0521	NA	NA	NA	NA
Engine Oil Temperature	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EST A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	P0351
EST B	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	P0352
EST C	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	P0353
EST D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	P0354
EST E	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	P0355
EST F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	P0356
EST G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	P0357
EST H	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	P0358
Fan Control #1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fan Control #2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fan Control #3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel Composition	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel Economy Mode Switch	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel Level	P0462	P0462	P0463	P0463	P0463	P0461	P0461	P0464	NA	NA	NA
Fuel Level #2	P2067	P2067	P2068	P2068	P2068	P2066	P2066	P0464	NA	NA	NA

Fuel Pump #2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel Pump Control	P0628	P0628	P0629	P0629	P0629	NA	NA	NA	NA	NA	NA
Fuel Tank Vapor Pressure	P0452	P0452	P0453	P0453	P0452	P0451	P0451	P0454	NA	NA	NA
Humidity	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hybrid Control Torque Request Circuit	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ignition Off Timer	NA	NA	NA	NA	NA	NA	NA	NA	P2610	NA	NA
Ignition Switch Accessory Position	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Intake Air Temperature	P0112	P0112	P0113	P0113	P0113	P0111	P0111	P0114	NA	NA	NA
Intake Air Temperature 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Intake Air Temperature 3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Intake Manifold Runner Control	NA	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	NA
Intake Manifold Tuning Valve Position	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Knock Sensor-Flat	P0327	P0327	P0328	P0328	P0325	NA	NA	NA	NA	NA	NA
Knock Sensor-Flat #2	P0332	P0332	P0333	P0333	P0330	NA	NA	NA	NA	NA	NA
Malfunction Indicator Lamp	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	P0650
Manifold Absolute Pressure	P0107	P0107	P0108	P0108	P0107	P0106	P0106	P1101	NA	NA	NA
Mass Air Flow	P0102	P0102	P0103	P0102	P0102	P0101	P0101	P1101	NA	NA	NA
Mass Air Flow 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mass Air Flow Supply Voltage Control	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Outside Air Temperature	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Powertrain Relay Control	NA	NA	NA	NA	NA	NA	NA	NA	P0690	NA	P0685
Powertrain Relay Feedback	NA	NA	NA	NA	NA	NA	NA	P0690	NA	NA	NA
Reverse Inhibit	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Secondary AIR Pressure Sensor Bank1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Secondary AIR Pressure Sensor Bank2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Secondary AIR Pump Command Bank1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Secondary AIR Pump Command Bank2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Secondary AIR Pump Solenoid Relay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SIDI Ignition Module Supply Voltage Group 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SIDI Ignition Module	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Supply Voltage Group 2											
Skip Shift Solenoid	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Supercharger Boost	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Supercharger Inlet Pressure	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Supercharger Intercooler	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Traction Control Torque Request Circuit	NA	NA	NA	NA	NA	NA	NA	P0856	NA	NA	NA
Transmission Control Torque Request Circuit A	NA	NA	NA	NA	NA	NA	NA	P2544	NA	NA	NA
Turbocharger Boost Pressure	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Turbocharger Intercooler	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Twin Turbo Control	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wastegate Control (Turbo)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

HD OBD Gasoline Monitoring Requirements Checklist										
Component/System	MONITORING REQUIREMENTS: List the DTC or SPN-FMI of monitor that detects the following failure mode:									
Fuel System	(f)(1.2.1)	(f)(1.2.2)	(f)(1.2.3)	(f)(1.2.4)	(f)(1.2.5)					
	FTP Emission Threshold	Adaptive Limits Reached	Secondary Fuel Trim FTP Emission Threshold	Fails to Enter Closed Loop in Approved Time	Fails to Enter Closed Loop in Approved Time for Engines Shutoff at Idle					
	P0171, P0172, P0174, P0175	P0171, P0172, P0174, P0175	NA	NA	NA	NA	NA	NA	NA	NA
Misfire	(f)(2.2.1)	(f)(2.2.2)								
	Catalyst Damage	Emission Threshold								
	P0300	P0300	NA	NA	NA	NA	NA	NA	NA	NA
EGR	(f)(3.2.1)	(f)(3.2.1)	(f)(3.2.2)	(f)(3.2.2)						
	Low Flow Emission Threshold	No Flow	High Flow Emission Threshold	Control Limits Reached						
	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cold Start Strategy	(f)(4.2)	(f)(4.2.)								
	Threshold	Functional								
	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Secondary Air	(f)(5.2.1)	(f)(5.2.2)	(f)(5.2.3)							
	Insufficient Flow Threshold	Increased Flow Threshold	Flow Functional							
	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Catalyst	(f)(6.2.1)	(f)(6.2.1)(B)								
	Conversion Efficiency	NMHC Conversion Efficiency =< 50%								
	P0420, P0430	P0420, P0430	NA	NA	NA	NA	NA	NA	NA	NA
Evaporative System	(f)(7.2.2)(A)	(f)(7.2.2) (B)								
	No Purge Flow	Leak Check								
	P0455	P0442	NA	NA	NA	NA	NA	NA	NA	NA
Upstream Exhaust Gas Sensor Monitoring	(f)(8.2.1)(A)	(f)(8.2.1)(B)	(f)(8.2.1)(B)	(f)(8.2.1)(B)	(f)(8.2.1)(C)	(f)(8.2.1)(D)	(f)(8.2.3)(A)	(f)(8.2.3)(B)		
	Emission Threshold	Out-of-range High	Out-of-range Low	Open Circuit	Feedback: Default OL	Sufficient for Other Diagnostics	Sensor heater performance	Sensor heater circuit continuity		
	P0133, P0153	P0132, P0152	P0131, P0151	P0134, P0154	NA	P0131, P0151, P0132, P0152, P0134, P0154, P0133, P0153	P0053, P0059, P0135, P0155	P0030, P0050	NA	NA
Downstream Exhaust Gas Sensor Monitoring	(f)(8.2.2)(A)	(f)(8.2.2)(B)	(f)(8.2.2)(C)	(f)(8.2.2)(D)	(f)(8.2.2)(D)	(f)(8.2.2)(E)	(f)(8.2.3)(A)	(f)(8.2.3)(B)		
	Emission Threshold	Open Circuit	Sufficient for Other Diagnostics	Out-of-range High	Out-of-range Low	Feedback: Default OL	Sensor heater performance	Sensor heater circuit continuity		
	P013A, P013B, P013C, P013D, P013E, P013F, P014A, P014B	P0140, P0160	P013A, P013B, P013C, P013D, P013E, P013F, P014A, P014B, P2270, P2272, P2273	P2273	P2270, P2272	P0054, P0060, P0137, P0157, P0138, P0158, P0140, P0160, P0141, P0161, P013A, P013B, P013C, P013D, P013E, P013F, P014A, P014B	P0054, P0060, P0141, P0161	P0036, P0056	NA	NA

						P2270, P2272, P2273				
VVT System	(f)(9.2.1)	(f)(9.2.2)	(f)(9.2.3)							
	Target Error Threshold Monitor	Slow Response Threshold Monitor	Functional Response Failure							
	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Engine Cooling System	(g)(1.2.1)(A)	(g)(1.2.1)(B)	(g)(1.2.2)(A)	(g)(1.2.2)(A)	(g)(1.2.2)(A)	(g)(1.2.2)(B)	(g)(1.2.2)(C)	(g)(1.2.2)(D)		
	Time to Reach Threshold Temp	Maintain Threshold Temp	Out-of-range High	Out-of-range Low	Open Circuit	Time to Reach Closed Loop	Stuck Below Highest Minimum Enable Temp	Stuck Above Lowest Maximum Enable Temp		
	P0128, P2181	NA	P0118, P00B4	P0117, P00B3	P0118, P0119, P00B4	NA	P0128, P00B6	P0116, P00B6	NA	NA
Crankcase Ventilation	(g)(2.2.2)									
	Disconnection									
	P0106, P0171, P0174, P0300	NA	NA	NA	NA	NA	NA	NA	NA	NA

HD OBD Gasoline Monitoring Requirements Checklist										
List the DTC or the SPN-FMI of comprehensive component monitor used that detects the following failure mode:										
Monitor/System	Out-of-range High	Out-of-range Low	Open Circuit	Rationality Low	Rationality High	Other Rationality	Functional			
AC Refrigerant Pressure Sensor A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
APowertrain Relay Control	NA	NA	NA	NA	NA	NA	P0690, P0685	NA	NA	NA
APowertrain Relay Feedback	NA	NA	NA	NA	NA	P0690	NA	NA	NA	NA
Barometric Pressure	P2229	P2228	P2228	P2227	P2227	P2230	NA	NA	NA	NA
Boost Control (Turbo)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Brake Booster Pressure	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cam Position Bank 1 Exhaust	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cam Position Bank 1 Intake	P0340	P0340	P0340	P0341	P0341	P0016	NA	NA	NA	NA
Cam Position Bank 2 Exhaust	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cam Position Bank 2 Intake	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cam Position Output Signal	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Canister Purge Solenoid	NA	NA	P0443	NA	NA	NA	P0443, P0496	NA	NA	NA
Canister Vent Solenoid	NA	NA	P0449	NA	NA	NA	P0449, P0446	NA	NA	NA
Clutch Pedal Position	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Crank Position	P0335	P0335	P0335	P0336	P0336	NA	NA	NA	NA	NA
Crank Position Output Signal	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ELCP Pressure Sensor	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ELCP Switching Valve	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ELCP Vacuum Pump	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Engine Oil Pressure	P0523	P0522	P0522, P0523	P0521	P0521	NA	NA	NA	NA	NA
Engine Oil Temperature	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EST A	NA	NA	NA	NA	NA	NA	P0351	NA	NA	NA
EST B	NA	NA	NA	NA	NA	NA	P0352	NA	NA	NA
EST C	NA	NA	NA	NA	NA	NA	P0353	NA	NA	NA
EST D	NA	NA	NA	NA	NA	NA	P0354	NA	NA	NA
EST E	NA	NA	NA	NA	NA	NA	P0355	NA	NA	NA
EST F	NA	NA	NA	NA	NA	NA	P0356	NA	NA	NA
EST G	NA	NA	NA	NA	NA	NA	P0357	NA	NA	NA
EST H	NA	NA	NA	NA	NA	NA	P0358	NA	NA	NA
Fan Control #1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
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
Fuel Composition	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel Economy Mode Switch	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel Level	P0463	P0462	P0463	P0461	P0461	P0464	NA	NA	NA	NA
Fuel Level #2	NA	P2067	NA	NA	NA	P0464	NA	NA	NA	NA
Fuel Pump #2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel Pump Control	P0629	P0628	P0629	NA	NA	NA	NA	NA	NA	NA
Fuel Tank Vapor Pressure	P0453	P0452	P0452	P0451	P0451	P0454	NA	NA	NA	NA
Humidity	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hybrid Control Torque Request Circuit	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ignition Off Timer	NA	NA	NA	NA	NA	NA	P2610	NA	NA	NA
Ignition Switch Accessory 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 3	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
Intake Manifold Tuning Valve Position	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Knock Sensor-Flat	P0327	P0327	P0328	P0328	P0325	NA	NA	NA	NA	NA
Knock Sensor-Flat #2	P0332	P0332	P0333	P0333	P0333	NA	NA	NA	NA	NA
Malfunction Indicator Lamp	NA	NA	NA	NA	NA	NA	P0650	NA	NA	NA
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	NA	NA	NA
Outside Air Temperature	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Reverse Inhibit	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Secondary AIR Pressure Sensor Bank 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Secondary AIR Pressure Sensor Bank 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Secondary AIR Pump Command Bank 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Secondary AIR Pump Command Bank 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Secondary AIR Pump Solenoid Relay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SIDI Ignition Module Supply Voltage Group 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SIDI Ignition Module Supply Voltage Group 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Skip Shift	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Supercharger Boost	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Supercharger Inlet Temperature	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Supercharger Intercooler	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Traction Control Torque Request Circuit	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Transmission Control Torque Request Circuit A	NA	NA	NA	NA	NA	P2544	NA	NA	NA	NA
Turbocharger Boost Pressure	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Turbocharger Intercooler	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Twin Turbo Control	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wastegate Control (Turbo)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA