COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY 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 limits Output driver is commanded on, Ignition switch is in crank or run position	> 11 Volts, and < 32 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Trips 2 B Type
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 > KtPHSD_phi_CamPosErrorLimIc1 Deg (see Supporting Table)	DTC's are NOT active: P0010 IntkCMP B1 Circuit IntakeCamSensorTFTKO CrankSensorTFTKO CrankIntakeCamCorrelationFA Engine is running VVT is enabled Desired camshaft position > 0 Power Take Off (PTO) not active	System Voltage > 11 Volts, and System Voltage < 32 Volts Both Desired & Measured cam positions cannot be < KtPHSD_phi_CamPos ErrorLimIc1 or > than (26.0 - KtPHSD_phi_CamPos ErrorLimIc1). Desired cam position cannot vary more than 7.5 Cam Deg for at least KtPHSD_t_StablePositi onTimeIc1 seconds (see Supporting Tables)	100 failures out of 1000 samples 100 ms /sample	Trips 2 B Type
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 crank degrees before or 11 crank degrees after nominal position in one cam revolution.		Crankshaft and camshaft position signals are synchronized Engine is Spinning		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.	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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	This time is defined by the table "Cam Correlation Oil Temperature Threshold". One sample per cam rotation	
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 Ignition Voltage Engine Speed	= Crank or Run 11.0 < Volts < 32.0 > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY 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 Ignition Voltage Engine Speed	= Crank or Run 11.0 < Volts < 32.0 > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	2 trips Type B
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 Ignition Voltage Engine Speed	= Crank or Run 11.0 < Volts < 32.0 > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	2 trips Type B
HO2S Heater Resistance Bank 1 Sensor 1	P0053	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Heater Resistance	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 > 28800 seconds -30.0 < ºC < 45.0 < 32.0 volts < 0.00 seconds	Once per valid cold start	2 trips Type B
HO2S Heater Resistance Bank 1 Sensor 2	P0054	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Heater Resistance	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 > 28800 seconds -30.0 < ºC < 45.0 < 32.0 volts < 0.05 seconds	Once per valid cold start	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY 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 Ignition Voltage Engine Speed	= Crank or Run 11.0 < Volts< 32.0 > 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	2 trips Type B
HO2S Heater Resistance Bank 2 Sensor 1	P0059	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Heater Resistance	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 > 28800 seconds -30.0 < ºC < 45.0 < 32.0 volts < 0.00 seconds	Once per valid cold start	2 trips Type B
HO2S Heater Resistance Bank 2 Sensor 2	P0060	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Heater Resistance	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 > 28800 seconds -30.0 < ºC < 45.0 < 32.0 volts < 0.05 seconds	Once per valid cold start	2 trips Type B
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 or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	Continuously fail MAP and MAF portions of diagnostic for 0.1875 s Continuous in MAIN processor	Trips: 1 Type: A MIL: YES

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			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				
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	2 trips Type B
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)	> 420000 Ohms	Engine run time Or IAT min	> 10.0 seconds ≥ -7.0 °C	5 failures out of 25 samples 1 sec/ sample Continuous	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY 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 C and a block heater has not been detected. 3) ECT at power up > IAT at power up by 19.3 C 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 Non-volatile memory initization Test complete this trip Test aborted this trip IAT LowFuel Condition 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. Diagnostic is aborted**	VehicleSpeed Sensor_FA IAT_SensorCircuitFA THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA IgnitionOffTimeValid TimeSinceEngineRunningValid > 28800 seconds = Not occurred = False = False ≥ -7 ºC = False > 19.3 ºC < 10.0 Seconds	1 failure 500 msec/ sample Once per valid cold start	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					when 3) or 4) occurs:			
					1a) Vehicle drive time	> 400 Seconds with		
					1b) Vehicle speed	> 14.9 MPH and		
					1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is below 1b as follows:	0.00 times the seconds with vehicle speed below 1b		
					1d) IAT drops from power up IAT	≥ 3.3 ºC		
					2a) ECT drops from power up ECT	> 1 ºC Within		
					2b) Engine run time	> 30 Seconds		
					4) Minimum IAT during test	≤ -7.0 ºC		
Mass Air Flow System Performance	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	<= 300 kPa*(g/s) > 20 grams/sec	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp	>= 465 RPM <= 4600 RPM >= -7 Deg C <= 125 Deg C >= -20 Deg C <= 100 Deg C	Continuous Calculation are performed every 12.5 msec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			AND ABS(Measured MAP – MAP Model 2) Filtered	> 20.0 kPa	Minimum total weight factor (all factors multiplied together)	>= 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 table "IFRD Residual Weighting Factors".		
					No Active DTCs:	MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						ECT_Sensor_Ckt_FP IAT_SensorFA IAT_SensorCircuitFP		
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	<= 1950 Hertz (~2.06gm/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
Mass Air Flow Sensor Circuit High Frequency	P0103	Detects a high frequency output from the MAF sensor	MAF Output	>= 14500 Hertz (~ 889.4 gm/sec)	Engine Run Time Engine Speed Ignition Voltage Above criteria present for a period of time	> 1.0 seconds >= 300 RPM >= 8.0 Volts >= 1.0 seconds	400 failures out of 500 samples 1 sample every cylinder firing event	Type B 2 trips
Manifold Absolute Pressure Sensor Performance	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)	>= 465 RPM <= 4600 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	Continuous Calculations are performed every 12.5 msec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						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 table "IFRD Residual Weighting Factors".		
					No Active DTCs:	MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA ECT_Sensor_Ckt_FP IAT_SensorFA IAT_SensorCircuitFP		
			Engine Not Rotating Case: Manifold Pressure OR Manifold Pressure	< 50.0 kPa > 115.0 kPa	Time between current ignition cycle and the last time the engine was running		4 failures out of 5 samples	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
							1 sample every 12.5 msec	
					Engine is not rotating	> 5.0 seconds		
					No Active DTCs:	EngModeNotRunTmErr MAP_SensorFA AAP_SnsrFA		
					No Pending DTCs:	MAP_SensorCircuitFP AAP_SnsrCktFP		
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 (0.2 Volts = 3.5 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips
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 (4.5 Volts = 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 STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Intake Air Temperature Sensor Circuit Performance	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:	> 28800 seconds < 60 deg C ECT_Sensor_Ckt_FA IAT_SensorCircuitFA	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B 2 trips
Intake Air Temperature Sensor Circuit Low (High Temperature)	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	> 0.0 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type B 2 trips
Intake Air Temperature Sensor Circuit High (Low Temperature)	P0113	Detects a continuous open circuit in the IAT signal circuit or the IAT sensor	Raw IAT Input	> 404973 Ohms (~-60 deg C)	Engine Run Time	> 0.0 seconds	40 failures out of 50 samples 1 sample every 100 msec	Type B 2 trips
Intake Air Temperature Sensor Intermittent In-Range	P0114	Detects a noisy or erratic IAT signal circuit or IAT sensor	Change in IAT reading between consecutive 100 millisecond samples Change in IAT is multiplied by IAT Intermittent Weight Factor based on Filtered IAT.	> 10 DegC	Continuous		20 failures out of 200 samples 1 sample every 100 msec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Filtered IAT = 0.11 * Current IAT + 0.89 * Filtered IAT from 100 milliseconds before					
Engine Coolant Temperature (ECT) Sensor Performance	P0116	This DTC detects ECT temp sensor stuck in mid range.	A failure will be reported if any of the following occur: 1) ECT at power up > IAT at power up by an IAT based table lookup value after a minimum 28800 second soak (fast fail). 2) ECT at power up > IAT at power up by 19.3 C after a minimum 28800 second soak and a block heater has not been detected. 3) ECT at power up > IAT at power up by 19.3 C after a minimum 28800 seconds soak and the time spent cranking the engine without starting is greater than 10.0 seconds with the LowFuelConditionDiag	See "P0116: Fail if power up ECT exceeds IAT by these values" in the Supporting tables section	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	VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA IgnitionOffTimeValid TimeSinceEngineRunningValid = Not occurred = False = False ≥ -7 ºC = False > 19.3 ºC < 10.0 Seconds **Block Heater is detected and diagnostic is aborted when 1) or 2) occurs. Diagnostic is aborted when 3) or 4) occurs:**	1 failure 500 msec/ sample Once per valid cold start	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
				= False	1a) Vehicle drive time 1b) Vehicle speed 1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is below 1b as follows: 1d) IAT drops from power up IAT	> 400 Seconds with > 14.9 MPH 0.00 times the seconds with vehicle speed below 1b ≥ 3.3 ºC		
					2a) ECT drops from power up ECT 2b) Engine run time	> 1 ºC Within > 30 Seconds		
					3) Engine run time with vehicle speed below 1b 4) Minimum IAT during test	> 1800 Seconds ≤ -7 ºC		
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	2 trips Type B
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)	> 419000 Ohms	Engine run time Or	> 10.0 seconds	5 failures out of 6 samples	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					IAT min	≥ -7.0 °C	1 sec/ sample Continuous	
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	2 trips Type B
Throttle Position Sensor Performance	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)	>= 465 RPM <= 4600 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	Continuous Calculation are performed every 12.5 msec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					No Active DTCs:	Modeled Air Flow Error multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Est See table "IFRD Residual Weighting Factors". MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA ECT_Sensor_Ckt_FP IAT_SensorFA IAT_SensorCircuitFP		
TPS1 Circuit Low	P0122	Detects a continuous or intermittent short or open in TPS1 circuit	TPS1 Voltage <	0.325		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions 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	Trips: 1 Type: A MIL: YES

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY 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 >	4.75		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions 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	Trips: 1 Type: A MIL: YES
Engine Coolant Temperature Below Stat Regulating Temperature For applications with dual coolant sensor	P0128	This DTC detects if the engine coolant temperature rises too slowly due to an ECT or Cooling system fault.	Total energy transferred to the engine cooling system is greater than the predicted energy before: <u>Range #1 (Primary)</u> ECT reaches 75.0 °C when IAT min is < 52.0°C and ≥ 10.0°C.	See "P0128: Maximum Total Energy transferred to Cooling System for IAT and Start-up ECT conditions" in the Supporting tables section.	No Active DTC's	MAP_SensorFA MAF_SensorFA TPS_Performance_FA TPS_FA TPS_ThrottleAuthority Defaulted IAT_SensorFA ECT_Sensor_Ckt_FA ECT_Sensor_Perf_FA VehicleSpeedSensor_FA EngineTorqueInaccurate	30 failures to set DTC 1 sec/ sample Once per ignition key cycle	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Range #2 (Alternate) ECT reaches 55.0 °C when IAT min is < 10.0°C and ≥ -7.0°C.		Engine not run time Engine run time Fuel Condition	≥ 1800 seconds ≥ 120 seconds Ethanol ≤ 87%		
					Range #1 (Primary) Test ECT at start run Average Cooling System Energy Vehicle Speed	 ≤ 70.0 °C ≥ 11.0 kW > 5 mph for at least 1.5 miles		
					Range #2 (Alternate) Test ECT at start run Average Cooling System Energy Vehicle Speed	 ≤ 50.0 °C ≥ 11.0 kW > 5 mph for at least 1.5 miles		
					Cooling System Energy Adjustments			
					1) Max. cooling system power when accumulating energy 2) When Cooling system power is < 17.0 kW then it is set to 3) With Decel Fuel Cut Off active, Cooling System energy is reduced by multiplying actual power by	 70.0 kW 0.0 kW		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					4) With Hybrid Engine Off Active, Cooling System Energy is reduced by	0.20 times 1.00 kW each second		
					Diagnostic will restart (using the lower value) if ECT drops	≥ 100.0°C below previous minimum ECT		
Engine Coolant Temperature Below Stat Regulating Temperature For applications with single coolant sensor	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 11.0 °C when IAT min is < 54.5°C and ≥ 10.0°C. Range #2 (Alternate) ECT reaches Commanded temperature minus 31.0 °C when IAT min is < 10.0°C and ≥ -7.0°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 Airflow T-Stat Heater duty commanded cycle	MAF_SensorFA IAT_SensorFA THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA ≥ 1800 seconds 10 ≤ Eng Run Tme ≤ 1370 seconds Ethanol ≤ 87% -7.0 ≤ ECT ≤ 70.0 °C ≥ 17.0 gps ≤ 0 %	1 failure to set DTC 1 sec/ sample Once per ignition key cycle	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Range #2 (Alternate) Test			
					ECT at start run	-7.0 ≤ ECT ≤ 60.0 °C		
					Average Airflow	≥ 17.0 gps		
					T-Stat Heater duty commanded cycle	≤ 0 %		
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 mVolts	No Active DTC's	TPS_ThrottleAuthority Defaulted	380 failures out of 475 samples	2 trips Type B
						MAP_SensorFA		
						AIR System FA		
						Ethanol Composition Sensor FA	Frequency: Continuous in 100 milli - second loop	
						EvapPurgeSolenoidCircuit_FA		
						EvapFlowDuringNonPurge_FA		
						EvapVentSolenoidCircuit_FA		
						EvapSmallLeak_FA		
						EvapEmissionSystem_FA		
						FuelTankPressureSnsrCkt_FA		
						FuelInjectorCircuit_FA		
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 < Volts < 32.0		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Equivalence Ratio	0.9922 < ratio < 1.0137		
					Air Per Cylinder	50 < mgram < 700		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel Condition	Ethanol ≤ 87%		
					Fuel State	DFCO not active		
					All of the above met for	> 2.0 seconds		
O2S Circuit High Voltage Bank 1 Sensor 1	P0132	This DTC determines if the O2 sensor circuit is shorted to high.	Oxygen Sensor Signal	> 1050 mvolts	**Open Test Criteria**		100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B
					No Active DTC's	TPS_ThrottleAuthority Defaulted MAF_SensorFA EthanolCompositionSensor_FA		
					System Voltage	10.0 < Volts < 32.0		
					AFM Status	= All Cylinders active		
					Heater Warm-up delay	= Complete		
					Engine Run Time	> 5 seconds		
					Engine Run Accum	> 225 seconds		
					Fuel Condition	≤ 87 % Ethanol		
					No Active DTC's	MAP_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA		
					Low Fuel Condition Diag	= False		
					Fuel Condition	≤ 87 % Ethanol		
					Initial delay after Open Test Criteria met (cold start condition)	> 40.0 seconds when engine soak time > 28800 seconds		
					Initial delay after Open Test Criteria met (not cold start condition)	> 40.0 seconds when engine soak time ≤ 28800 seconds		
					Equivalence Ratio	0.9922 ≤ ratio ≤ 1.0137		
					Air Per Cylinder	50.0 ≤ mgram ≤ 700.0		
					Fuel Control State	not = Power Enrichment		
					All of the above met for	> 2.0 seconds		
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	TPS_ThrottleAuthority Defaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA	Sample time is 60 seconds Frequency: Once per trip	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						AIR System FA EthanolCompositionSensor_FA EngineMisfireDetected_FA		
						P0131		
						P0132		
						P0134		
					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 (B1S1)** in Supporting Tables tab.		
					O2 Heater on for	≥ 40 seconds		
					Learned Htr resistance	= Valid		
					Engine Coolant	> 60 ºC		
					IAT	> -40 ºC		
					Engine run Accum	> 160 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		
					Purge duty cycle	≥ 0 % duty cycle		
					Engine airflow	20 ≤ grams per second ≤ 55		
					Engine speed	1200 <= RPM <= 3000		
					Fuel	< 87 % Ethanol		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Baro	> 70 kpa		
					Air Per Cylinder	≥ 200 mGrams		
					Low Fuel Condition Diag	= False		
					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		
O2S Circuit Insufficient Activity Bank 1 Sensor 1	P0134	This DTC determines if the O2 sensor circuit is open.	Oxygen Sensor Signal	> 1700 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted MAF_SensorFA EthanolCompositionSensor_FA	200 failures out of 250 samples. Frequency: Continuous	2 trips Type B
					System Voltage	10.0 < Volts < 32.0		
					AFM Status	= All Cylinders active	100msec loop	
					Heater Warm-up delay	= Complete		
					Engine Run Time	> 5 seconds		
					Engine Run Accum	> 225 seconds		
					Fuel	≤ 87 % Ethanol		
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	0.3 < Amps < 3.1	No Active DTC's	ECT_Sensor_FA	8 failures out of 10 samples Frequency: 1 tests per trip	2 trips Type B
					System Voltage	10.0 < Volts < 32.0		
					Heater Warm-up delay	= Complete		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					O2S Heater device control B1S1 O2S Heater Duty Cycle	= Not active > zero	5 seconds delay between tests and 1 second execution rate	
					All of the above met for	> 120 seconds		
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	TPS_ThrottleAuthority Defaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA	430 failures out of 540 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					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		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Equivalence Ratio	0.9922 ≤ ratio ≤ 1.0137		
					Air Per Cylinder	50 ≤ mgrams ≤ 700		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel Condition	Ethanol <= 87%		
					Fuel State	DFCO not active		
					All of the above met for	> 2.0 seconds		
O2S Circuit High Voltage Bank 1 Sensor 2	P0138	This DTC determines if the O2 sensor circuit is shorted to high.	Oxygen Sensor Signal	> 1050 mvolts	**Open Test Criteria**		100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B
					No Active DTC's	TPS_ThrottleAuthority Defaulted MAF_SensorFA EthanolCompositionSensor_FA		
					System Voltage	10.0 < Volts < 32.0		
					AFM Status	= All Cylinders active		
					Heater Warm-up delay	= Complete		
					Engine Run Time	> 5 seconds		
					Fuel Condition	≤ 87 % Ethanol		
					No Active DTC's	MAP_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Low Fuel Condition Diag	= False		
					Fuel Condition	≤ 87 % Ethanol		
					Initial delay after Open Test Criteria met (cold start condition)	> 40.0 seconds when engine soak time > 28800 seconds		
					Initial delay after Open Test Criteria met (not cold start condition)	> 40.0 seconds when engine soak time ≤ 28800 seconds		
					Equivalence Ratio	0.9922 ≤ ratio ≤ 1.0137		
					Air Per Cylinder	50 ≤ mgrams ≤ 700		
					Fuel Control State	not = Power Enrichment		
					All of the above met for	> 2.0 seconds		
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		No Active DTC's	TPS_ThrottleAuthority Defaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	1 trips Type A EWMA
			OR	> 8.3 units				
			The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds)	> 75 grams (upper threshold is 500 mvolts and lower threshold is 200 mvolts)				
					B1S2 Failed this key cycle	P013B, P013E, P013F, P2270 or P2271		
					System Voltage	10.0 < Volts < 32.0		
					Learned heater resistance	= Valid		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Post fuel cell DTC's Passed DTC's Passed	= 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)		
					After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).			
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)	> 32.0 units > 150 grams (lower threshold is 350 mvolts and upper threshold is 650 mvolts)	No Active DTC's	TPS_ThrottleAuthority Defaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	1 trips Type A EWMA

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					B1S2 Failed this key cycle	P013A, P013E, P013F, P2270 or P2271		
					System Voltage	10.0 < Volts < 32.0		
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **Green Sensor Delay Criteria (B1S2)** in Supporting Tables tab.		
					Low Fuel Condition Diag	= False		
					Post fuel cell	= enabled		
					DTC's Passed	P2270 (and P2272 if applicable) P013E (and P014A if applicable) P013A (and P013C if applicable) P2271 (and P2273 if applicable) P013F (and P014B if applicable)		
					After above conditions are met: Fuel Enrich mode continued.			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY 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 grams (upper threshold is 500 mvolts and lower threshold is 200 mvolts)	No Active DTC's B2S2 Failed 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_ThrottleAuthority Defaulted 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 = Not Valid = Not Valid, See definition of **Green Sensor Delay Criteria (B2S2)** in Supporting Tables tab. = False = enabled P2270 (and P2272 if applicable)	Frequency: Once per trip Note: if NaPOPD_b_Reset FastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_Rapid ResponseActive = TRUE, multiple tests per trip are allowed.	1 trips Type A EWMA

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					DTC's Passed	P013E (and P014A if applicable)		
					After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).			
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)	> 32.0 units > 150 grams (lower threshold is 350 mvolts and upper threshold is 650 mvolts)	No Active DTC's B2S2 Failed this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay	TPS_ThrottleAuthority Defaulted 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 = Not Valid	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.	1 trips Type A EWMA

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Green O2S Condition	= Not Valid, See definition of **Green Sensor Delay Criteria (B2S2)** in Supporting Tables tab.		
					Low Fuel Condition Diag	= False		
					Post fuel cell	= enabled		
					DTC's Passed	P2270 (and P2272 if applicable) P013E (and P014A if applicable) P013A (and P013C if applicable) P2271 (and P2273 if applicable) P013F (and P014B if applicable)		
					After above conditions are met: Fuel Enrich mode continued.			
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	> 500 mvolts > 78 grams	No Active DTC's	TPS_ThrottleAuthority Defaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA		
					B1S2 Failed this key cycle	P013A, P013B, P013F, P2270 or P2271		
					System Voltage	10.0 < Volts < 32.0		
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **Green Sensor Delay Criteria (B1S2)** in Supporting Tables tab.		
					Low Fuel Condition Diag	= False		
					Post fuel cell	= enabled		
					DTC's Passed	P2270 (and P2272 if applicable)		
					After above conditions are met: DFCO mode entered (wo driver initiated pedal input).			
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	Post O2 sensor voltage AND The Accumulated mass air flow monitored during the Delayed Response Test	< 350 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA	Frequency: Once per trip Note: if NaPOPD_b_Reset FastRespFunc= FALSE for the given Fuel Bank	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		threshold.		> 1185 grams		MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA B1S2 Failed this key cycle P013A, P013B, P013E, P2270 or P2271 System Voltage 10.0 < Volts < 32.0 Learned heater resistance = Valid ICAT MAT Burnoff delay = Not Valid Green O2S Condition = Not Valid, See definition of **Green Sensor Delay Criteria (B1S2)** in Supporting Tables tab. Low Fuel Condition Diag = False Post fuel cell = enabled DTC's Passed P2270 (and P2272 if applicable) P013E (and P014A if applicable) P013A (and P013C if applicable)	OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						P2271 (and P2273 if applicable)		
					After above conditions are met: Fuel Enrich mode entered.			
O2S Circuit Insufficient Activity Bank 1 Sensor 2	P0140	This DTC determines if the O2 sensor circuit is open.	Oxygen Sensor Signal	> 1700 mvolts	No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Fuel	TPS_ThrottleAuthority Defaulted 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 100msec loop	2 trips Type B
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	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** Time	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.	2 trips Type B
O2 Sensor Delayed Response Rich to	P014A	This DTC determines if the post catalyst O2 sensor has an initial delayed response to an A/F	Post O2 sensor AND	> 500 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted	Frequency: Once per trip Note: if	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Lean Bank 2 Sensor 2		change from Rich to Lean. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	The Accumulated mass air flow monitored during the Delayed Response Test	> 78 grams.		ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA	NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	
					B2S2 Failed this key cycle	P013C, P013D, P014B, P2272 or P2273		
					System Voltage	10.0 < Volts < 32.0		
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **Green Sensor Delay Criteria (B2S2)** in Supporting Tables tab.		
					Low Fuel Condition Diag	= False		
					Post fuel cell	= enabled		
					DTC's Passed	P2270 (and P2272 if applicable)		
					After above conditions are met: DFCO mode entered (wo driver initiated pedal input).			
O2 Sensor Delayed Response Lean to	P014B	This DTC determines if the post catalyst O2 sensor has an initial delayed response to an A/F	Post O2 sensor AND	< 350 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted	Frequency: Once per trip Note: if	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Rich Bank 2 Sensor 2		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.	AND The Accumulated mass air flow monitored during the Delayed Response Test	> 1185 grams.		ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA	Note: If NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	
					B2S2 Failed this key cycle	P013C, P013D, P014A, P2272 or P2273		
					System Voltage	10.0 < Volts < 32.0		
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **Green Sensor Delay Criteria (B2S2)** in Supporting Tables tab.		
					Low Fuel Condition Diag	= False		
					Post fuel cell	= enabled		
					DTC's Passed	P2270 (and P2272 if applicable) P013E (and P014A if applicable)		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						P013A (and P013C if applicable) P2271 (and P2273 if applicable)		
					After above conditions are met: Fuel Enrich mode entered.			
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	TPS_ThrottleAuthority Defaulted 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	380 failures out of 475 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Equivalence Ratio	0.9922 ≤ equiv. ratio ≤ 1.0137		
					Air Per Cylinder	50.0 ≤ APC ≤ 700.0 mgrams		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel	≤ 87% Ethanol		
					Fuel State	DFCO not active		
					All of the above met for	> 2.0 seconds		
O2S Circuit High Voltage Bank 2 Sensor 1	P0152	This DTC determines if the O2 sensor circuit is shorted to high.	Oxygen Sensor Signal	> 1050 mvolts	**Open Test Criteria**		100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B
					No Active DTC's	TPS_ThrottleAuthority Defaulted MAF_SensorFA EthanolCompositionSensor_FA		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					AFM Status	= All Cylinders active		
					Heater Warm-up delay	= Complete		
					Engine Run Time	> 5 seconds		
					Engine Run Accum	> 225 seconds		
					Fuel Condition	<= 87 % Ethanol		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					No Active DTC's	MAP_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA		
					Low Fuel Condition Diag	= False		
					Fuel	≤ 87 % Ethanol		
					Initial delay after Open Test Criteria met (cold start condition)	> 85.0 seconds when engine soak time > 28800 seconds		
					Initial delay after Open Test Criteria met (not cold start condition)	> 85.0 seconds when engine soak time ≤ 28800 seconds		
					Equivalence Ratio	0.9922 ≤ ratio ≤ 1.0137		
					Air Per Cylinder	50 ≤ mgrams ≤ 700		
					Fuel Control State	not = Power Enrichment		
					All of the above met for	> 2 seconds		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY 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_ThrottleAuthority Defaulted 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	2 trips Type B
					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		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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		
					Engine Coolant	> 60 ºC		
					IAT	> -40 ºC		
					Engine run Accum	> 160 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		
					Purge duty cycle	≥ 0 % duty cycle		
					Engine airflow	20 ≤ gps ≤ 55		
					Engine speed	1200 ≤ RPM ≤ 3000		
					Fuel	< 87 % Ethanol		
					Baro	> 70 kpa		
					Air Per Cylinder	>= 200 mGrams		
					Low Fuel Condition Diag	= False		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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		
O2S Circuit Insufficient Activity Bank 2 Sensor 1	P0154	This DTC determines if the O2 sensor circuit is open.	Oxygen Sensor Signal	> 1700 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted MAF_SensorFA EthanolCompositionSensor_FA	200 failures out of 250 samples. Frequency: Continuous	2 trips Type B
					System Voltage	10.0 < Volts < 32.0		
					AFM Status	= All Cylinders active	100msec loop	
					Heater Warm-up delay	= Complete		
					Engine Run Time	> 5 seconds		
					Engine Run Accum	> 225 seconds		
					Fuel	≤ 87 % Ethanol		
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	0.3 > amps > 3.1	No Active DTC's	ECT_Sensor_FA	8 failures out of 10 samples Frequency: 1 tests per trip	2 trips Type B
					System Voltage	10.0 < Volts < 32.0		
					Heater Warm-up delay	= Complete		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					O2S Heater device control B1S1 O2S Heater Duty Cycle **All of the above met for**	= Not active > zero > 120 seconds	5 seconds delay between tests and 1 second execution rate	
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	TPS_ThrottleAuthority Defaulted 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	430 failures out of 540 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Equivalence Ratio	0.9922 ≤ ratio ≤ 1.0137		
					Air Per Cylinder	50 ≤ mgrams ≤ 700		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel	≤ 87% Ethanol		
					Fuel State	DFCO not active		
					All of the above met for	> 2.0 seconds		
O2S Circuit High Voltage Bank 2 Sensor 2	P0158	This DTC determines if the O2 sensor circuit is shorted to high.	Oxygen Sensor Signal	> 1050 mvolts	**Open Test Criteria**		100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B
					No Active DTC's	TPS_ThrottleAuthority Defaulted MAF_SensorFA EthanolCompositionSensor_FA		
					System Voltage	10.0 < Volts < 32.0		
					AFM Status	= All Cylinders active		
					Heater Warm-up delay	= Complete		
					Engine Run Time	> 5 seconds		
					Engine Run Accum	> 225 seconds		
					Fuel	≤ 87 % Ethanol		
					No Active DTC's	MAP_SensorFA EvapPurgeSolenoidCircuit_FA		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA		
					Low Fuel Condition Diag	= False		
					Fuel	≤ 87 % Ethanol		
					Initial delay after Open Test Criteria met (cold start condition)	> 85.0 seconds when engine soak time > 28800 seconds		
					Initial delay after Open Test Criteria met (not cold start condition)	> 85.0 seconds when engine soak time ≤ 28800 seconds		
					Equivalence Ratio	0.9922 ≤ ratio ≤ 1.0137		
					Air Per Cylinder	50 ≤ mgrams ≤ 700		
					Fuel Control State	not = Power Enrichment		
					All of the above met for	> 2 seconds		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY 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	> 1700 mvolts	No Active DTC's System Voltage AFM Status Heater Warm-up delay Engine Run Time Engine Run Accum Fuel	TPS_ThrottleAuthority Defaulted 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 100msec loop	2 trips Type B
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	0.3 > amps > 2.9	No Active DTC's System Voltage Heater Warm-up delay O2S Heater device control B1S1 O2S Heater Duty Cycle **<u>All of the above met for</u>**	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	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY 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 fuel trim.	The filtered long-term fuel trim metric	>= 1.245	Engine speed BARO Coolant Temp MAP Inlet Air Temp MAF Fuel Level	375 <rpm< 7000 > 70 kPa -40 <°C< 150 10 <kPa< 255 -20 <°C< 150 1.0 <g/s< 510.0 > 10 % or if fuel sender is faulty	Frequency: 100 ms Continuous Loop Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during 76% of the EPAIII drive cycle. This is also typical of real-world driving, however values will vary (higher or lower) based on the actual conditions present during the drive cycle.	2 Trip(s) Type B
					Long Term Fuel Trim data accumulation:	> 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.		
					fuel trim diagnosed during decels? Yes			
					Long-Term Fuel Trim Cell Usage			
					Sometimes, certain Long-Term Fuel Trim Cells are not utilized for control or diagnosis. **Please see "Supporting Tables" Tab for a list of cells utilized for diagnosis.**			
					Fuel Control Status			
					Closed Loop Long Term FT	Enabled Enabled		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						Please see "Closed Loop Enable Criteria" and "Long Term FT Enable Criteria" in Supporting Tables.		
					Fuel Consumed	> 0.3 liters of fuel consumed after a fuel fill event ("Virtual Flex Fuel Sensor applications only)		
					EGR Flow Diag. Intrusive Test Not Active Catalyst Monitor Intrusive Test Not Active Post O2 Diag. Intrusive Test Not Active Device Control Not Active EVAP Diag. “tank pull down” Not Active			
					No active DTCs: IAC_SystemRPM_FA MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR System FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSensorCircuit_FA Ethanol Composition Sensor FA			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					FuelInjectorCircuit_FA EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit_FA MAP_EngineVacuumStatus AmbientAirDefault O2S_Bank_1_Sensor_1_FA			
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. The Intrusive test is described below:	**Passive Test:**			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 Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during 76% of the EPAIII drive cycle. Th+H1388is is also typical of real-world driving, however values will vary (higher or lower) based on the actual conditions present during the drive cycle.	2 Trip(s) Type B
			The filtered Non-Purge Long Term Fuel Trim metric	<= 0.710 (a Passive Test decision cannot be made when Purge is enabled)				
			Intrusive Test:					
			The filtered Purge Long Term Fuel Trim metric	<= 0.715				
			AND					
			The filtered Non-Purge Long Term Fuel Trim metric	<= 0.710 for 3 out of 5 intrusive segments				

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		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.	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. 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 > Purge Rich Limit Table for at least 200 seconds, indicating that the canister has been purged.					
Fuel System Too Lean Bank 2	P0174	Determines if the fuel control system is in a lean condition, based on the filtered long-term fuel trim.	The filtered long-term fuel trim metric	>= 1.245	Engine speed BARO Coolant Temp MAP Inlet Air Temp MAF Fuel Level Long Term Fuel Trim data accumulation: fuel trim diagnosed during decels? Yes	375 <rpm< 7000 > 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.	Frequency: 100 ms Continuous Loop Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during 76% of the EPAIII drive cycle. This is also typical of real-world driving, however values will vary (higher or lower) based on the actual conditions present during the drive cycle.	2 Trip(s) Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Long-Term Fuel Trim Cell Usage			
					Sometimes, certain Long-Term Fuel Trim Cells are not utilized for control or diagnosis. **Please see "Supporting Tables" Tab for a list of cells utilized for diagnosis.**			
					Fuel Control Status			
					Closed Loop Long Term FT	Enabled Enabled **Please see "Closed Loop Enable Criteria" and "Long Term FT Enable Criteria" in Supporting Tables.**		
					Fuel Consumed	> 0.3 liters of fuel consumed after a fuel fill event ("Virtual Flex Fuel Sensor applications only)		
					EGR Flow Diag. Intrusive Test Not Active Catalyst Monitor Intrusive Test Not Active Post O2 Diag. Intrusive Test Not Active Device Control Not Active EVAP Diag. “tank pull down” Not Active			
					No active DTCs:			
					IAC_SystemRPM_FA			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR System FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSensorCircuit_FA Ethanol Composition Sensor FA FuelInjectorCircuit_FA EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit_FA MAP_EngineVacuumStatus AmbientAirDefault O2S_Bank_2_Sensor_1_FA			
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. The Intrusive test is described below:	**Passive Test:** The filtered Non-Purge Long Term Fuel Trim metric	<= 0.710 (a Passive Test decision cannot be made when Purge is enabled)		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 Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during 76% of the EPAIII drive cycle.	2 Trip(s) Type B

<table>
<tr><th>COMPONENT/ SYSTEM</th><th>FAULT CODE</th><th>MONITOR STRATEGY DESCRIPTION</th><th>MALFUNCTION CRITERIA</th><th>THRESHOLD VALUE</th><th>SECONDARY PARAMETERS</th><th>ENABLE CONDITIONS</th><th>TIME REQUIRED</th><th>MIL ILLUM.</th></tr>
<tr><td rowspan="5"></td><td rowspan="5"></td><td rowspan="4"></td><td colspan="2">Intrusive Test:</td><td rowspan="5"></td><td rowspan="5"></td><td rowspan="5">This is also typical of real-world driving, however values will vary (higher or lower) based on the actual conditions present during the drive cycle.</td><td rowspan="5"></td></tr>
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3 out of 5 intrusive segments</td></tr>
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Performing intrusive tests too frequently may also affect EVAP and EPAIII emissions, and the execution frequency of other diagnostics.</td><td>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.

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 > Purge Rich Limit Table for at least 200 seconds, indicating that the canister has been purged.</td><td></td></tr>
</table>

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Injector 1	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 ≤ Voltage ≤ 32 volts greater than 5 seconds	8 failures out of 10 samples 250 ms /sample Continuous	2 trips Type B
Injector 2	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 ≤ Voltage ≤ 32 volts greater than 5 seconds	8 failures out of 10 samples 250 ms /sample Continuous	2 trips Type B
Injector 3	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 ≤ Voltage ≤ 32 volts greater than 5 seconds	8 failures out of 10 samples 250 ms /sample Continuous	2 trips Type B
Injector 4	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 ≤ Voltage ≤ 32 volts greater than 5 seconds	8 failures out of 10 samples 250 ms /sample Continuous	2 trips Type B
Injector 5	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 ≤ Voltage ≤ 32 volts greater than 5 seconds	8 failures out of 10 samples 250 ms /sample Continuous	2 trips Type B
Injector 6	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 ≤ Voltage ≤ 32 volts greater than 5 seconds	8 failures out of 10 samples 250 ms /sample Continuous	2 trips Type B
Injector 7	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 ≤ Voltage ≤ 32 volts greater than 5 seconds	8 failures out of 10 samples 250 ms /sample Continuous	2 trips Type B
Injector 8	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 ≤ Voltage ≤ 32 volts greater than 5 seconds	8 failures out of 10 samples 250 ms /sample Continuous	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY 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 <	0.25		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions 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	Trips: 1 Type: A MIL: YES
TPS2 Circuit High	P0223	Detects a continuous or intermittent short or open in TPS2 circuit	TPS2 Voltage >	4.59		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions 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	Trips: 1 Type: A MIL: YES
Random Misfire Detected Cylinder 1 Misfire Detected Cylinder 2 Misfire Detected Cylinder 3 Misfire Detected	P0300 P0301 P0302 P0303	These DTC's will determine if a random or a cylinder specific misfire is occurring by monitoring crankshaft velocity	Deceleration index vs. Engine Speed Vs Engine load Deceleration index calculation is tailored to specific veh. 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.	**(>**Idle SCD AND > Idle SCD ddt Tables) **OR** (>SCD Delta AND > SCD Delta ddt Tables) **OR** (>Idle Cyl Mode AND > Idle Cyl Mode ddt Tables) **OR** (>Cyl Mode AND > Cyl Mode ddt Tables) **OR** (>Rev Mode Table) **OR** (> AFM Table in Cyl Deact mode)	Engine Run Time ECT If ECT at startup ECT System Voltage + Throttle delta - Throttle delta	> 2 crankshaft revolutions -7ºC < ECT < 130ºC < -7ºC 21ºC < ECT < 130ºC 9.00<volts<32.00 < 85.00% per 25 ms < 85.00% per 25 ms	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.	2 Trips Type B (Mil Flashes with Catalyst Damaging Misfire)

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Cylinder 4 Misfire Detected	P0304							
Cylinder 5 Misfire Detected	P0305						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.	
Cylinder 6 Misfire Detected	P0306							
Cylinder 7 Misfire Detected	P0307							
Cylinder 8 Misfire Detected	P0308							
			Misfire Percent Emission Failure Threshold	≥ 0.8125% P0300 ≥ 1.04% emission				
			Misfire Percent Catalyst Damage	>"Catalyst Damaging Misfire Percentage" Table whenever secondary conditions are met.	Engine Speed Engine Load Misfire counts (at low speed/loads, one cylinder may not cause cat damage)	> 1000 rpm AND > 50 % load AND < 180 counts on one cylinder		
			When engine speed and load are less than the FTP cals (3) catalyst damage exceedences are allowed.	≤ 0 FTP rpm AND ≤ 0 FTP % load				

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
							Continuous	
					Engine Speed	360 < rpm < (Engine Speed Limit) - 400 Engine speed limit is a function of inputs like Gear and temperature typical Engine Speed Limit = 5000 rpm	4 cycle delay	
				disable conditions:	No active DTCs:	TPS_FA EnginePowerLimited MAF_SensorTFTKO MAP_SensorTFTKO IAT_SensorTFTKO ECT_Sensor_Ckt_TFTKO 5VoltReferenceB_FA CrankSensorTestFailedTKO CrankSensorFaultActive CrankIntakeCamCorrelationFA CrankExhaustCamCorrelationFA CrankCamCorrelationTFTKO AnyCamPhaser_FA AnyCamPhaser_TFTKO	4 cycle delay	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						If Monitor Rough Road=1 and RoughRoadSource="TOSS" Transmission Output Shaft Angular Velocity Validity (Auto Trans only) Clutch Sensor FA (Manual Trans only) TransEngagedState_FA (Auto Trans only)		
					P0315 & engine speed	> 1000 rpm		
					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	4 cycle delay	
					Fuel System Status Active Fuel Management	≠ Fuel Cut Transition in progress	4 cycle delay 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	> 8192 rpm	0 cycle delay	
					Below zero torque (except CARB approved 3000 rpm to redline triangle.)	<" Zero torque engine load" in Supporting Tables tab	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	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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:	4 engine cycles after misfire 3 Engine cycles after misfire		
					Abnormal engine speed oscillations: (Rough road etc) Off Idle, number of consecutive decelerating cylinders after accelerating,: (Number of decels can vary with misfire detection equation) TPS Engine Speed Veh Speed SCD Cyl Mode Rev Mode	> 3 % > 950 rpm > 3 mph		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Misfire Pattern Recognition Enabled: Validates misfire vs. false detection	1 (1 = Enabled)		
					Engine Speed Veh Speed	Between > 900 RPM and < 3000 RPM		
					Final fail conditions within:	> 1 kph > 0.9 < 2.0 of misfire threshold for a given		
					Rough Road Section: Monitor Rough Road	1 (1=Yes)		
					RoughRoadSource	FromABS		
					IF Rough Road is monitored, then ONE of the following Rough Road Sources will be used: Rough Road Source = "TOSS" Rough Road	detected		
					Rough Road Source = "WheelSpeedInECM" ABS/TCS system RoughRoad VSES	active detected active		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Rough Road Source = "FromABS" ABS/TCS system RoughRoad VSES	 active detected active		
Crankshaft Position System Variation Not Learned	P0315	Monitor for valid crankshaft error compensation factors	Sum of Compensation factors	≥ 4.0040 OR ≤ 3.9960	OBD Manufacturer Enable Counter	=0	0.50 seconds Frequency Continuous 100 msec	1 Trips Type A
Knock Sensor (KS) Performance Per Cylinder	P0324	This diagnostic checks for knock sensor performance out of the normal expected range due to: 1) Excessive knock **and** 2) Abnormal engine noise on a per cylinder basis	Common Enable Criteria		Diagnostic Enabled? Engine Speed Engine Air Flow ECT IAT	Enabled ≤ 8500 RPM ≥ 20 mg/cylinder and ≤ 2000 mg/cylinder ≥ -40 deg's C ≥ -40 deg's C	First Order Lag Filter with Weight Coefficient	Type: B MIL: YES Trips: 2
			Specific Enable Criteria and Thresholds					

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			1. Filtered Knock Intensity (for Excessive Knock) VaKNKD_k_PerfCylKnockIntFilt	> 1.7000	Engine Speed Engine running	≥ 1500 RPM ≥ 0.2 seconds	Weight Coefficient = 0.0480 Updated each engine event	
			2. Filtered FFT Intensity: (for Abnormal Noise) VaKNKD_k_PerfCylAbnFiltIntnsity	< Abnormal Noise Threshold (see supporting tables)	Engine Speed Engine running	≥ 2500 RPM ≥ 0.1 seconds	Weight Coefficient = 0.0480 Updated each engine event	
Knock Sensor (KS) Circuit Bank 1	P0325	This diagnostic checks for an open in the knock sensor circuit	Filtered FFT Output (VaKNKD_k_OpenFiltIntensity[0])	> OpenCktThrshMin **and** < OpenCktThrshMax See Supporting Tables for OpenCktThrshMin & Max	Diagnostic Enabled?	Enabled	First Order Lag Filter with Weight Coefficient	Type: B MIL: YES Trips: 2
					Engine Speed	≥ 400 RPM and ≤ 8500 RPM		
					Engine Air Flow	≥ 70 mg/cylinder and ≤ 2000 mg/cylinder		
					ECT	≥ -40 deg's C	Weight Coefficient = 0.0100 Updated each engine event	
					IAT	≥ -40 deg's C		
					Engine running	≥ 3.8 seconds		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY 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 due to 1. Excessive knock **or** 2. Abnormal engine noise on a per bank/sensor basis	Common Enable Criteria		Diagnostic Enabled?	Enabled	First Order Lag Filter with Weight Coefficient	Type: B MIL: YES Trips: 2
					Engine Speed	≤ 8500 RPM		
					Engine Air Flow	≥ 20 mg/cylinder and ≤ 2000 mg/cylinder		
					ECT	≥ -40 deg's C		
					IAT	≥ -40 deg's C		
			1. Filtered Knock Intensity (for Excessive Knock) VaKNKD_k_PerfKnockIntFilt	> 1.5000	Engine Speed Engine running	≥ 1500 RPM ≥ 1.7 seconds	Weight Coefficient = 0.0060 Updated each engine event	
			2. Filtered FFT Intensity: (for Abnormal Noise) VaKNKD_k_PerfAbnFiltIntnsity	< Abnormal Noise Threshold (see supporting tables)	Engine Speed Engine running	≥ 2500 RPM ≥ 1.0 seconds	Weight Coefficient = 0.0060 Updated each engine event	
Knock Sensor (KS) Circuit Low Bank 1	P0327	This diagnostic checks for an out of range low knock sensor signal	Sensor Input Signal Line	< 0.57 Volts	Diagnostic Enabled?	Enabled	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
					Engine Speed	> 0 RPM and < 8500 RPM		
			or					
			Sensor Return Signal Line	< 0.40 Volts				

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY 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 Signal Line	> 2.76 Volts	Diagnostic Enabled?	Enabled	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
					Engine Speed	> 0 RPM and < 8500 RPM		
			or					
			Sensor Return Signal Line	> 1.95 Volts				
Knock Sensor (KS) Circuit Bank 2	P0330	This diagnostic checks for an open in the knock sensor circuit	Filtered FFT Output (VaKNKD_k_OpenFiltIntensity[1])	> OpenCktThrshMin **and** < OpenCktThrshMax See Supporting Tables for OpenCktThrshMin & Max	Diagnostic Enabled?	Enabled	First Order Lag Filter with Weight Coefficient	Type: B MIL: YES Trips: 2
					Engine Speed	≥ 400 RPM and ≤ 8500 RPM		
					Engine Air Flow	≥ 70 mg/cylinder and ≤ 2000 mg/cylinder		
							Weight Coefficient = 0.0100	
					ECT	≥ -40 deg's C		
					IAT	≥ -40 deg's C		
					Engine running	≥ 3.8 seconds	Updated each engine event	
Knock Sensor (KS) Performance Bank 2	P0331	This diagnostic checks for knock sensor performance out of the normal expected range due to 1. Excessive knock **or** 2. Abnormal engine noise on a per bank basis			Diagnostic Enabled?	Enabled	First Order Lag Filter with Weight Coefficient	Type: B MIL: YES Trips: 2
					Engine Speed	≤ 8500 RPM		
					Engine Air Flow	≥ 20 mg/cylinder and ≤ 2000 mg/cylinder		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					ECT	≥ -40 deg's C		
					IAT	≥ -40 deg's C		
			1. Filtered Knock Intensity (for Excessive Knock) VaKNKD_k_PerfKnockIntFilt	> 1.5000	Engine Speed Engine running	≥ 1500 RPM ≥ 1.7 seconds	Weight Coefficient = 0.0060 Updated each engine event	
			2. Filtered FFT Intensity: (for Abnormal Noise) VaKNKD_k_PerfAbnFiltIntnsity	< Abnormal Noise Threshold (see supporting tables)	Engine Speed Engine running	≥ 2500 RPM ≥ 1.0 seconds	Weight Coefficient = 0.0060 Updated each engine event	
Knock Sensor (KS) Circuit Low Bank 2	P0332	This diagnostic checks for an out of range low knock sensor signal	Sensor Input Signal Line	< 0.57 Volts	Diagnostic Enabled?	Enabled	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
					Engine Speed	> 0 RPM and < 8500 RPM		
			or					
			Sensor Return Signal Line	< 0.40 Volts				
Knock Sensor (KS) Circuit High Bank 2	P0333	This diagnostic checks for an out of range high knock sensor signal	Sensor Input Signal Line	> 2.76 Volts	Diagnostic Enabled?	Enabled	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Engine Speed	> 0 RPM and < 8500 RPM		
			or					
			Sensor Return Signal Line	> 1.95 Volts				
Crankshaft Position (CKP) Sensor A Circuit	P0335	Determines if a fault exists with the crank position sensor signal	<u>Engine-Cranking Crankshaft Test:</u> Time since last crankshaft position sensor pulse received	>= 4.0 seconds	<u>Engine-Cranking Crankshaft Test:</u> 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))	<u>Engine-Cranking Crankshaft Test:</u> Continuous every 100 msec	Type B 2 trips
			<u>Time-Based Crankshaft Test:</u> No crankshaft pulses received	>= 0.3 seconds	<u>Time-Based Crankshaft Test:</u> Engine is Running		<u>Time-Based Crankshaft Test:</u> Continuous every 12.5 msec	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Starter is not engaged No DTC Active:	 5VoltReferenceB_FA		
			Event-Based Crankshaft Test: No crankshaft pulses received		Event-Based Crankshaft Test: Engine is Running OR Starter is engaged No DTC Active:	 5VoltReferenceA_FA 5VoltReferenceB_FA P0340 P0341	Event-Based Crankshaft Test: 2 failures out of 10 samples One sample per engine revolution	
Crankshaft Position (CKP) Sensor A Performance	P0336	Determines if a performance fault exists with the crank position sensor signal	Crank Re-synchronization Test: Time in which 10 or more crank re-synchronizations occur Time-Based Crankshaft Test:	< 10.0 seconds	Crank Re-synchronization Test: Engine Air Flow Cam-based engine speed No DTC Active: Time-Based Crankshaft Test:	 >= 3.0 grams/second > 450 RPM 5VoltReferenceB_FA P0335	Crank Re-synchronization Test: Continuous every 250 msec Time-Based Crankshaft Test:	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			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	
			Engine Start Test during Crank: Time since starter engaged without detecting crankshaft synchronization gap	>= 1.5 seconds	Engine Start Test during Crank: 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))	Engine Start Test during Crank: Continuous every 100 msec	
			Event-Based Crankshaft Test: Crank Pulses received in one engine revolution	< 51	Event-Based Crankshaft Test: Engine is Running OR		Event-Based Crankshaft Test: 8 failures out of 10 samples	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			OR Crank Pulses received in one engine revolution	 > 65	Starter is engaged No DTC Active:	 5VoltReferenceA_FA 5VoltReferenceB_FA P0340 P0341	 One sample per engine revolution	
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor A	P0340	Determines if a fault exists with the cam position bank 1 sensor A signal	Engine Cranking Camshaft Test: Time since last camshaft position sensor pulse received OR Time that starter has been engaged without a camshaft sensor pulse Time-Based Camshaft Test:	 >= 5.5 seconds >= 4.0 seconds	Engine Cranking Camshaft Test: Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow Time-Based Camshaft Test:	 = FALSE = FALSE = FALSE > 3.0 grams/second))	Engine Cranking Camshaft Test: Continuous every 100 msec Time-Based Camshaft Test:	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			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	
			Fast Event-Based Camshaft Test: No camshaft pulses received during first 24 MEDRES events (There are 24 MEDRES events per engine cycle)		Fast Event-Based Camshaft Test: Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged		Fast Event-Based Camshaft Test: Continuous every MEDRES event	
			Slow Event-Based Camshaft Test:		No DTC Active: Slow Event-Based Camshaft Test:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Slow Event-Based Camshaft Test:	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			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	
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	Fast Event-Based Camshaft Test: The number of camshaft pulses received during first 24 MEDRES events is less than 4 or greater than 8 (There are 24 MEDRES events per engine cycle) Slow Event-Based Camshaft Test: The number of camshaft pulses received during 100 engine cycles		Fast Event-Based Camshaft Test: 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: Slow Event-Based Camshaft Test: Crankshaft is synchronized	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Fast Event-Based Camshaft Test: Continuous every MEDRES event Slow Event-Based Camshaft Test: 8 failures out of 10 samples	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			OR	< 398 > 402	No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Continuous every engine cycle	
IGNITION CONTROL #1 CIRCUIT	P0351	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 1	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	 > 6.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #2 CIRCUIT	P0352	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 2	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	 > 6.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #3 CIRCUIT	P0353	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 3	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	 > 6.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #4 CIRCUIT	P0354	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 4	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	 > 6.00 Volts	50 Failures out of 63Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #5 CIRCUIT	P0355	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 5	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	 > 6.00 Volts	50 Failures out of 63Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #6 CIRCUIT	P0356	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 6	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	 > 6.00 Volts	50 Failures out of 63Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #7 CIRCUIT	P0357	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 7	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	 > 6.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY 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	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	 > 6.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
Catalyst System Low Efficiency Bank 1	P0420	Oxygen Storage The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and O2 during lean A/F excursions to store the excess oxygen (I.e. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H2 to release this stored oxygen (I.e. Cerium Reduction). This is referred to as the Oxygen Storage Capacity, or OSC. CatMon's strategy is to "measure" the OSC of the catalyst through forced 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 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.	Normalized Ratio OSC Value (EWMA filtered)	< 0.350	***Valid Idle Period Criteria*** Driver must be off the accel pedal. This checks that the final accel pedal position (comprehending deadband and hysteresis) is essentially zero. Vehicle Speed Engine speed Engine run time Tests attempted this trip The catalyst diagnostic has not yet completed for the current trip.	 *< 1.24 MPH* > 1300 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: 1000ms	Type A 1 Trip(s)

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Catalyst Idle Conditions Met Criteria			
					General Enable met and the Valid Idle Period Criteria met			
					Green Converter Delay	Not Active		
					Induction Air	*-20 < ° C < 250*		
					Intrusive test(s): Fueltrim Post O2 EVAP EGR	Not Active		
		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.			Other vehicle functions: Power Take Off	Not Active		
					RunCrank Voltage	> 10.90 Volts		
					Ethanol Estimation	NOT in Progress		
					ECT	*40 < ° C < 129*		
					Barometric Pressure	> 70 KPA		
					Idle Time before going intrusive is	< 50 Seconds		
					Idle time is incremented if Vehicle speed	< 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.		
					Short Term Fuel Trim	*0.90 < ST FT < 1.36*		
					Predicted catalyst temp > 420 degC 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) .			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Also, in order to increment the WarmedUpEvents counter (counter must exceed 30 cal value), 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 Enabled **Please see "Closed Loop Enable Criteria" section of the "Supporting Tables" tab for details.**			
					PRNDL is in Drive Range on an Auto Transmission vehicle.			
					Idle Stable Criteria :: Must hold true from after Catalyst Idle Conditions Met to the end of test			
					MAF	*4.00 < g/s < 20.00*		
					Predicted catalyst temperature	< 800 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	*0.960 < ST FT Avg < 1.040*		
					Rapid Step Response (RSR) feature will initiate multiple tests:			
					If the difference between current EWMA value and the current OSC Normalized Ratio value is > 0.620 and the			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					current OSC Normalized Ratio value is < 0.100			
					Maximum of 24 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 > 0 ° C for 0 seconds non-continuously. Note: this feature is only enabled when the vehicle is new and cannot be enabled in service			
					PTO Not Active			
					General Enable			
					DTC's Not Set			
					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			
					O2S_Bank_2_Sensor_2_FA			
					FuelTrimSystemB1_FA			
					FuelTrimSystemB1_TFTKO			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					FuelTrimSystemB2_FA			
					FuelTrimSystemB2_TFTKO			
					EngineMisfireDetected_FA			
					EvapPurgeSolenoidCircuit_FA			
					IAC_SystemRPM_FA			
					EGRValvePerformance_FA			
					EGRValveCircuit_FA			
					CamSensorAnyLocationFA			
					CrankSensor_FA			
					TPS_Performance_FA			
					EnginePowerLimited			
					VehicleSpeedSensor_FA			
Catalyst System Low Efficiency Bank 2	P0430	Oxygen Storage	Normalized Ratio OSC Value (EWMA filtered)	< 0.350	***Valid Idle Period Criteria***		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: 1000ms	Type A 1 Trip(s)
		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 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.			Driver must be off the accel pedal. This checks that the final accel pedal position (comprehending deadband and hysteresis) is essentially zero.			
					Vehicle Speed	*< 1.24 MPH*		
					Engine speed	> 1300 RPM for a minimum of 20 seconds since end of last idle period.		
					Engine run time	≥ MinimumEngineRunTime**, This is a function of Coolant Temperature, please see Supporting Tables**		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Tests attempted this trip	< 255		
					The catalyst diagnostic has not yet completed for the current trip.			
					Catalyst Idle Conditions Met Criteria			
					General Enable met and the Valid Idle Period Criteria met			
					Green Converter Delay	Not Active		
					Induction Air	*-20 < ° C < 250*		
					Intrusive test(s): Fueltrim Post O2 EVAP EGR	Not Active		
					Other vehicle functions: Power Take Off	Not Active		
		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.			RunCrank Voltage	> 10.90 Volts		
					Ethanol Estimation	NOT in Progress		
					ECT	*40 < ° C < 129*		
					Barometric Pressure	> 70 KPA		
					Idle Time before going intrusive is	< 50 Seconds		
					Idle time is incremented if Vehicle speed	< 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.		
					Short Term Fuel Trim	*0.90 < ST FT < 1.36*		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Predicted catalyst temp > 420 degC 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 (counter must exceed 30 cal value), 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 Enabled **Please see "Closed Loop Enable Criteria" section of the "Supporting Tables" tab for details.**			
					PRNDL is in Drive Range on an Auto Transmission vehicle.			
					Idle Stable Criteria :: Must hold true from after Catalyst Idle Conditions Met to the end of test			
					MAF	*4.00 < g/s < 20.00*		
					Predicted catalyst temperature	< 800 degC		
					Engine Fueling Criteria at Beginning of Idle Period			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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 < ST FT Avg < 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 > 0.620 and the current OSC Normalized Ratio value is < 0.100			
					Maximum of 24 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 > 0 ° C for 0 seconds non-continuously. Note: this feature is only enabled when the vehicle is new and cannot be enabled in service			
					PTO Not Active			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					General Enable			
					DTC's Not Set			
					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			
					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			
					CrankSensor_FA			
					TPS_Performance_FA			
					EnginePowerLimited			
					VehicleSpeedSensor_FA			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Evaporative Emission (EVAP) System Small Leak Detected	P0442	This DTC will detect a small leak (≥ 0.150") in the EVAP system between the fuel fill cap and the purge solenoid. 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.	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).		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	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	Once per trip, during hot soak (up to 2400 sec.). No more than 2 unsuccessful attempts between completed tests.	1 trip Type A EWMA Average run length is 8 under normal conditions Run length is 3 to 6 trips after code clear or non-volatile reset

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Estimate of Ambient Air Temperature Valid	0 °C ≤ Temperature ≤ 34 °C		
			When EWMA is , the DTC light is illuminated.	> 0.70 (EWMA Fail Threshold)	**Conditions for Estimate of Ambient Air Temperature to be valid:**			
		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 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.	The DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 2 additional consecutive trips.	≤ 0.35 (EWMA Re-Pass Threshold)	**1. Cold Start** Startup delta deg C (ECT-IAT) OR **2. Short Soak and Previous EAT Valid** Previous time since engine off OR **3. Less than a short soak and Previous EAT Not Valid** Previous time since engine off	≤ 8 °C ≤ 7200 seconds ≤ 7200 seconds		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					AND			
					Must expire Estimate of Ambient Temperature Valid Conditioning Time. **"P0442: Estimate of Ambient Temperature Valid Conditioning Time" in Supporting Tables Tab.**	Vehicle Speed ≥ 9.9 mph AND Mass Air Flow ≥ 10 g/sec		
					OR			
					4. Not a Cold Start and greater than a Short Soak			
					Previous time since engine off	> 7200 seconds		
					AND			
					Must expire maximum value in Estimate of Ambient Temperature Valid Conditioning Time. **Please see "P0442: Estimate of Ambient Temperature Valid Conditioning Time" in Supporting Tables Tab.**	Vehicle Speed ≥ 9.9 mph AND Mass Air Flow ≥ 10 g/sec		
				Abort Conditions:	**1. High Fuel Volatility**			
					During the volatility phase, pressure in the fuel tank is integrated vs. time. If the integrated pressure is			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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** See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for information on fuel level refueling. OR	< -5		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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	0.50 seconds		
					OR **7. Key up during EONV test** No active DTCs:	FuelLevelDataFault MAF_SensorFA ECT_Sensor_FA IAT_SensorFA		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						VehicleSpeedSensor_FA IgnitionOffTimeValid AmbientAirDefault P0443 P0446 P0449 P0452 P0453 P0455 P0496		
Evaporative Emission (EVAP) Canister Purge Solenoid Valve Circuit (ODM)	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	11 volts ≤ Voltage ≤ 32 volts	20 failures out of 25 samples 250 ms / sample Continuous with solenoid operation	2 trips Type B
Evaporative Emission (EVAP) Vent System Performance	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 OR Vented Vacuum for 60 seconds	 < -623 Pa > 1245 Pa	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	Once per Cold Start Time is dependent on driving conditions	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Vent Restriction Test: Tank Vacuum for 5 seconds 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.	 > 2989 Pa ≥ 14 liters		TPS_FA VehicleSpeedSensor_FA IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454	Maximum time before test abort is 1000 seconds	
Evaporative Emission (EVAP) Vent Solenoid Control Circuit (ODM)	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.		Run/Crank Voltage Run/Crank voltage goes to 0 volts at key off	11 volts ≤ Voltage ≤ 32 volts	20 failures out of 25 samples 250 ms / sample Continuous with solenoid operation	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Fuel Tank Pressure (FTP) Sensor Circuit Performance	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	 0.2 volts 0.2 volts > 0.73 (EWMA Fail 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.	1 trip Type A EWMA Average run length: 6 Run length is 2 trips after code clear or non-volatile reset

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			, the DTC light is illuminated. The DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 2 additional consecutive trips.	≤ 0.40 (EWMA Re-Pass Threshold)				
Fuel Tank Pressure (FTP) Sensor Circuit Low Voltage	P0452	This DTC will detect a fuel tank pressure sensor signal that is too low out of range.	Fuel tank pressure sensor signal The normal operating range of the fuel tank pressure sensor is 0.5 volts (~1245 Pa) to 4.5 volts (~ -3736 Pa).	< 0.15 volts (3 % of Vref or ~ 1681 Pa)	Time delay after sensor power up for sensor warm-up ECM State ≠ crank Stops 6.0 seconds after key-off	is 0.10 seconds	80 failures out of 100 samples 100 ms / sample Continuous	2 trips Type B
Fuel Tank Pressure (FTP) Sensor Circuit High Voltage	P0453	This DTC will detect a fuel tank pressure sensor signal that is too high out of range.	Fuel tank pressure sensor signal The normal operating range of the fuel tank pressure sensor is 0.5 volts (~1245 Pa) to 4.5 volts (~ -3736 Pa).	> 4.85 volts (97% of Vref or ~ -4172 Pa)	Time delay after sensor power up for sensor warm-up ECM State ≠ crank	is 0.10 seconds	80 failures out of 100 samples 100 ms / sample	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Stops 6.0 seconds after key-off		Continuous	
Fuel Tank Pressure (FTP) Sensor Circuit Intermittent	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	 >112 Pa < 249 Pa	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.	1 trips Type A

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			in 12.5 msec. A refueling event is confirmed if the fuel level has a persistent change for 30 seconds.	of 10 %			12.5 ms / sample Continuous when vent solenoid is closed.	
Evaporative Emission (EVAP) System Large Leak Detected	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	> 64 liters ≤ 2740 Pa ≥ 2740 Pa	Fuel Level System Voltage BARO Purge Flow No active DTCs:	10% ≤ Percent ≤ 90% 11 volts ≤ Voltage ≤ 32 volts ≥ 70 kPa ≥ 3.75 % MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorCircuitFA 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 1000 seconds Weak Vacuum Follow-up Test	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Note: Weak Vacuum Follow-up Test can only report a pass.		<u>Cold Start Test</u> If ECT > IAT, Startup temperature delta (ECT-IAT): Cold Test Timer Startup IAT Startup ECT <u>Weak Vacuum Follow-up Test</u> This test can run following a weak vacuum failure or on a hot restart.	≤ 8 °C ≤ 1000 seconds 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C	With large leak detected, the follow-up test is limited to 1300 seconds. Once the MIL is on, the follow-up test runs indefinitely.	
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 83 miles.	< 3 liters	Engine Running No active DTCs:	VehicleSpeedSensor_FA	250 ms / sample Continuous	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY 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.			Engine Running No active DTCs:	 VehicleSpeedSensor_FA	250 ms / sample Continuous	2 trips Type B
			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 and remains in this condition for OR	>= 1024.0 liters < 0.0 liters 124 miles.				
			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 transfered into the primary tank within 0 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.		Transfer Pump is commanded on No device control for the transfer pump Fuel Volume in Secondary Tank Vehicle Speed	 < 10 liters < 0 kph		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY 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	< 3 liters				
			over an accumulated 103 miles.					
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 %	Run/Crank Voltage Run/Crank voltage goes to 0 volts at key off	11 volts ≤ Voltage ≤ 32 volts	100 failures out of 125 samples 100 ms / sample Continuous	2 trips Type B
Fuel Level Sensor 1 Circuit High Voltage	P0463	This DTC will detect a fuel sender stuck out ofrange high in the primary fuel tank.	Fuel level Sender % of 5V range	> 60 %	Run/Crank Voltage Run/Crank voltage goes to 0 volts at key off	11 volts ≤ Voltage ≤ 32 volts	100 failures out of 125 samples 100 ms / sample Continuous	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Fuel Level Sensor 1 Circuit Intermittent	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 intermintant change in fuel level is defined as: The fuel level changes and does not remain for 30 seconds during a 600 second refueling rationality test.	 by 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	1 trips Type A

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Evaporative Emission (EVAP) System Flow During Non-Purge	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 5 seconds BEFORE Test time	> 2491 Pa ≥ 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 ≥ 28800.0 seconds MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454	Once per cold start Cold start: max time is 1000 seconds	2 trips Type B
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	2 trips Type B
			filter coefficient	0.00275	Coolant Temp	> 60 °C and < 125 °C Must verify KfECTI_T_EngCoolHot LoThresh is less than KfECTI_T_EngCoolHot HiThresh	Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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	≤ 2 mph		
					Commanded RPM delta	≤ 25 rpm		
					Idle time	> 10 sec		
					For manual transmissions: Clutch Pedal Position or Clutch Pedal Position	> 88.00 pct < 20.00 pct		
						PTO not active		
						Transfer Case not in 4WD LowState		
						Off-vehicle device control (service bay control) must not be active.		
						following conditions not TRUE: (VeTESR_e_EngSpdReqIntvType = CeTESR_e_EngSpdMinLimit AND VeTESR_e_EngSpdReqRespType = CeTESR_e_NoSuggestion)		
						Clutch is not depressed		
					No active DTCs	TC_BoostPresSnsrFA		
						ECT_Sensor_FA		
						EnginePowerLimited		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						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		
						LowFuelConditionDiagnostic		
						Clutch Sensor FA		
						AmbPresDfltdStatus		
						P2771		
					All of the above met for Idle time	> 10 sec		
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	2 trips Type B
			filter coefficient	0.00275	Coolant Temp	> 60 °C and < 125 °C Must verify KfECTI_T_EngCoolHot LoThresh is less than KfECTI_T_EngCoolHot HiThresh	Diagnostic reports pass or fail in 10 seconds once all enable conditions are met	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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	≤ 2 mph		
					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		
						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		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						IAT_SensorCircuitFA		
						EvapFlowDuringNonPurge_FA		
						FuelTrimSystemB1_FA		
						FuelTrimSystemB2_FA		
						FuelInjectorCircuit_FA		
						MAF_SensorFA		
						EngineMisfireDetected_FA		
						IgnitionOutputDriver_FA		
						TPS_FA		
						TPS_Performance_FA		
						VehicleSpeedSensor_FA		
						FuelLevelDataFault		
						LowFuelConditionDiagnostic		
						Clutch Sensor FA		
						AmbPresDfltdStatus		
						P2771		
					All of the above met for Idle time	> 10 sec		
Engine Oil Pressure (EOP) Sensor Performance	P0521	Determines if the Engine Oil Pressure (EOP) Sensor is stuck or biased in range	**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.):		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). Details on Supporting Tables Tab (P0521 Section)	Enabled Present	Performed every 100 msec	2 trip(s) Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
				< -50.0 kPa OR > 50.0 kPa				
			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.):	> -47.0 kPa AND < 47.0 kPa	No active DTC's	>= 0.30 weighting Fault bundles: CrankSensorFA ECT_Sensor_FA MAF_SensorFA IAT_SensorFA EOPCircuit_FA		
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 percent	Engine Speed Enable Engine Speed Disable Ignition Voltage Sensor Present Diagnostic enabled/ disabled	> 400 rpm < 350 rpm <= 32.0 V and >= 11.0 V Yes Enabled	50 failures out of 63 samples Performed every 100 msec	2 trip(s) Type R

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY 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 percent	Ignition Voltage Sensor Present Diagnostic enabled/ disabled	<= 32.0 V and >= 11.0 V Yes Enabled	204 failures out of 255 samples Performed every 100 msec	2 trip(s) Type R
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	Trips: 1 Type: A MIL: YES
			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	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
				In all cases, the failure count is cleared when controller shuts down				
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	Diagnostic runs at powerup and once per second continuously after that	Type A 1 trips
						PCM is identified through calibration as a Service PCM		
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	Type A 1 trips
							Diagnostic reports a fault if 1 failure occurs	
ECM RAM Failure	P0604	Indicates that the ECM has detected a RAM fault:						Trips: 1
								Type: A
		Primary Processor System 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)	MIL: YES

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		Primary Processor Cache RAM Fault	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)	
		Primary Processor TPU RAM Fault	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)	
		Primary Processor Update Dual Store RAM Fault	Indicates that the primary processor detects a mismatch between the data and dual data is found during RAM updates. Detects a mismatch in data and dual data updates >	0.47413 seconds			When dual store updates occur.	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		Primary Processor Write Protected RAM Fault	Indicates that the primary processor detects an illegal write attempt to protected RAM. Number of illegal writes are >	0 counts			Diagnostic runs continuously (background loop)	
		Secondary Processor RAM Fault	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)	
Internal ECM Processor Integrity Fault	P0606	Indicates that the ECM has detected an internal processor integrity fault:						Trips: 1 Type: A MIL: YES
		Primary Processor SPI Fault Detected	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 recieved 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	
		Secondary Processor SPI Fault Detected	Loss or invalid message of SPI communication from the Primary	Loss or invalid message at initialization detected or loss or			In the secondary processor, 20/200	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			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 recieved by the Secondary Processor	invalid message after a valid message was recieved			counts intermittent or 0 counts continuous; 0 counts continuous @ initialization. 12.5 ms /count in the ECM main processor	
		Secondary Processor Stack Fault	Checks for stack over or underflow in secondary processorby 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.	variable, depends on length of time to corrupt stack	
		Secondary processor received incorrect Keys	MAIN processor is verified by responding to a seed sent from the secondary with a key response to secondary. Checks number of incorrect keys received > or Secondary processor has not received a new within time limit	2 incorrect seeds within 8 messages, 0.200 seconds		Ignition in Run or Crank	150 ms for one seed continually failing	
		MAIN processor did not receive seed within time limit	Time new seed not received exceeded			always running	0.450 seconds	
		MAIN processor test for seeds to arrive in a known sequence	MAIN processor receives seed in wrong order			always running	3 / 17 counts intermittent. 50 ms/count in the ECM main	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		Secondary processor ALU check	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.	25 ms	
		Secondary processor register configuration check	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.	12.5 to 25 ms	
		MAIN processor discrete fault:	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 time from initialization >= 0.488 seconds Value of KePISD_b_ConfigRegTestEnbld is: 1.	50 ms	
		MAIN detected corruption in throttle or pedal critical RAM data	memory and complement memory do not agree				0.19 seconds	
		MAIN Processor Performance Check	1. Software tasks loops > schedule tasks loop 2. 12.5ms task loop sequence does not complete >=	See supporting tables 0.19 seconds		KePISD_b_SeedUpdKeyStorFltEnbl== 1 Value of KePISD_b_SeedUpdKeyStorFltEnbl is: 1. KePISD_b_12p5msSeqTestEnbld== 1 Value of KePISD_b_12p5msSeqTestEnbld is: 1.	Error > 5 times of loop time; loop times are 6.25, 12.5, 25 ms in the main processor	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		MAIN Processor Performance Check	Software background task first pass time to complete exceeds		Powertrain relay	> 6.41 V	360.000 seconds	
		MAIN processor ALU check	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.	25 ms	
		MAIN processor configuration register check	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.	12.5 to 25 ms	
		MAIN Stack Fault	Checks number of stack over/under flow since last powerup reset >=	5		KeMEMD_b_StackLimitTestEnbl == 1 Value of KeMEMD_b_StackLimitTestEnbl is: 1.	variable, depends on length of time to corrupt stack	
		MAIN processor ADC test	Voltage deviation >	0.495		KePISD_b_A2D_CnvrtrTestEnbld == 1 Value of KePISD_b_A2D_CnvrtrTestEnbld is: 1.	3 / 8 counts or 0.150 seconds continuous; 50 ms/count in main processor	
		Flash ECC Fault	Checks for ECC (error correcting code) circuit test errors reported by the hardware for flash memory. Increments counter during controller initialization if ECC error occured since last controller initialization. Counter >=	3 (results in MIL), 5(results in MIL and remedial action)		KeMEMD_b_FlashECC_CktTestEnbl == 1 Value of KeMEMD_b_FlashECC_CktTestEnbl is: 1.	variable, depends on length of time to access flash with corrupted memory	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		RAM ECC Fault	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.	variable, depends on length of time to access flash with corrupted memory	
		MAIN DMA transfer check	MAIN processor DMA transfer from Flask to RAM has 1 failure			KePISD_b_DMA_XferTestEnbld == 1 Value of KePISD_b_DMA_XferTestEnbld is: 1.	variable, depends on length of time to write flash to RAM	
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	11 volts ≤ Voltage ≤ 32 volts ≥ 0 RPM	8 failures out of 10 samples 250 ms / sample Continuous with device on	2 trips Type B
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	11 volts ≤ Voltage ≤ 32 volts ≥ 0 RPM	8 failures out of 10 samples 250 ms / sample Continuous with device off	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY 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/accesory, run, or crank	1 test failure Diagnostic runs once at powerup	Type A 1 trips
VIN Not Programmed or Mismatched - Engine Control Module (ECM)	P0630	This DTC checks VIN is correctly written	At least one of programed VIN's digit	= 00 or FF	OBD Manufacturer Enable Counter	= 0	250 ms / test Continuous	Type A 1 trips
5 Volt Reference #1 Circuit	P0641	Detects a continuous or intermittent short on th 5 volt reference circuit #1	ECM Vref1 < or ECM Vref1 >	4.875 5.125		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	19/39 counts or 0.1875 sec continuous; 12.5 ms/count in main processor	Trips: 1 Type: A MIL: YES
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	11 volts ≤ Voltage ≤ 32 volts	20 failures out of 25 samples 250 ms / sample	2 trip Type B NO MIL

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
							Continuous	
5 Volt Reference #2 Circuit	P0651	Detects a continuous or intermittent short on th 5 volt reference circuit #2	ECM Vref2 < or ECM Vref2 >	4.875 5.125		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	19/39 counts or 0.1875 sec continuous; 12.5 ms/count in main processor	Trips: 1 Type: A MIL: YES
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	11 volts ≤ Voltage ≤ 32 volts	8 failures out of 10 samples 250 ms / sample Continuous	2 trips Type B
Powertrain Relay Feedback Circuit High	P0690	This DTC is a check to determine if the Powertrain relay is functioning properly.	PT Relay feedback voltage is Stuck Test: PT Relay feedback voltage is when commanded 'OFF'	≥ 18 volts > 2 volts	Powertrain relay commanded "ON" No active DTCs:	PowertrainRelayStateOn_FA	5 failures out of 6 samples 1 second / sample Stuck Test: 100 ms/ sample Continous failures ≥ 4 seconds	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY 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 th 5 volt reference circuit #1	ECM Vref3 < or ECM Vref3 >	4.875 5.125		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	19/39 counts or 0.1875 sec continuous; 12.5 ms/count in main processor	Trips: 1 Type: A MIL: YES
5 Volt Reference #4 Circuit	P06A3	Detects a continuous or intermittent short on th 5 volt reference circuit #2	ECM Vref4 < or ECM Vref4 >	4.875 5.125		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	19/39 counts or 0.1875 sec continuous; 12.5 ms/count in main processor	Trips: 1 Type: A MIL: YES
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	Gated FFT Diagnostic Output (VaKNKD_k_OpenTestCktIntFilter [0])	> OpenTestThreshLo **and** < OpenTestThreshHi See Supporting Tables	Diagnostic Enabled? Engine Speed Engine Air Flow Engine running	Enabled > 400 RPM and < 3500 RPM ≥ 10 mg/cylinder and ≤ 2000 mg/cylinder ≥ 3.8 seconds	First Order Lag Filter with Weight Coefficient Weight Coefficient = 0.0100 Updated each engine event	Type: B MIL: YES Trips: 2
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	Gated FFT Diagnostic Output (VaKNKD_k_OpenTestCktIntFilter [1])	> OpenTestThreshLo **and** < OpenTestThreshHi See Supporting Tables	Diagnostic Enabled?	Enabled	First Order Lag Filter with Weight Coefficient	Type: B MIL: YES Trips: 2

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Engine Speed	> 400 RPM and < 3500 RPM		
					Engine Air Flow	≥ 10 mg/cylinder and ≤ 2000 mg/cylinder	Weight Coefficient = 0.0100	
					Engine running	≥ 3.8 seconds	Updated each engine event	
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 MIL: NO
Traction Control Torque Request Circuit (GMT900 with Stabilitrak only)	P0856	Determines if torque request from the EBTCM is valid	Serial Communication 2's complement message - ($140 for PPEI2 or $1C9 for PPEI3, $1CA for Hybrid))	Message <> 2's complement of message	Serial communication to EBTCM (U0108) Power Mode Engine Running	No loss of communication = Run = True	**All except Class2 PWM:** Count of 2's complement values not equal >= 10 Performed every 12.5 msec	
			OR					
			Serial Communication message ($140 for PPEI2 or $1C9 for PPEI3, $1CA for Hybrid)) rolling count value	Message rolling count value <> previous message rolling count value plus one	Status of traction in GMLAN message ($4E9)	= Traction Present	10 rolling count failures out of 10 samples Performed every 12.5 msec	
			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	0 trip(s)

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
								Special Type C
			Torque request greater than torque request diagnostic maximum threshold	> 250 Nm for engine based traction torque system, > 4000 Nm for axle based traction torque system			>= 4 out of 10 samples Performed every 12.5 msec	
Inlet Airflow System Performance	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)	>= 465 RPM <= 4600 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	Continuous Calculation are performed every 12.5 msec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						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 table "IFRD Residual Weighting Factors". MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA ECT_Sensor_Ckt_FP IAT_SensorFA IAT_SensorCircuitFP		
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.	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)	No Active DTC's	TPS_ThrottleAuthority Defaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault	Sample time is 60 seconds Frequency: Once per trip	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
				< 3		MAF_SensorFA		
				< 3		EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA		
			OR Slope Time L/R Switches OR Slope Time R/L Switches			EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA EthanolCompositionSensor_FA EngineMisfireDetected_FA		
					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	= 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		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Engine Coolant	> 60 ºC		
					IAT	> -40 ºC		
					Engine run Accum	> 160 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		
					Purge duty cycle	≥ 0 % duty cycle		
					Engine airflow	20 ≤ gps ≤ 55		
					Engine speed	1200 ≤ RPM ≤ 3000		
					Fuel	< 87 % Ethanol		
					Baro	> 70 kpa		
					Air Per Cylinder	≥ 200 mgrams		
					Low Fuel Condition Diag	= False		
					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 STRATEGY 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. 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 "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) < 3 < 3	No Active DTC's Bank 2 Sensor 1 DTC's not active System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Diag	TPS_ThrottleAuthority Defaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA EthanolCompositionSensor_FA EngineMisfireDetected_FA = P0151, P0152 or P0154 10.0 < Volts < 32.0 = Not active = Not active = Not active = Not active = False	Sample time is 60 seconds Frequency: Once per trip	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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		
					Engine Coolant	> 60 ºC		
					IAT	> -40 ºC		
					Engine run Accum	> 160 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		
					Purge duty cycle	≥ 0 %		
					Engine airflow	20 ≤ gps ≤ 55		
					Engine speed	1200 ≤ RPM ≤ 3000		
					Fuel	< 87 % Ethanol		
					Baro	> 70 kpa		
					Air Per Cylinder	≥ 200 mGrams		
					Low Fuel Condition Diag	= False		
					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		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Fuel State Commanded Proportional Gain **All of the above met for**	DFCO not active ≥ 0.0 % > 3.5 seconds		
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	1 trips Type A
ABS Rough Road malfunction	P1380	This diagnostic detects if the ABS controller is indicating a fault, and misfire is present. When this occurs, misfire will continue to run.	GMLan Message: "Wheel Sensor Rough Road Magnitude Validity"	= FALSE	Vehicle Speed Engine Speed Engine Load RunCrankActive Active DTC	VSS ≥ 5 mph rpm < 8192 load < 60 = TRUE P0300, MIL Request	40 failures out of 80 samples 250 ms /sample Continuous	0 Trips Type C "Special Type C"

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
ABS System Rough Road Detection Communication Fault (GMT900 only)	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	VSS ≥ 5 mph rpm < 8192 load < 60 = TRUE	40 failures out of 80 samples 250 ms /sample Continuous	0 Trips Type C "Special Type C"
					Active DTC	P0300, MIL Request		
Cold Start Emissions Reduction System Fault (GMT900 chassis cert only)	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 estimated accumulated exhaust power OR Average desired accumulated exhaust power - Average estimated accumulated exhaust power (EWMA filtered)	< -32.00 KJ/s (high RPM failure mode) > 6.50 KJ/s (low RPM failure mode)	**To enable the diagnostic, the Cold Start Emission Reduction Strategy must be Active per the following:**		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 Trip(s)
					Catalyst Temperature	< 300.00 degC		
					AND			
					Engine Coolant	> 140.00 degC		
					The Cold Start Emission Reduction strategy must not be exiting. The strategy will exit per the following:			
					Catalyst Temperature	>= 600.00 degC		
					AND			
					Engine Run Time	>= 1.00 seconds		
					OR			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Engine Run Time	> 80.00 seconds		
					OR			
					Engine Coolant	>= -40.00 degC		
					Other Enable Criteria			
					Vehicle Speed	< 1.24 MPH		
					Driver must be off the accel pedal. This checks that the final accel pedal position (comprehending deadband and hysteresis) is essentially zero.			
					A change in throttle position (tip-in/tip-out) will initiate a delay in the calculation of the average qualified residual value. When the			
					OBD Manufacturer Enable Counter	0		
					Pedal Close Delay Timer	> 5.00 seconds		
					the diagnostic will continue the calculation.			
					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			
					Idle Speed Control System	Active		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					General Enable			
					DTC's Not Set			
					AcceleratorPedalFailure			
					ECT_Sensor_FA			
					IAT_SensorCircuitFA			
					IAT2_SensorCircuitFA			
					CrankSensorFaultActive			
					FuelInjectorCircuit_FA			
					MAF_SensorFA			
					MAP_SensorFA			
					EngineMisfireDetected_FA			
					Clutch Sensor FA			
					IAC_SystemRPM_FA			
					IgnitionOutputDriver_FA			
					P050A (ColdStrt_IAC_SysPerf)			
					P050B (ColdStrtIgnTmngPerf)			
					TPS_FA			
					VehicleSpeedSensor_FA			
					5VoltReferenceMAP_OOR_Flt			
					TransmissionEngagedState_FA			
					EngineTorqueInaccurate			
Replicated Transmission Output Speed (RTOS) Sensor (GMT900 with 3 channel ABS systems only)	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 ≤ 7500 for ≥ 5.0 seconds ≤ 124 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 STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Replicated Transmission Output Speed (RTOS) Sensor (GMT900 with 3 channel ABS systems only)	P150B	RTOS Signal Circuit Intermittent	RTOS Sensor Loop-to-Loop speed change	≥ 350 RPM	Raw Output Speed Positive Output Speed change Transmission output speed angualr velocity Engine Speed Vehicle Speed Ignition voltage	≥ 300 RPM for ≥ 2.0 sec ≤ 150 RPM for ≥ 2.0 sec ≥ 500 RPM 200 ≤ RPM ≤ 7500 for ≥ 5.0 seconds ≤ 124 MPH for ≥ 5.0 sec 9.0 ≤ Volts ≤ 32.0	≥ 3.0 sec	Type B 2 trips
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	2 trips Type B
			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		
Steady State Actuation Fault	P1516	Detect an inablity to maintain a steady state throttle position	Throttle is considered to be steady state when: Change in throttle position over 12.5 msec is < 4.00 seconds	0.25 percent		Run/crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	0.49 ms	Trips: 1 Type: A MIL: YES

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY 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 – ETC Run/Crank| >	3.00 Volts	Powertrain commanded on and Run/crank voltage > or ETC Run/crank voltage > and Run/crank voltage >	Table, f(IAT). See supporting tables 5.5 5.5	240/480 counts or 0.1750sec continuous; 12.5 ms/count in main processor	Trips: 1 Type: A MIL: YES
Internal Control Module Redundant Memory Performance	P16F3	Detect Processor Calculation faults due to RAM corruptions, ALU failures and ROM failures						Trips: 1 Type: A MIL: YES
			Desired engine torque request greater than redundant calculation plus threshold	99.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Cylinders active greater than commanded AFM apps only	1 cylinder		Engine speed greater than 0rpm and less than 3200rpm	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Difference between Cruise Axle Torque Arbitrated Request and Cruise Axle Torque Request exceeds threshold	187.88 Nm		Cruise has been engaged for more than 4.00 seconds	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Engine min capacity above threshold	100.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 65 ms continuous, 0.5 down time multipier	
			No fast unmanaged retarded spark above the applied spark plus the threshold	Table, f(Erpm). See supporting tables		Engine speed greater than 0rpm	Up/down timer 162 ms continuous, 0.5 down time multipier	
			Absolute difference of adjustment factor based on temperature and its dual store above threshold	4.03 m/s		Ignition in unlock/accessory, run or crank	Up/down timer 91 ms continuous, 0.5 down time multipier	
			1) Absolute difference of redundant calculated engine speed above threshold 2)Time between lores events and its dual store do not match	KeEPSD_n_LoresSecurBndry 200 RPM		Engine speed greater than 0 RPM	Up/down timer 162 ms continuous, 0.5 down time multipier	
			After throttle blade pressure and its dual store do not match	N/A		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Speed Control's Preditcted Torque Request and its dual store do not match	N/A		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Engine oil temperature and its dual store do not match	N/A		Ignition in unlock/accessory, run or crank	Up/down timer 220 ms continuous, 0.5 down time multipier	
			Desired throttle position greater than redundant calculation plus threshold	8.41 percent		Ignition in unlock/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	0.84 kpa		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Throttle desired torque above desired torque plus threshold	100.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Desired filtered throttle torque exceeds the threshold plus the higher of desired throttle torque or modeled throttle torque	100.00 Nm		Ignition in unlock/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	High Threshold 50.00 Nm		Ignition in unlock/accessory, run	Up/down timer 475 ms continuous, 0.5	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			its dual store copy does not match	Low Threshold -50.00 Nm		or crank	down time multipier	
			Torque feedback integral term magnitude or rate of change is out of allowable range or its dual store copy do not match	High Threshold 93.75 Nm Low Threshold -100.00 Nm Rate of change threshold 6.25 Nm/loop		Ignition in unlock/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 in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Difference of torque desired throttle area and its redundant calculation is out of bounds given by threshold range	High Threshold 0.50% Low Threshold -0.50%		Ignition in unlock/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 in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Difference of base friction torque and its redundant calculation is out of bounds given by threshold range	High Threshold 100.00Nm Low Threshold -100.00Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Accessory drive friction torque is out of bounds given by threshold range	High Threshold 100.00 Nm Low Threshold 0.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			AC friction torque is greater than commanded by AC control software or less than threshold limit	High Threshold 55.00 Nm Low Threshold 0.00 Nm		Ignition in unlock/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 in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Generator friction torque is out of bounds given by threshold range	High Threshold 100.00 Nm Low Threshold 0.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Supercharger friction torque is out of bounds given by threshold range	High Threshold 100.00 Nm Low Threshold 0.00 Nm		Ignition in unlock/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	High Threshold 100.00 Nm		Engine speed >0rpm MAF, MAP and Baro	Up/down timer 475 ms continuous, 0.5	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			out of allowable range or its dual store copy do not match	Low Threshold -100.00 Nm Rate of change threshold 6.25 Nm/loop		DTCs are false	down time multipier	
			Torque error compensation is out of bounds given by threshold range	High Threshold 100.00 Nm Low Threshold 0.00 Nm		Ignition in unlock/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 11.90 Nm Low Threshold -9.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			1) Difference of reserve torque value and its redundant calculation exceed threshold 2) Reserve request does not agree with operating conditions or Difference of final predicted torque and its redundant calculation exeed threshold 3) Rate of change of reserve torque exceeds threshold, increasing direction only 4) Reserve engine torque above allowable capacity threshold	1) 99.00 Nm 2) NA 3) 99.00 Nm 4) 99.00 Nm		1&2) Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 100.00 Nm 3&4) Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			AC friction torque is greater than commanded by AC control software	55.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Absolute difference of the calculated spark offset for	6.28 degrees		Engine speed >0rpm	Up/down timer 162 ms continuous, 0.5	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			equivalence ratio and its redundant calculation greater than threshold				down time multipier	
			Engine Vacuum and its dual store do not match	N/A		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of the calculated Intake Manifold Pressure during engine event versus during time event is greater than threshold	Table, f(Engine Torque). See supporting tables		Engine speed >0rpm	Up/down timer 162 ms continuous, 0.5 down time multipier	
			Min. Axle Torque Capacity is greater than threshold	0.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Predicted torque for zero pedal determination is greater than calc'ed limit.	Table, f(Engine, Oil Temp). See supporting tables + 100.00 Nm		Ignition in unlock/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 in unlock/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	N/A		AFM not changing from Active to Inactive and	Up/down timer 1988 ms	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			equal			preload torque not changing and one loop after React command Engine speed >0rpm	continuous, 0.5 down time multipier	
			Difference of Weighting factor for number of cylinders fueled and its redundant calculation is above threshold	0.26		Engine run flag = TRUE > 1.00s	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	6.28 degrees		Ignition in unlock/accessory, run or crank	Up/down timer 162 ms continuous, 0.5 down time multipier	
			Difference of commanded spark advance and adjusted delivered is out of bounds given by threshold range	6.28 degrees		Engine speed >0rpm	Up/down timer 162 ms continuous, 0.5 down time multipier	
			Estimated Engine Torque and its dual store do not match	100.00 Nm		Engine speed >0rpm	Up/down timer 475 ms continuous, 0.5 down time multipier	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Estimated Engine Torque without reductions due to torque control and its dual store are not match	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	6.28 degrees		Torque reserve (condition when spark control greater than optimum to allow fast transitions for torque disturbances) > 100.00 Nm	Up/down timer 462 ms continuous, 0.5 down time multipier	
			Absolute difference of Engine Capacity Minimum Running Immediate Brake Torque Excluding Cylinder Sensitivity and its redundant calculation is out of bounds given by threshold range	100.00 Nm		Engine speed >0rpm	Up/down timer 175 ms continuous, 0.5 down time multipier	
			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 > 580rpm	Up/down timer 462 ms continuous, 0.5 down time multipier	
			Rate limited cruise axle torque request and its dual store do not match	187.88 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 163 ms continuous, 0.5 down time multipier	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY 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 2) Absolute difference of Calculated accelerator pedal position compensated for carpet learn and error conditions and its dual store do not equal 3) Absolute difference of Calculated accelerator pedal position and its dual store do not equal	1) 5.00 % 2) NA 3) NA		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded axle torque is greater than its redundant calculation by threshold	1503.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded axle torque is less than its redundant calculation by threshold	-65535.00 Nm		Ignition in unlock/accessory, run or crank Redundant commanded axle torque < --65535.00 Nm	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Preload Throttle Area is greater than its redundant calculation by threshold	10.00%		Engine speed >0rpm	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			AFM apps only					
			Preload timer and its redundant calculation do not equal AFM apps only	NA		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Preload Throttle Area and its dual store do not equal AFM apps only	NA		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Commanded engine torque due to fast actuators and its dual store do not equal	NA		Ignition in unlock/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	NA		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Arbitrated Air-Per-Cylinder filter coefficient is out of bounds given by threshold range	High Threshold 1.000 Low Threshold 0.074		Ignition in unlock/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	NA		Engine speed < 7900.00 or 8000.00 rpm (hysteresis pair)	Up/down timer 162 ms continuous, 0.5 down time multipier	
			Rate limited vehicle speed and its dual store do not equal	NA		Time since first CAN message with vehicle speed >= 0.500sec	10/20 counts; 25.0msec/count	
			transfer case neutral request from four wheel drive logic does not match with operating conditions FWD Apps only	NA		Ignition in unlock/accessory, run or crank Transfer case range valid and not over-ridden	32/0 counts; 25.0msec/count	
			transfer case neutral and its dual store do not equal FWD Apps only	NA		Ignition in unlock/accessory, run or crank	8/16 counts; 25.0msec/count	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Throttle progression mode and its dual store do not equal	NA		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			TOS to wheel speed conversion factor is out of bounds given by threshold range	High Threshold 1.10 T/C Range Hi 0.10 T/C Range Lo Low Threshold 1.10 T/C Range Hi 0.10 T/C Range Lo		Ignition in unlock/accessory, run or crank	255/6 counts; 25.0msec/count	
			TOS to wheel speed conversion factor and its dual store do not equal	NA		Ignition in unlock/accessory, run or crank	255/6 counts; 25.0msec/count	
			Cylinders active greater than commanded	2 cylinders		Engine run flag = TRUE > 2.00s Number of cylinder events since engine run > 24 No fuel injector faults active	Up/down timer 162 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 in unlock/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 in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Absolute difference of Filtered Air-per-cylinder and its redundant	50.96 mg		Ignition in unlock/accessory, run	Up/down timer 175 ms continuous, 0.5	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			calculation is out of bounds given by threshold range			or crank	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	6.28 degrees		Engine speed >0rpm	Up/down timer 162 ms continuous, 0.5 down time multipier	
			Desired Throttle Area calculated does not equal its redundant calculation	N/A		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Equivance Ratio torque compensation exceeds threshold	-100.00 Nm		Ignition in unlock/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 bt threshold	100.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Commanded Predicted Engine Torque and its dual store do not match	N/A		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Zero pedal axle torque is out of bounds given by threshold range	High Threshold 1503.00 Nm Low Threshold -65535.00 Nm		Ignition in unlock/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 1503.00 Nm Low Threshold -65535.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Torque Learn offset is out of bounds given by threshold range	High Threshold 10.00 Nm Low Threshold -10.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			One step ahead calculation of air-per-cylinder and two step ahead is greater than threshold	80.00 mg		Engine speed >580rpm	Up/down timer 462 ms continuous, 0.5 down time multipier	
			Difference between Unmanaged Spark and PACS Spark is greater than threshold	6.28 degrees		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Predicted torque for uncorrected zero pedal determination is greater than calc'ed limit.	Table, f(Engine, Oil Temp). See supporting tables + 100.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 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 in unlock/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 in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Difference between Driver Requested Immediate Torque primary path and its secondary exceeds threshold	1503.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			PTO Torque Request exceeds allowed rate limited PRO Torque Request	150.00 Nm/25ms		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Engine Speed Lores Intake Firing (event based) calculation does not equal its redundant calculation	N/A		Engine speed greater than 0rpm	Up/down timer 162 ms continuous, 0.5 down time multipier	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Engine Speed Lores Intake Firing timing (event based) calculation does not equal its redundant calculation	N/A		Engine speed greater than 0rpm	Up/down timer 162 ms continuous, 0.5 down time multipier	
			Engine Speed Lores Intake Firing (12.5ms based) calculation does not equal its redundant calculation	N/A		Engine speed greater than 0rpm	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Cold Delta Friction Torque and its dual store do not match	N/A		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			1. Driver Predicted Request is greater than its redundant calculation plus threshold 2. Driver Predicted Request is less than its redundant calculation minus threshold	1503.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Driver Immediate Request is less than its redundant calculation minus threshold	1503.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			1. Commanded Immediate Request is greater than its redundant calculation plus threshold 2. Commanded Immediate Request is less than its redundant calculation minus threshold	1503.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Commanded Immediate Response Type is set to Inactive	N/A		Ignition in unlock/accessory, run	Up/down timer 2048 ms	Not used Series 11

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						or crank	continuous, 0.5 down time multipier	
			Commanded Immediate Engine Request is greater than its redundant calculation plus threshold	100.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Commanded Predicted Engine Request is greater than its redundant calculation plus threshold	100.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 475 ms continuous, 0.5 down time multipier	
			Commanded Hybrid Predicted Crankshaft Request is greater than its redundant calculation plus threshold	4096.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Commanded Hybrid Immediate Crankshaft Request is less than its redundant calculation minus threshold	4096.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Engine Predicted Request Without Motor is greater than its redundant calculation plus threshold	99.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Engine Immediate Request Without Motor is greater than its redundant calculation plus threshold	99.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			1. Positive Torque Offset is greater than its redundant calculation plus threshold 2. Positive Torque Offset is less than its redundant calculation minus threshold	100.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
			Engine Capacity Minimum Immediate Without Motor is greater than its dual store plus threshold	100.00 Nm		Ignition in unlock/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 in unlock/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 in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Regeneration Brake Assist is not within a specified range	Brake Regen Assist < 0 Nm or Brake Regen Assist > 0.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 2048 ms continuous, 0.5 down time multipier	Not used Series 11
			Cylinder Spark Delta Correction exceeds the absolute difference	6.28 degrees		Ignition in unlock/accessory, run	Up/down timer 175 ms continuous, 0.5	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			as compared to Unadjusted Cylinder Spark Delta			or crank	down time multipier	
			1. Cylinder Torque Offset exceeds step size threshold 2. Sum of Cylinder Torque Offset exceeds sum threshold	1. 100.00 Nm 2. 100.00 Nm		Ignition in unlock/accessory, run or crank	Up/down timer 175 ms continuous, 0.5 down time multipier	
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.			Engine Running No active DTCs:	 VehicleSpeedSensor_FA	250 ms / sample Continuous	2 trips Type B
			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 and remains in this condition for OR	>= 1024.0 liters < 0.0 liters 124 miles				

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			During fuel tranfer 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 transfered into the primary tank within 0 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 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 20 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		Transfer Pump is commanded on No device control for the transfer pump Fuel Volume in Secondary Tank Vehicle Speed	< 10 liters < 0 kph		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			If the vehicle is driven a distance of 124 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 deadband AND If the vehicle is driven a distance of 124 miles without the secondary fuel level changing by 3 liters, then the sender must be stuck.	> 10 liters.	Volume in Secondary Tank and Volume in Secondary Tank Secondary Full Transfer Pump On Time	>= 0 liters < 10 liters >= 200 seconds		
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 %	Run/Crank Voltage Run/Crank voltage goes to 0 volts at key off	11 volts ≤ Voltage ≤ 32 volts	100 failures out of 125 samples 100 ms / sample Continuous	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY 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 %	Run/Crank Voltage Run/Crank voltage goes to 0 volts at key off	11 volts ≤ Voltage ≤ 32 volts	100 failures out of 125 samples 100 ms / sample Continuous	2 trips Type B
Control Module Throttle Actuator Position Performance	P2101	1) Detect a throttle positioning error	Difference between measured throttle position and modeled throttle position >	8.41 percent	TPS minimum learn is not active and Throttle is being Controlled and (Engine Running or Ignition Voltage > or Ignition Voltage >)	Run/crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions 11 5.5	1. 15 counts; 12.5 ms/count in the primary processor	Trips: 1 Type: A MIL: YES
			Difference between modeled throttle position and measured throttle position >	8.41 percent	Ignition voltage failure is false (P1682)			
		2) Detect throttle control is driving the throttle in the incorrect direction or exceed the reduced power limit	Throttle Position >	39.26 percent	TPS minimum learn is active		2. 11 counts; 12.5 ms/count in the primary processor	
			Throttle Position >	38.26 percent	Reduced Power is True			
					Powertrain relay voltage	> 6.41 Volts		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY 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.	TPS1 Voltage > AND TPS2 Voltage >	1.689 1.789	Throttle de-energized No TPS circuit faults PT Relay Voltage >	Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions No 5V reference error or fault for # 4 5V reference circuit (P06A3) 5.5	0.4969 sec	Trips: 1 Type: C MIL: NO
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 <	0.463		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions 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	Trips: 1 Type: A MIL: YES
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 >	4.75		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions 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	Trips: 1 Type: A MIL: YES

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY 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 <	0.325		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions 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	Trips: 1 Type: A MIL: YES
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 >	2.6		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions 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	Trips: 1 Type: A MIL: YES
Throttle Position (TP) Sensor 1-2 Correlation	P2135	1. Detects a continuous or intermittent correlation fault between TPS sensors #1 and #2 on Main processor	1. Difference between TPS1 displaced and TPS2 displaced >	1. 6.999% offset at min. throttle position with a linear threshold to 9.699% at max. throttle position		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	1 & 2: 79/159 counts or 58 counts continuous; 3.125 ms/count in the main processor	Trips: 1 Type: A MIL: YES

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			2. Difference between (normalized min TPS1) and (normalized min TPS2) >	2. 5.000 % Vref		No TPS sensor faults (P0122, P0123, P0222, P0223) No 5V reference error or fault for # 4 5V reference circuit (P06A3)		
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	1. Difference between APP1 displaced and APP2 displaced >	1. 8.073% offset at min. pedal position with a linear threshold to 9.973% at max. pedal position		Run/Crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	1 & 2: 19/39 counts intermittent or 15 counts continuous, 12.5 ms/count in the main processor	Trips: 1 Type: A MIL: YES
			2. Difference between (normalized min APP1) and (normalized min APP2) >	2. 5.000% Vref		No APP sensor faults (P2122, P2123,P2127, P2128) No 5V reference errors or faulst for # 3 & # 4 5V reference circuits (P06A3, P0697)		
Transfer Case Speed Sensor Output (TCSS) (GMT900 K trucks only)	P2160	No activity in the TCSS Signal circuit	TCSS Raw Speed	≤ 50 RPM	Engine Torque Throttle Position Transmission gear Garage Shift PTO	60.0 ≤ N-M ≤ 8191.8 8 ≤ % ≤ 99 Not in Park or Neutral Not active Not active	≥ 5.0 sec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					EngineTorqueEstInaccurate OR If KeETQC_b_MinTransRemedial = 1 (KeETQC_b_MinTransRemedial = 0)	Not a hybrid vehicle FALSE Not MAF_SensorTFTKO Not MAP_SensorTFTKO Not EngineMisfireDetected		
						NOT TPS_FA		
					OR			
					The below conditions apply only if KeVSPR_b_OBD_WhlSpdSensors = 1	KeVSPR_b_OBD_WhlSpdSensors = 0		
					Driven Wheel Speed	65 ≤ RPM ≤ 1100		
					DTC's not fault active:	C1207, C1208, C1209, C1210, C1221, C1222, C1223, C1224, C1225, C1226, C1227, C1228, C1232, C1233, C1234, C1235, C1255, C1256, C12E1, C12E2, C12FF, or U0121		
Transfer Case Speed Sensor Output (TCSS) (GMT900 K trucks only)	P2161	TCSS Circuit Signal Intermittent	TCSS Loop-to-Loop speed decrease	≥ 475 RPM			≥ 4.0 sec	Type B 2 trips
			OR					
			TCSS Loop-to-Loop speed increase	≥ 225 RPM				
					Engine Speed	≥ 1000 RPM		
					TCSS Speed	> 0		
					Transmission gear	Not in Park or Neutral		
					Garage Shift	Not active		
					PTO	Not active		
					P2160	CrankSensor_FA = FALSE Not Fault Active		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY 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 >	0.935		Run/crank voltage or Powertrain relay voltage > 6.41 and reduced power is false, else the failure will be reported for all conditions	2.0 secs	Trips: 1 Type: A MIL: YES
			Number of learn attempts >	10 counts				
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 2. When above is present for more than 5 seconds, fail counts start.		No Active DTC's	MAF_SensorFA IAT_SensorFA THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA	30 failures out of 90 samples 1 sec/ sample	2 trips Type B
					Engine not run time	≥ 1800 seconds		
					Engine run time	90 ≤ Time ≤ 1370 seconds	Once per ignition key cycle	
					Fuel Condition	Ethanol ≤ 87%		
			Engine total airgrams is accumulated when 17 ≤ AirFlow ≤ 450 grams per second.		ECT at Power Up	-7.0 ≤ ECT ≤ 70.0 °C		
					IAT min	-7°C ≤ IAT ≤ 55°C.		
					Airflow	17.0 ≤ Airflow ≤ 450.0 GPS		
			Ratio Definition: Current temp difference between ECT and RCT minus PwrUp difference divided by total airgrams. Note: Minimum total airgrams is 500.0 grams.					

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Air Fuel Imbalance Bank 1	P219A	Determines if the air-fuel delivery system is imbalanced by monitoring the pre and post catalyst O2 sensor voltage characteristics. To improve S/N, pre-catalyst O2 voltages between 1000 and 0 millivolts are ignored. This feature is enabled at Air Per Cylinder values <= 0 mg/cylinder. Note: If the first voltage value is >= the second voltage value, AND/OR the Air Per Cylinder value is equal to zero, the feature is not used on this application and the full pre-catalyst O2 voltage range is utilized.	Bank 1 Filtered Length Ratio variable	> 0.75	System Voltage	*10 <= V <= 32 for >= 4 seconds*	Frequency: Continuous Monitoring of O2 voltage signal in 12.5ms loop	2 Trip(s) Type B
					ECT	> -20 oC		
					Engine speed	*1000 <= rpm <= 3500*		
			OR		Mass Airflow	*10.0 <= g/s <= 510.0*		
			Bank 1 AFM (DoD) Filtered Length Ratio variable (AFM applications only)	> 1.00	Air Per Cylinder	*180 <= mg/cylinder <= 680*		
					% Ethanol	<= 87 %		
					Positive (rising) Delta O2 voltage during previous 12.5ms is OR Negative (falling) Delta O2 voltage during previous 12.5ms is	> 5.0 millivolts	The AFIM Filtered Length Ratio variable is updated after every 2.50 seconds of valid data.	
			AND					
			Bank 1 Filtered Post catalyst O2 voltage is NOT between Note: If the first voltage value is >= the second voltage value, this is an indication that the post catalyst O2 data is not used for diagnosis on this application.	1000 and 0 millivolts	**OR**			
					Negative (falling) Delta O2 voltage during previous 12.5ms is	< -5.0 millivolts		
					For AFM (Cylinder Deactivation) vehicles only	No AFM state change during current 2.50 second sample period.	The first report is delayed for 210 seconds to allow time for the AFIM Filtered Length Ratio variable to saturate. This minimizes the possibility of reporting a pass before a potential failure could be detected.	
					O2 sensor switches	>= 1 times during current 2.50 second sample period		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Quality Factor	>= 0.75 in the current operating region		
					No EngineMisfireDetected_FA			
					No MAP_SensorFA			
					No MAF_SensorFA			
					No ECT_Sensor_FA			
					No Ethanol Composition Sensor FA			
					No TPS_ThrottleAuthorityDefaulted			
					No FuelInjectorCircuit_FA			
					No AIR System FA			
					No O2S_Bank_1_Sensor_1_FA			
					No O2S_Bank_2_Sensor_1_FA			
					No EvapPurgeSolenoidCircuit_FA			
		Monitor Strategy Notes: The AFIM Filtered Length Ratio is derived from the pre-O2 sensor voltage metric known as String Length. String Length is simply the curve length of the O2 sensor voltage over a fixed time period of 2.50 seconds. The reason we use String Length is because it comprehends both O2 signal frequency and amplitude in one metric. The busier the O2 voltage (an indication of imbalance), the longer the String Length will be.	The AFIM Filtered Length Ratio is the difference between the measured String Length and a 17x17 table lookup value,divided by the same lookup value, and finally multiplied by a Quality Factor (the latter ranges between 0 and 1, based on robustness to false diagnosis in the current operating region). The reason we use a ratio of the String Lengths is so that we can normalize the failure metric over various engine speed and load regions since engine speed and load directly impact pre-O2 String Length, especially when AFIM failures are present. In order to filter out signal noise (to avoid false failures), the Length Ratio is filtered using a common first-order lag filter. The result is the AFIM Filtered Length Ratio.	The Quality Factor (QF) calibrations are located in a 17x17 lookup table versus engine speed and load (see Supporting Tables). A QF of “1” is an indication that we were able to achieve at least 4sigma/2sigma robustness in that speed/load region. QF values less than “1” indicate that we don’t have 4sigma/2sigma robustness in that region. The quality of the data is determined via statistical analysis of String Length data. QF values less than 0.75 identify regions where diagnosis is not possible.	No EvapFlowDuringNonPurge_FA			
					No EvapVentSolenoidCircuit_FA			
					No EvapSmallLeak_FA			
					No EvapEmissionSystem_FA			
					No FuelTankPressureSensorCircuit_FA			
					Device Control Not Active			
					Intrusive Diagnostics Not Active			
					Engine OverSpeed Protection Not Active			
					Reduced Power Mode (ETC DTC) Not Active			
					PTO Not Active			
					Traction Control Not Active			
					Fuel Control Status			
					Closed Loop Long Term FT	for >= 5.0 seconds, and Enabled **Please see "Closed Loop Enable Criteria" and "Long Term FT Enable Criteria" in Supporting Tables.**		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Cumulative (absolute) delta MAF during the current 2.50 second sample period is Note: This protects against false diagnosis during severe transient maneuvers.	*< 200 g/s* *Note: This protects against false diagnosis during severe transient maneuvers.*		
					Data collection is suspended under the following circumstances:	- for 2.5 seconds after AFM transitions - for 2.5 seconds after Closed Loop transitions from Off to On - for 2.5 seconds after purge transitions from Off to On or On to Off - for 1.0 seconds after the AFIM diagnostic transitions from Disabled to Enabled		
Air Fuel Imbalance Bank 2	P219B	Determines if the air-fuel delivery system is imbalanced by monitoring the pre and post catalyst O2 sensor voltage characteristics.	Bank 2 Filtered Length Ratio variable	> 1.00	System Voltage	*10 <= V <= 32 for >= 4 seconds*	Frequency: Continuous Monitoring of O2 voltage signal in 12.5ms loop	2 Trip(s) Type B
					ECT	> -20 oC		
					Engine speed	*1000 <= rpm <= 3500*		
			OR		Mass Airflow	*10.0 <= g/s <= 510.0*		
			Bank 2 AFM (DoD) Filtered Length Ratio variable (AFM applications only)	> 1.00	Air Per Cylinder	*180 <= mg/cylinder <= 680*		
					% Ethanol	<= 87 %		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		To improve S/N, pre-catalyst O2 voltages between 1000 and 0 millivolts are ignored. This feature is enabled at Air Per Cylinder values <= 0 mg/cylinder. Note: If the first voltage value is >= the second voltage value, AND/OR the Air Per Cylinder value is equal to zero, the feature is not used on this application and the full pre-catalyst O2 voltage range is utilized.			Positive (rising) Delta O2 voltage during previous 12.5ms is OR Negative (falling) Delta O2 voltage during previous 12.5ms is	> 5.0 millivolts	The AFIM Filtered Length Ratio variable is updated after every 2.50 seconds of valid data.	
			AND					
			Bank 2 Filtered Post catalyst O2 voltage is NOT between Note: If the first voltage value is >= the second voltage value, this is an indication that the post catalyst O2 data is not used for diagnosis on this application.	1000 and 0 millivolts	**OR**			
					Negative (falling) Delta O2 voltage during previous 12.5ms is	< -5.0 millivolts	The first report is delayed for 210 seconds to allow time for the AFIM Filtered Length Ratio variable to saturate. This minimizes the possibility of reporting a pass before a potential failure could be detected.	
					For AFM (Cylinder Deactivation) vehicles only	No AFM state change during current 2.50 second sample period.		
					O2 sensor switches	>= 1 times during current 2.50 second sample period		
					Quality Factor	>= 0.75 in the current operating region		
					No EngineMisfireDetected_FA			
					No MAP_SensorFA			
					No MAF_SensorFA			
					No ECT_Sensor_FA			
					No Ethanol Composition Sensor FA			
					No TPS_ThrottleAuthorityDefaulted			
					No FuelInjectorCircuit_FA			
					No AIR System FA			
					No O2S_Bank_1_Sensor_1_FA			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					No O2S_Bank_2_Sensor_1_FA			
					No EvapPurgeSolenoidCircuit_FA			
		Monitor Strategy Notes: The AFIM Filtered Length Ratio is derived from the pre-O2 sensor voltage metric known as String Length. String Length is simply the curve length of the O2 sensor voltage over a fixed time period of 2.50 seconds. The reason we use String Length is because it comprehends both O2 signal frequency and amplitude in one metric. The busier the O2 voltage (an indication of imbalance), the longer the String Length will be.	The AFIM Filtered Length Ratio is the difference between the measured String Length and a 17x17 table lookup value,divided by the same lookup value, and finally multiplied by a Quality Factor (the latter ranges between 0 and 1, based on robustness to false diagnosis in the current operating region). The reason we use a ratio of the String Lengths is so that we can normalize the failure metric over various engine speed and load regions since engine speed and load directly impact pre-O2 String Length, especially when AFIM failures are present. In order to filter out signal noise (to avoid false failures), the Length Ratio is filtered using a common first-order lag filter. The result is the AFIM Filtered Length Ratio.	The Quality Factor (QF) calibrations are located in a 17x17 lookup table versus engine speed and load (see Supporting Tables). A QF of “1” is an indication that we were able to achieve at least 4sigma/2sigma robustness in that speed/load region. QF values less than “1” indicate that we don’t have 4sigma/2sigma robustness in that region. The quality of the data is determined via statistical analysis of String Length data. QF values less than 0.75 identify regions where diagnosis is not possible.	No EvapFlowDuringNonPurge_FA			
					No EvapVentSolenoidCircuit_FA			
					No EvapSmallLeak_FA			
					No EvapEmissionSystem_FA			
					No FuelTankPressureSensorCircuit_FA			
					Device Control Not Active			
					Intrusive Diagnostics Not Active			
					Engine OverSpeed Protection Not Active			
					Reduced Power Mode (ETC DTC) Not Active			
					PTO Not Active			
					Traction Control Not Active			
					Fuel Control Status			
					Closed Loop Long Term FT	for >= 5.0 seconds, and Enabled **Please see "Closed Loop Enable Criteria" and "Long Term FT Enable Criteria" in Supporting Tables.**		
					Cumulative (absolute) delta MAF during the current 2.50 second sample period is Note: This protects against false diagnosis during severe transient maneuvers.	*< 200 g/s* *Note: This protects against false diagnosis during severe transient maneuvers.*		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Data collection is suspended under the following circumstances:	- for 2.5 seconds after AFM transitions - for 2.5 seconds after Closed Loop transitions from Off to On - for 2.5 seconds after purge transitions from Off to On or On to Off - for 1.0 seconds after the AFIM diagnostic transitions from Disabled to Enabled		
Barometric Pressure (BARO) Sensor Performance	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	> 15.0 kPa <= 0.06 miles	No Active DTCs: Engine Run Time	AmbientAirPressCktFA ECT_Sensor_Ckt_FA IAT_SensorFA MAF_SensorFA AfterThrottlePressureFA TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA > 0.00 seconds	320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
				> 20.0 kPa				
			when distance since last estimated baro update					
				> 0.06 miles				
			Engine Not Rotating Case:					
					Time between current ignition cycle and the last time the engine was running		4 failures out of 5 samples	
			Barometric Pressure OR	< 50.0 kPa				
			Barometric Pressure	> 115.0 kPa			1 sample every 12.5 msec	
						> 5.0 seconds		
					Engine is not rotating			
					No Active DTCs:	EngModeNotRunTmErr MAP_SensorFA AAP_SnsrFA SCIAP_SensorFA AAP2_SnsrFA		
					No Pending DTCs:	MAP_SensorCircuitFP AAP_SnsrCktFP SCIAP_SensorCircuitFP AAP2_SnsrCktFP		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Barometric Pressure (BARO) Sensor Circuit Low	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
Barometric Pressure (BARO) Sensor Circuit High	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
Barometric Pressure (BARO) Sensor Circuit Intermittent	P2230	Detects a noisy or erratic barometric pressure input	Difference between the current Baro sensor reading and the previous Baro sensor reading	> 10.0 kPa	Vehicle Speed No Active DTCs:	< 512 KPH AmbientAirPressCktFA ECT_Sensor_FA IAT_SensorFA MAF_SensorFA AfterThrottlePressure_NA TPS_FA TPS_Performance_FA VehicleSpeedSensorError	320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY 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 Failed this key cycle System Voltage ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled)	TPS_ThrottleAuthority Defaulted 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 1100 ≤ RPM ≤ 2500 1050 ≤ RPM ≤ 2650	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.	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Engine Airflow	3 ≤ gps ≤ 20		
					Vehicle Speed to initially enable test	40.4 ≤ MPH ≤ 82.0		
					Vehicle Speed range to keep test enabled (after initially enabled)	36.0 ≤ MPH ≤ 87.0 mph		
					Closed loop integral	0.74 ≤ C/L Int ≤ 1.08		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater on Time	≥ 100.0 sec		
					Predicted Catalyst temp	550 ≤ °C ≤ 900		
					Fuel State	= DFCO possible		
					All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested.			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY 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 Failed 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	TPS_ThrottleAuthority Defaulted 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 1100 ≤ RPM ≤ 2500 3 ≤ gps ≤ 20 40.4 ≤ MPH ≤ 82.0 0.74 ≤ C/L Int ≤ 1.08 = TRUE	Frequency: Once per trip Note: if NaPOPD_b_Reset FastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_Rapid ResponseActive = TRUE, multiple tests per trip are allowed.	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					Power Take Off	= not active		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater on Time	≥ 100.0 sec		
					Predicted Catalyst temp	550 ≤ ºC ≤ 900		
					Fuel State	= DFCO possible		
					DTC's Passed	= P2270 (and P2272 if applicable)		
					DTC's Passed	= P013E (and P014A if applicable)		
					DTC's Passed	= P013A (and P013C if applicable)		
					After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY 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 Failed this key cycle System Voltage ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Engine Speed to initially enable test Engine Speed range to keep test enabled (after initially enabled)	TPS_ThrottleAuthority Defaulted 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 1100 ≤ RPM ≤ 2500 1050 ≤ RPM ≤ 2650	Frequency: Once per trip Note: if NaPOPD_b_Reset FastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_Rapid ResponseActive = TRUE, multiple tests per trip are allowed.	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Engine Airflow	3 ≤ gps ≤ 20		
					Vehicle Speed to initially enable test	40.4 ≤ MPH ≤ 82.0		
					Vehicle Speed range to keep test enabled (after initially enabled)	36.0 ≤ MPH ≤ 87.0 mph		
					Closed loop integral	0.74 ≤ C/L Int ≤ 1.08		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater on Time	≥ 100.0 sec		
					Predicted Catalyst temp	550 ≤ °C ≤ 900		
					Fuel State	= DFCO possible		
					All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested.			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY 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 Failed 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	TPS_ThrottleAuthority Defaulted 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 1100 ≤ RPM ≤ 2500 3 ≤ gps ≤ 20 40.4 ≤ MPH ≤ 82.0 0.74 ≤ C/L Int ≤ 1.08	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.	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Closed Loop Active Evap Ethanol Post fuel cell Power Take Off EGR Intrusive diagnostic All post sensor heater delays O2S Heater on Time Predicted Catalyst temp Fuel State DTC's Passed DTC's Passed DTC's Passed	= TRUE not in control of purge not in estimate mode = enabled = not active = not active = not active ≥ 100.0 sec 550 ≤ °C ≤ 900 = DFCO possible = P2270 (and P2272 if applicable) = P013E (and P014A if applicable) = P013A (and P013C if applicable)		
					After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).			
Transmission Control Torque Request Circuit	P2544	Determines if the torque request from the TCM is valid	**Protect error** - Serial Communication message - ($199 - PTEI3)	Message <> two's complement of message	Diagnostic enabled/ disabled	Enabled	>= 16 Protect errors during key cycle. Performed every 12.5 msec	2 trip(s)

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			OR					
			Rolling count error - Serial Communication message ($199 - PPEI3) rolling count value	Message <> previous message rolling count value + one	Power Mode	= Run	>= 6 Rolling count errors out of ten samples. Performed every 12.5 msec	Type B
			OR					
			RAM error - Serial Communication message ($199 - PPEI3)	Transmission torque request value or request type dual store not equal	Engine Running Run/Crank Active	= True > 0.50 Sec	>= 6 RAM errors out of 10 samples. Performed every 12.5 msec	
			OR					
			Range Error - Serial Communication message - ($199 - PTEI3) TCM Requested Torque Increase	> 450 Nm			>= 6 out of 10 samples. Performed every 12.5 msec	
			OR					
			Multi-transition error - Trans torque intervention type request change	Requested torque intervention type toggles from not increasing request to increasing request			>= 3 multi-transitions out of 5 samples. Performed every 200 msec	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
ECM/PCM Internal Engine Off Timer Performance	P2610	This DTC determines if the engine mode not running 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): Runs a mirror timer to the HWIO timer. The mirror timer is started when the Engine Mode Not Run Timer is started. When the engine starts or when a controller shutdown is requested, the HWIO timer and mirror timer are compared.	**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 at controller shutdown.	> 1.50 seconds > 25 %	IAT Temperature No active DTCs: **Count Up Test:** Ignition key off OR Engine off **Range Test:** ECM is powering down	-256 °C ≤ Temperature ≤ 256 °C IAT_SensorFA	**Count Up Test:** 4 failures out of 20 samples 1 sec / sample Continuous from key off or engine off until controller shutdown. **Range Test:** One time when the controller is powered down.	2 trips Type B DTC sets on next key cycle if failure detected.
Four Wheel Drive Low Switch Circuit (GMT900 K Trucks	P2771	Fail Case 1: Continuous Open (Stuck Off) in the Four Wheel Drive Low Switch Circuit	4WD Low Switch	= TRUE Boolean			≥ 2.0 sec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
only)			Transfer case gear ratio	≥ 2.400 and ≤ 3.000				
		Fail Case 2: Ground (Stuck On) in the Four Wheel Drive Low Switch Circuit	4WD Low Switch Transfer case gear ratio	= FALSE Boolean ≥ 0.800 and ≤ 1.200			≥ 7.0 sec	
					Engine Torque	30.0 ≤ N-M ≤ 8191.8		
					Engine Speed	1000 ≤ RPM ≤ 5500		
					Ignition voltage	11.0 ≤ Volts ≤ 32.0		
					Throttle position	3.0 ≤ % ≤ 99.0		
					Transmission Temperature	-40.0 ≤ ºC ≤ 130.0		
					Engine Run time	>= 10.0 Sec		
					Vehicle Speed	>= 3.1 Mph		
					TPS_FA	FALSE		
					VehicleSpeedSensor_FA	FALSE		
					EngineTorqueEstInaccurate OR If KeETQC_b_MinTransRemedial = 1 (KeETQC_b_MinTransRemedial = 0)	FALSE Not MAF_SensorTFTKO Not MAP_SensorTFTKO Not EngineMisfireDetected		
					Transmission gear	Not in Park, Reverse, or Neutral		
					P0502, P0503, P0722, P0723, P215C, P2160, P2161, U0101	Not Fault Active		
					Clutch	Engaged (Manual transmission only)		
					Transmission Input Speed Signal	Valid (Automatic transmission only)		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY 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	≥ 5 counts	CAN hardware is bus OFF for	> 0.1125 seconds	Diagnostic runs in 12.5 ms loop	2 Trip(s)
			out of these samples	≥ 5 counts	Diagnostic enable timer	> 3.0000 seconds		Type B
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 this amount of time.	Type B time = 10s Type C time = 12s Torque Security Ucode = varied and possibly much shorter time.	Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	The fail diagnostic runs in the 6.25 ms loop with pass conditions reported to the DFIR in the 1000ms loop.	2 Trip(s)
					Power mode is RUN			Type B
					Communication bus is not OFF			
					or is typed as a C code			
					Normal Communication is enabled			
					Normal Transmit capability is TRUE			
					The diagnostic system is not disabled			
					The bus has been on for	> 3.0000 seconds		
					A message has been selected to monitor.			
Lost Communication with Transfer Case Control Module (GMT900 with transfer case control module only)	U0102	This DTC monitors for a loss of communication with the transfer case control module	Message is not received from controller for this amount of time.	Type B time = 10s Type C time = 12s Torque Security Ucode = varied and possibly much shorter time.	Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	The fail diagnostic runs in the 6.25 ms loop with pass conditions reported to the DFIR in the 1000ms loop.	0 Trip(s)
					Power mode is RUN			Type C
					Communication bus is not OFF			
					or is typed as a C code			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Normal Communication is enabled			
					Normal Transmit capability is TRUE			
					The diagnostic system is not disabled			
					The bus has been on for	> 3.0000 seconds		
					A message has been selected to monitor.			
Lost Communication With Anti-Lock Brake System (ABS) Control Module (GMT900 only)	U0121	This DTC monitors for a loss of communication with the ABS control module.	Message is not received from controller for this amount of time.	Type B time = 10s Type C time = 12s Torque Security Ucode = varied and possibly much shorter time.	Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	The fail diagnostic runs in the 6.25 ms loop with pass conditions reported to the DFIR in the 1000ms loop.	0 Trip(s)
					Power mode is RUN			Type C
					Communication bus is not OFF			**Special Type C**
					or is typed as a C code			
					Normal Communication is enabled			
					Normal Transmit capability is TRUE			
					The diagnostic system is not disabled			
					The bus has been on for	> 3.0000 seconds		
					A message has been selected to monitor.			
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 this amount of time.	Type B time = 10s Type C time = 12s Torque Security Ucode = varied and possibly much shorter time.	Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	The fail diagnostic runs in the 6.25 ms loop with pass conditions reported to the DFIR in the 1000ms loop.	0 Trip(s)
					Power mode is RUN			Type C

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Communication bus is not OFF			**Special Type C**
					or is typed as a C code			
					Normal Communication is enabled			
					Normal Transmit capability is TRUE			
					The diagnostic system is not disabled			
					The bus has been on for	> 3.0000 seconds		
					A message has been selected to monitor.			

(Nox FEL = 0.42)

400	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000
800	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000
1200	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000
1600	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000
2000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000
2400	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000
2800	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000
3200	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000
3600	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000
4000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000
4400	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000
4800	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000
5200	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000
5600	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000
6000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000
6400	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000
6800	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000	8.0000

P0011
KtPHSD_t_StablePositionTimeIc1

X axis is Deg C
Y axis is RPM

	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
800	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
1200	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
1600	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
2000	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
2400	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
2800	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
3200	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
3600	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
4000	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
4400	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
4800	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
5200	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
5600	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
6000	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
6400	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
6800	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350

P0420, P0430

MinimumEngineRunTime

Coolant Temp	40	50	60	70	80
Engine Run Time	100	100	100	100	100

MinAirflowToWarmCatalyst

Engine Coolant	0	45	90
MinAirFlowToWrmCat	20	18	18

P0300-P0308: Idle SCD (decel index (> Idle SCD AND > Idle SCD ddt Tables))

load
Load

	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
8	550	500	400	200	150	110	100	90	50	32767	32767	32767	32767
9	550	500	400	200	150	110	100	90	50	32767	32767	32767	32767
11	550	500	400	200	150	110	100	90	50	32767	32767	32767	32767
12	550	450	400	200	150	110	100	90	50	32767	32767	32767	32767
13	550	475	360	230	150	110	110	90	50	32767	32767	32767	32767
14	550	475	330	260	190	130	110	80	50	32767	32767	32767	32767
15	550	475	360	260	190	140	110	75	50	32767	32767	32767	32767
16	600	525	400	270	190	130	95	70	50	32767	32767	32767	32767
17	600	550	400	250	190	120	100	75	40	32767	32767	32767	32767
18	600	550	425	270	190	130	110	80	50	32767	32767	32767	32767
19	700	600	425	270	200	140	120	80	55	32767	32767	32767	32767
21	800	700	450	270	200	140	120	80	60	32767	32767	32767	32767
22	900	750	475	300	200	150	100	80	60	32767	32767	32767	32767
24	1000	800	500	325	220	160	100	80	60	32767	32767	32767	32767
25	1100	900	600	350	240	170	120	80	60	32767	32767	32767	32767
27	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: Idle SCD ddt

load

	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
8	550	500	400	200	150	110	100	90	50	32767	32767	32767	32767
9	550	500	400	200	150	110	100	90	50	32767	32767	32767	32767
11	550	500	400	200	150	110	100	90	50	32767	32767	32767	32767
12	550	450	400	200	150	110	100	90	50	32767	32767	32767	32767
13	550	500	375	230	150	110	100	90	50	32767	32767	32767	32767
14	550	500	375	240	170	110	100	80	50	32767	32767	32767	32767
15	550	500	375	240	170	110	90	75	50	32767	32767	32767	32767
16	600	550	375	250	170	110	75	70	50	32767	32767	32767	32767
17	600	550	375	250	180	120	80	75	40	32767	32767	32767	32767
18	600	550	375	270	180	130	100	80	50	32767	32767	32767	32767
19	700	600	375	270	180	140	110	80	50	32767	32767	32767	32767
21	800	700	400	270	180	115	105	80	55	32767	32767	32767	32767
22	900	750	400	300	180	120	90	80	55	32767	32767	32767	32767
24	1000	800	500	325	200	130	100	70	50	32767	32767	32767	32767
25	1100	900	600	350	220	140	120	80	50	32767	32767	32767	32767
27	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: SCD Delta **OR** (decel index >SCD Delta **AND** > SCD Delta ddt Tables))

load
Load

	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
8	600	450	300	220	150	130	90	70	55	32767	32767	32767	32767
9	570	420	275	180	135	110	85	65	50	32767	32767	32767	32767
11	550	400	250	180	135	110	85	60	45	32767	32767	32767	32767
12	550	400	275	190	140	115	75	60	50	32767	32767	32767	32767
13	650	500	320	220	160	115	80	60	50	32767	32767	32767	32767
15	700	550	350	240	170	115	90	70	55	32767	32767	32767	32767
17	700	550	380	260	180	120	90	70	60	32767	32767	32767	32767
19	750	600	425	300	200	140	100	80	65	32767	32767	32767	32767
22	750	600	500	350	220	160	120	90	75	32767	32767	32767	32767
25	1050	900	750	400	275	180	140	120	90	32767	32767	32767	32767
29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
33	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
42	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
48	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
61	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: SCD Delta ddt

load	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
8	600	450	300	220	150	130	90	70	55	32767	32767	32767	32767
9	570	420	275	180	135	110	85	65	50	32767	32767	32767	32767
11	550	400	250	180	135	110	85	60	45	32767	32767	32767	32767
12	550	400	275	190	140	115	75	60	50	32767	32767	32767	32767
13	650	500	320	220	160	115	80	60	50	32767	32767	32767	32767
15	700	550	350	240	170	115	90	70	55	32767	32767	32767	32767
17	700	550	380	260	180	120	90	70	60	32767	32767	32767	32767
19	750	600	425	300	200	140	100	80	65	32767	32767	32767	32767
22	750	600	500	350	220	160	120	90	75	32767	32767	32767	32767
25	1050	900	750	400	275	180	140	120	90	32767	32767	32767	32767
29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
33	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
42	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
48	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
61	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: Idle Cyl Mode **OR** (decel index (>Idle Cyl Mode **AND** > Idle Cyl Mode ddt Tables))

load Load	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
8	1100	1000	650	450	350	250	225	150	120	100	75	70	60
9	1200	1100	650	450	350	300	225	150	130	100	75	70	60
11	1200	1100	700	450	350	300	225	150	130	100	75	70	60
12	1300	1200	800	450	350	300	225	150	130	100	75	70	60
13	1300	1200	800	550	350	300	225	150	130	100	75	70	60
14	1200	1100	800	550	350	300	225	150	130	100	75	70	60
15	1100	1000	800	650	450	325	225	150	120	90	75	70	60
16	1100	1000	900	650	425	325	250	160	120	90	75	70	60
17	1300	1200	900	650	425	300	250	175	120	110	75	70	60
18	1400	1300	900	650	425	300	250	175	130	110	80	70	60
19	1500	1400	900	650	425	325	250	175	130	120	80	80	60
21	1600	1500	900	650	450	325	250	175	130	120	85	80	70
22	1700	1600	1000	650	450	325	250	190	130	120	100	80	70
24	1800	1700	1000	750	450	325	230	190	150	120	100	80	70
25	1900	1800	1050	750	450	325	230	190	160	130	100	80	80
27	2000	1900	1100	800	500	325	250	190	150	140	110	80	80
29	2100	2000	1150	900	550	350	275	200	160	140	110	110	100

P0300-P0308: Idle Cyl Mode ddt

load	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
8	1100	1100	600	450	350	300	200	150	130	100	75	70	60
9	1200	1100	600	450	350	300	200	150	130	100	75	70	60
11	1200	1100	650	450	350	300	200	150	130	100	75	70	60
12	1300	1100	700	450	350	300	200	150	130	100	75	70	60
13	1300	1100	700	550	350	300	200	150	130	100	75	70	60
14	1200	1000	700	550	350	300	200	150	130	100	75	70	60
15	1100	900	700	600	450	280	200	150	120	100	75	70	60
16	1100	1000	800	600	425	280	200	150	120	90	75	70	60
17	1300	1200	800	600	425	280	200	175	110	100	75	70	60
18	1400	1300	800	600	425	250	200	170	110	100	80	70	60
19	1500	1400	800	600	375	250	200	150	110	100	80	80	60
21	1600	1500	800	600	375	250	200	140	110	100	80	80	70
22	1700	1600	900	600	375	250	200	150	110	100	80	80	70
24	1800	1700	1000	700	400	275	200	150	120	100	90	80	70
25	1900	1800	1050	700	400	275	210	150	120	100	95	80	80
27	2000	1900	1100	800	500	300	250	160	120	100	100	80	80
29	2100	2000	1150	900	550	350	275	180	120	100	100	90	100

P0300-P0308: Cyl Mode

OR (decel index > Cyl Mode AND > Cyl Mode ddt Tables))

Load	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2600	2800
8	1300	1100	800	650	400	280	200	170	160	110	60	50	36	27	20	15	13
9	1200	1000	750	600	380	280	200	170	160	100	60	45	36	27	19	15	12
11	1200	1000	650	500	360	275	200	160	125	80	55	40	30	25	17	14	12
12	1300	1100	700	550	375	275	200	150	120	75	50	35	26	22	16	13	10
13	1200	1000	700	550	350	250	175	150	125	65	50	35	28	22	15	12	10
15	1400	1200	800	600	400	275	200	150	140	80	60	40	30	25	17	14	12
17	1500	1300	900	600	400	300	225	160	140	90	65	45	42	26	18	16	14
19	1600	1400	1000	700	500	325	275	175	160	100	75	55	40	30	22	16	15
22	1700	1500	1100	800	500	350	300	200	180	120	90	65	50	35	26	20	16
25	1800	1600	1200	900	700	450	350	250	200	140	100	70	55	40	30	24	20
29	1900	1700	1300	1000	800	550	400	300	220	150	110	80	60	42	35	25	22
33	2000	1800	1400	1200	900	650	500	350	235	160	130	90	60	45	40	30	24
38	2000	1800	1600	1400	1000	750	600	400	250	180	140	100	70	55	45	35	30
42	2200	2000	1800	1600	1100	950	700	500	300	220	150	110	80	60	50	40	32
48	2200	2000	1800	1600	1200	1000	800	550	375	230	150	125	95	75	55	45	35
54	2200	2000	1800	1600	1200	1000	800	600	400	240	180	125	100	80	60	50	40
61	2200	2000	1800	1600	1200	1000	800	700	500	300	250	170	110	85	65	55	45

Load	3000	3500	4000	4500	5000	5500	6000	6500	7000
8	12	6	5	5	4	3	3	3	3
9	11	6	5	4	4	3	3	3	3
11	10	6	4	4	4	3	3	3	3
12	10	5	4	4	4	3	3	3	3
13	10	6	4	4	4	3	3	3	3
15	10	6	4	4	4	3	3	3	3
17	11	6	5	4	4	3	3	3	3
19	12	6	5	4	4	3	3	3	3
22	14	7	5	4	4	3	3	3	3
25	16	8	6	5	4	3	3	3	3
29	18	8	6	5	4	3	3	3	3
33	20	9	7	5	4	3	3	3	3
38	22	10	7	6	5	3	3	3	3
42	25	11	8	6	5	4	4	4	4
48	30	12	9	6	5	4	4	4	4
54	30	14	10	7	6	5	5	5	5
61	40	16	11	8	6	6	6	6	6

P0300-P0308: Cyl Mode ddt

load	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2600	2800
8	1300	1100	800	650	400	280	200	170	160	110	50	50	35	27	20	15	13
9	1200	1000	750	600	380	280	200	170	160	100	60	45	35	27	19	15	12
11	1200	1000	650	500	360	275	200	150	110	80	50	40	28	25	17	14	12
12	1300	1100	700	550	350	275	200	140	110	80	50	35	24	22	16	13	10
13	1200	1000	700	550	350	250	175	150	115	80	50	35	28	22	15	12	10
15	1400	1200	800	600	400	275	200	150	140	85	50	40	30	25	17	14	12
17	1500	1300	900	600	400	300	225	160	140	90	50	45	35	26	18	16	14
19	1600	1400	1000	700	500	325	275	175	160	100	70	55	38	30	22	16	15
22	1700	1500	1100	800	500	350	300	200	180	120	75	65	40	35	26	20	16
25	1800	1600	1200	900	700	450	350	250	200	140	90	70	50	40	30	24	20
29	1900	1700	1300	1000	900	550	400	300	220	150	90	80	50	42	35	25	22
33	2000	1800	1500	1200	1000	650	500	350	235	160	110	90	60	45	40	30	24
38	2000	1800	1600	1400	1100	750	600	400	250	180	140	100	70	55	45	35	30
42	2200	2000	1800	1600	1200	950	700	500	300	220	150	110	80	60	50	40	32
48	2200	2000	1800	1600	1200	1000	800	550	375	230	175	125	95	75	55	45	35
54	2200	2000	1800	1600	1200	1000	800	600	400	240	180	125	100	80	60	50	40
61	2200	2000	1800	1600	1200	1000	800	700	500	300	250	170	110	85	65	55	45

P0300-P0308: Cyl Mode ddt (Con't)

load	3000	3500	4000	4500	5000	5500	6000	6500	7000
8	12	0	0	0	0	0	0	0	0
9	11	0	0	0	0	0	0	0	0
11	10	0	0	0	0	0	0	0	0
12	10	0	0	0	0	0	0	0	0
13	10	0	0	0	0	0	0	0	0
15	10	0	0	0	0	0	0	0	0
17	11	0	0	0	0	0	0	0	0
19	12	0	0	0	0	0	0	0	0
22	14	0	0	0	0	0	0	0	0
25	16	0	0	0	0	0	0	0	0
29	18	0	0	0	0	0	0	0	0
33	20	0	0	0	0	0	0	0	0
38	22	0	0	0	0	0	0	0	0
42	25	0	0	0	0	0	0	0	0
48	30	0	0	0	0	0	0	0	0
54	30	0	0	0	0	0	0	0	0
61	40	0	0	0	0	0	0	0	0

P0300-P0308: Rev Mode Table **OR** (decel index > Rev Mode Table)

load	1100	1200	1400	1600	1800	2000	2200	2400	2600	2800
8	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
9	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
11	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
12	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
15	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
17	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
22	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
33	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
42	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
48	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
61	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

load	3000	3500	4000	4500	5000	5500	6000	6500	7000
8	110	75	45	35	26	25	25	25	25
9	100	60	40	30	25	24	24	24	24
11	95	60	40	35	26	24	24	24	24
12	100	60	40	35	28	24	24	24	24
13	110	70	50	40	28	24	24	24	24
15	115	80	55	45	32	26	26	26	26
17	120	90	65	50	35	32	32	32	32
19	140	100	75	55	45	35	35	35	35
22	160	120	80	65	50	40	40	40	40
25	180	140	100	75	60	45	45	45	45
29	200	150	110	85	70	55	55	55	55
33	220	180	120	100	80	60	60	60	60
38	280	220	140	120	80	70	70	70	70
42	320	240	160	130	100	80	80	80	80
48	350	290	180	145	110	90	90	90	90
54	370	320	200	150	120	100	100	100	100
61	400	350	230	155	140	140	140	140	140

P0300-P0308: AFM Mode Table

OR (decel index > AFM Table if active fuel management)

Load	400	500	600	700	800	900	1000	1100	1200	1400
8	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
9	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
11	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
12	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
15	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
17	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
22	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
33	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
42	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
48	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
61	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

Load	1600	1800	2000	2200	2400	2600	2800	3000	3500
8	32767	32767	32767	32767	32767	32767	32767	32767	32767
9	32767	32767	32767	32767	32767	32767	32767	32767	32767
11	32767	32767	32767	32767	32767	32767	32767	32767	32767
12	32767	32767	32767	32767	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767	32767	32767	32767	32767
15	32767	32767	32767	32767	32767	32767	32767	32767	32767
17	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767
22	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767
29	32767	32767	32767	32767	32767	32767	32767	32767	32767
33	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767
42	32767	32767	32767	32767	32767	32767	32767	32767	32767
48	32767	32767	32767	32767	32767	32767	32767	32767	32767
54	32767	32767	32767	32767	32767	32767	32767	32767	32767
61	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: Zero torque engine load

Zero Torque: All Cylinders active

RPM	Pct load
400	11.00
500	9.50
600	8.75
700	8.50
800	8.50
900	8.50
1000	8.50
1100	8.50
1200	8.50
1400	8.50
1600	8.50
1800	8.50
2000	8.50
2200	8.75
2400	9.00
2600	9.00
2800	9.00
3000	9.70
3500	11.36
4000	13.71
4500	16.06
5000	18.42
5500	20.77
6000	23.13
6500	25.49
7000	27.84

Baro KPa	Multiplier
65	0.82
70	0.85
75	0.88
80	0.90
85	0.93
90	0.95
95	0.97
100	1.00
105	1.03

Zero Torque: Active Fuel Management (AFM)

RPM	Pct load
400	11.00
500	9.50
600	8.75
700	8.50
800	8.50
900	8.50
1000	8.50
1100	8.50
1200	8.50
1400	8.50
1600	8.50
1800	8.50
2000	8.50
2200	8.75
2400	9.00
2600	9.00
2800	9.00
3000	9.70
3500	11.36
4000	13.71
4500	16.06
5000	18.42
5500	20.77
6000	23.13
6500	25.49
7000	27.84

Note: Zero torque is adjusted for Baro. Misfire thresholds are relative to (maximum air density PID $1188 SAE xxx) and do not shift appreciably with altitude compared to (current density as defined PID $04 SAE1979)

Catalyst Damaging Misfire Percentage

load
Load

	0	1000	2000	3000	4000	5000	6000	7000
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

RoughRoadSource = CeRRDR_e_TOSS
Rough Road Threshold
Engine Speed

Trans
Speed

	600	800	1000	1200	1400	1600	1800	2000	2200	2400
100	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
600	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
1200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1500	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1800	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2100	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2700	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
3000	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
3300	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
3600	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
4200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Trans
Speed

	2600	2800	3000	3500	4000	4500	5000	5500	6000
100	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
600	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
1200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1500	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
1800	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2100	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2400	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2700	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
3000	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
3300	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
3600	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
4200	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

RoughRoadSource = CeRRDR_e_WheelSpeedInECM or CeRRDR_e_SerialDataFromABS
Rough Road Threshold

Kph	0	12	24	36	48	60	72	84	96	108	120	132	144	158	170	181	194
Accel	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

P0114: IAT Intermittent Weight Factor

X axis is Filtered Intake Air Temperature in Deg C

Temp	-40	0	40	80	120	160	200
	1.00	1.00	1.00	1.00	1.00	1.00	1.00

P0101, P0106, P0121, P012B, P0236, P1101: IFRD Residual Weighting Factors

TPS Residual Weight Factor based on RPM

RPM	0	500	850	1200	1550	1900	2250	2600	2950	3300	3650	4000	4350	4700	5050	5400	5750
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

MAF Residual Weight Factor based on RPM

RPM	0	500	850	1200	1550	1900	2250	2600	2950	3300	3650	4000	4350	4700	5050	5400	5750
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.892	0.554	0.515	0.564	0.657	1.000	1.000

MAF Residual Weight Factor Based on MAF Estimate

gm/sec	0.0	50.0	70.0	73.0	76.0	79.0	82.0	85.0	89.0	95.0	100.0	110.0	150.0	170.0	180.0	200.0	350.0
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

MAP1 Residual Weight Factor based on RPM

RPM	0	500	850	1200	1550	1900	2250	2600	2950	3300	3650	4000	4350	4700	5050	5400	5750
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

MAP2 Residual Weight Factor based on RPM

RPM	0	500	850	1200	1550	1900	2250	2600	2950	3300	3650	4000	4350	4700	5050	5400	5750
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

MAP3 Residual Weight Factor based on RPM

RPM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

TIAP1 Residual Weight Factor based on RPM

RPM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

SCIAP1 Residual Weight Factor based on RPM

RPM	0	1500	2200	2500	2800	3100	3200	3300	3500	3700	4000	4200	4500	5000	5500	6500	8000
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

SCIAP2 Residual Weight Factor based on RPM

RPM	0	1500	2200	2500	2800	3100	3200	3300	3500	3700	4000	4200	4500	5000	5500	6500	8000
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Boost Residual Weight Factor based on % of Boost

% Boost	0.00	0.06	0.13	0.19	0.25	0.31	0.38	0.44	0.50	0.56	0.63	0.69	0.75	0.81	0.88	0.94	1.00
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Offset based on RPM

RPM	1000	1750	2500	3250	4000	4750	5500	6250	7000
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min Air Flow based on RPM

RPM	1000	1750	2500	3250	4000	4750	5500	6250	7000
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

P0101, P0106, P0121, P0236, P1101: TIAP-MAP Correlation Min MAP based on RPM

RPM	1000	1750	2500	3250	4000	4750	5500	6250	7000
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Offset based on RPM

RPM	1000	1750	2500	3250	4000	4750	5500	6250	7000
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max Air Flow based on RPM

RPM	1000	1750	2500	3250	4000	4750	5500	6250	7000
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

P0101, P0106, P0121, P0236, P1101: TIAP-Baro Correlation Max MAP based on RPM

RPM	1000	1750	2500	3250	4000	4750	5500	6250	7000
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Supercharger Intake Flow Rationality Diagnostic Failure Matrix						
TPS Model Failure	MAF Model Failure	MAP 1 Model Failure	MAP 2 Model Failure	SCIAP 1 Model Failure	SCIAP 2 Model Failure	DTC Set
F	F	F	F	F	F	No DTC
F	F	F	F	F	T	No DTC
F	F	F	F	T	F	No DTC
F	F	F	F	T	T	P012B
F	F	F	T	F	F	No DTC
F	F	F	T	F	T	P1101
F	F	F	T	T	F	P1101
F	F	F	T	T	T	P1101
F	F	T	F	F	F	No DTC
F	F	T	F	F	T	P1101
F	F	T	F	T	F	P1101
F	F	T	F	T	T	P1101
F	F	T	T	F	F	P0106
F	F	T	T	F	T	P1101
F	F	T	T	T	F	P1101
F	F	T	T	T	T	P1101
F	T	F	F	F	F	No DTC
F	T	F	F	F	T	P0101
F	T	F	F	T	F	No DTC
F	T	F	F	T	T	P0101, P012B
F	T	F	T	F	F	P1101
F	T	F	T	F	T	P0101
F	T	F	T	T	F	P1101
F	T	F	T	T	T	P0101, P012B
F	T	T	F	F	F	P1101
F	T	T	F	F	T	P1101
F	T	T	F	T	F	P1101
F	T	T	F	T	T	P1101
F	T	T	T	F	F	P1101
F	T	T	T	F	T	P1101
F	T	T	T	T	F	P1101
F	T	T	T	T	T	P1101
T	F	F	F	F	F	P0121
T	F	F	F	F	T	No DTC
T	F	F	F	T	F	P0121
T	F	F	F	T	T	P1101
T	F	F	T	F	F	P1101
T	F	F	T	F	T	P1101
T	F	F	T	T	F	P1101
T	F	F	T	T	T	P1101
T	F	T	F	F	F	P0121
T	F	T	F	F	T	P1101
T	F	T	F	T	F	P0121
T	F	T	F	T	T	P1101
T	F	T	T	F	F	P1101
T	F	T	T	F	T	P1101
T	F	T	T	T	F	P1101
T	F	T	T	T	T	P1101
T	T	F	F	F	F	P0121
T	T	F	F	F	T	P1101
T	T	F	F	T	F	P0121
T	T	F	F	T	T	P1101
T	T	F	T	F	F	P1101
T	T	F	T	F	T	P1101
T	T	F	T	T	F	P1101
T	T	F	T	T	T	P1101
T	T	T	F	F	F	P0121
T	T	T	F	F	T	P1101
T	T	T	F	T	F	P0121
T	T	T	F	T	T	P1101
T	T	T	T	F	F	P1101

Supercharger Intake Flow Rationality Diagnostic Failure Matrix (Con't)						
TPS Model Failure	MAF Model Failure	MAP 1 Model Failure	MAP 2 Model Failure	SCIAP 1 Model Failure	SCIAP 2 Model Failure	DTC Set
T	T	T	T	F	T	P1101
T	T	T	T	T	F	P1101
T	T	T	T	T	T	P1101

Turbocharger Intake Flow Rationality Diagnostic Failure Matrix								
MAF Model Failure	MAP 1 Model Failure	MAP 2 Model Failure	MAP 3 Model Failure	TIAP 1 Model Failure	TPS Model Failure	TIAP Correlation Failure	TIAP Correlation Valid	DTC Set
F	F	F	F	F	F	F	F	No DTC
F	F	F	F	F	F	F	T	No DTC
F	F	F	F	F	F	T	F	No DTC
F	F	F	F	F	F	T	T	No DTC
F	F	F	F	F	T	F	F	No DTC
F	F	F	F	F	T	F	T	No DTC
F	F	F	F	F	T	T	F	No DTC
F	F	F	F	F	T	T	T	No DTC
F	F	F	F	T	F	F	F	No DTC
F	F	F	F	T	F	F	T	No DTC
F	F	F	F	T	F	T	F	No DTC
F	F	F	F	T	F	T	T	No DTC
F	F	F	F	T	T	F	F	P1101
F	F	F	F	T	T	F	T	P0121
F	F	F	F	T	T	T	F	P1101
F	F	F	F	T	T	T	T	P0236
F	F	F	T	F	F	F	F	P1101
F	F	F	T	F	F	F	T	P1101
F	F	F	T	F	F	T	F	P1101
F	F	F	T	F	F	T	T	P1101
F	F	F	T	F	T	F	F	P1101
F	F	F	T	F	T	F	T	P1101
F	F	F	T	F	T	T	F	P1101
F	F	F	T	F	T	T	T	P1101
F	F	F	T	T	F	F	F	P1101
F	F	F	T	T	F	F	T	P1101
F	F	F	T	T	F	T	F	P1101
F	F	F	T	T	F	T	T	P1101
F	F	F	T	T	T	F	F	P1101
F	F	F	T	T	T	F	T	P1101
F	F	F	T	T	T	T	F	P1101
F	F	F	T	T	T	T	T	P1101
F	F	T	F	F	F	F	F	P1101
F	F	T	F	F	F	F	T	P1101
F	F	T	F	F	F	T	F	P1101
F	F	T	F	F	F	T	T	P1101
F	F	T	F	F	T	F	F	P1101
F	F	T	F	F	T	F	T	P1101
F	F	T	F	F	T	T	F	P1101
F	F	T	F	F	T	T	T	P1101
F	F	T	F	T	F	F	F	P1101
F	F	T	F	T	F	F	T	P1101
F	F	T	F	T	F	T	F	P1101
F	F	T	F	T	F	T	T	P1101
F	F	T	F	T	T	F	F	P1101
F	F	T	F	T	T	F	T	P1101
F	F	T	F	T	T	T	F	P1101
F	F	T	F	T	T	T	T	P1101
F	F	T	T	F	F	F	F	P1101
F	F	T	T	F	F	F	T	P1101
F	F	T	T	F	F	T	F	P1101
F	F	T	T	F	F	T	T	P1101
F	F	T	T	F	T	F	F	P1101
F	F	T	T	F	T	F	T	P1101
F	F	T	T	F	T	T	F	P1101
F	F	T	T	F	T	T	T	P1101

Turbocharger Intake Flow Rationality Diagnostic Failure Matrix (Con't)								
MAF Model Failure	MAP 1 Model Failure	MAP 2 Model Failure	MAP 3 Model Failure	TIAP 1 Model Failure	TPS Model Failure	TIAP Correlation Failure	TIAP Correlation Valid	DTC Set
F	F	T	T	F	T	T	T	P1101
F	F	T	T	T	F	F	F	No DTC
F	F	T	T	T	F	F	T	No DTC
F	F	T	T	T	F	T	F	No DTC
F	F	T	T	T	F	T	T	No DTC
F	F	T	T	T	T	F	F	P1101
F	F	T	T	T	T	F	T	P1101
F	F	T	T	T	T	T	F	P1101
F	F	T	T	T	T	T	T	P1101
F	T	F	F	F	F	F	F	P1101
F	T	F	F	F	F	F	T	P1101
F	T	F	F	F	F	T	F	P1101
F	T	F	F	F	F	T	T	P0236
F	T	F	F	F	T	F	F	P1101
F	T	F	F	F	T	F	T	P0121
F	T	F	F	F	T	T	F	P1101
F	T	F	F	F	T	T	T	P0236
F	T	F	F	T	F	F	F	P1101
F	T	F	F	T	F	F	T	P1101
F	T	F	F	T	F	T	F	P1101
F	T	F	F	T	F	T	T	P0236
F	T	F	F	T	T	F	F	P1101
F	T	F	F	T	T	F	T	P0121
F	T	F	F	T	T	T	F	P1101
F	T	F	F	T	T	T	T	P0236
F	T	F	T	F	F	F	F	P1101
F	T	F	T	F	F	F	T	P1101
F	T	F	T	F	F	T	F	P1101
F	T	F	T	F	F	T	T	P1101
F	T	F	T	F	T	F	F	P1101
F	T	F	T	F	T	F	T	P1101
F	T	F	T	F	T	T	F	P1101
F	T	F	T	F	T	T	T	P1101
F	T	F	T	T	F	F	F	P1101
F	T	F	T	T	F	F	T	P1101
F	T	F	T	T	F	T	F	P1101
F	T	F	T	T	F	T	T	P1101
F	T	F	T	T	T	F	F	P1101
F	T	F	T	T	T	F	T	P1101
F	T	F	T	T	T	T	F	P1101
F	T	F	T	T	T	T	T	P1101
F	T	T	F	F	F	F	F	P1101
F	T	T	F	F	F	F	T	P1101
F	T	T	F	F	F	T	F	P1101
F	T	T	F	F	F	T	T	P1101
F	T	T	F	F	T	F	F	P1101
F	T	T	F	F	T	F	T	P1101
F	T	T	F	F	T	T	F	P1101
F	T	T	F	F	T	T	T	P1101
F	T	T	F	T	F	F	F	P1101
F	T	T	F	T	F	F	T	P1101
F	T	T	F	T	F	T	F	P1101
F	T	T	F	T	F	T	T	P1101
F	T	T	F	T	T	F	F	P1101
F	T	T	F	T	T	F	T	P1101
F	T	T	F	T	T	T	F	P1101
F	T	T	F	T	T	T	T	P1101
F	T	T	T	F	F	F	F	P0106
F	T	T	T	F	F	F	T	P0106
F	T	T	T	F	F	T	F	P0106
F	T	T	T	F	F	T	T	P0106
F	T	T	T	F	T	F	F	P1101
F	T	T	T	F	T	F	T	P1101

Turbocharger Intake Flow Rationality Diagnostic Failure Matrix (Con't)								
MAF Model Failure	MAP 1 Model Failure	MAP 2 Model Failure	MAP 3 Model Failure	TIAP 1 Model Failure	TPS Model Failure	TIAP Correlation Failure	TIAP Correlation Valid	DTC Set
F	T	T	T	F	T	T	F	P1101
F	T	T	T	F	T	T	T	P1101
F	T	T	T	T	F	F	F	P1101
F	T	T	T	T	F	F	T	P1101
F	T	T	T	T	F	T	F	P1101
F	T	T	T	T	F	T	T	P1101
F	T	T	T	T	T	F	F	P1101
F	T	T	T	T	T	F	T	P1101
F	T	T	T	T	T	T	F	P1101
F	T	T	T	T	T	T	T	P1101
T	F	F	F	F	F	F	F	P1101
T	F	F	F	F	F	F	T	P1101
T	F	F	F	F	F	T	F	P1101
T	F	F	F	F	F	T	T	P0236
T	F	F	F	F	T	F	F	P1101
T	F	F	F	F	T	F	T	P0121
T	F	F	F	F	T	T	F	P1101
T	F	F	F	F	T	T	T	P0236
T	F	F	F	T	F	F	F	P1101
T	F	F	F	T	F	T	F	P1101
T	F	F	F	T	T	F	F	P1101
T	F	F	F	T	T	F	T	P0121
T	F	F	F	T	T	T	F	P1101
T	F	F	F	T	T	T	T	P0236
T	F	F	T	F	F	F	F	P1101
T	F	F	T	F	F	F	T	P1101
T	F	F	T	F	F	T	F	P1101
T	F	F	T	F	F	T	T	P1101
T	F	F	T	F	T	F	F	P1101
T	F	F	T	F	T	F	T	P1101
T	F	F	T	F	T	T	F	P1101
T	F	F	T	F	T	T	T	P1101
T	F	F	T	T	F	F	F	P1101
T	F	F	T	T	F	F	T	P1101
T	F	F	T	T	F	T	F	P1101
T	F	F	T	T	F	T	T	P1101
T	F	F	T	T	T	F	F	P1101
T	F	F	T	T	T	F	T	P1101
T	F	F	T	T	T	T	F	P1101
T	F	F	T	T	T	T	T	P1101
T	F	T	F	F	F	F	F	P1101
T	F	T	F	F	F	F	T	P1101
T	F	T	F	F	F	T	F	P1101
T	F	T	F	F	F	T	T	P1101
T	F	T	F	F	T	F	F	P1101
T	F	T	F	F	T	F	T	P1101
T	F	T	F	F	T	T	F	P1101
T	F	T	F	F	T	T	T	P1101
T	F	T	F	T	F	F	F	P1101
T	F	T	F	T	F	F	T	P1101
T	F	T	F	T	F	T	F	P1101
T	F	T	F	T	F	T	T	P1101
T	F	T	F	T	T	F	F	P1101
T	F	T	F	T	T	F	T	P1101
T	F	T	F	T	T	T	F	P1101
T	F	T	F	T	T	T	T	P1101
T	F	T	T	F	F	F	F	P1101
T	F	T	T	F	F	F	T	P1101
T	F	T	T	F	F	T	F	P1101
T	F	T	T	F	F	T	T	P1101
T	F	T	T	F	T	F	F	P1101

Turbocharger Intake Flow Rationality Diagnostic Failure Matrix (Con't)								
MAF Model Failure	MAP 1 Model Failure	MAP 2 Model Failure	MAP 3 Model Failure	TIAP 1 Model Failure	TPS Model Failure	TIAP Correlation Failure	TIAP Correlation Valid	DTC Set
T	F	T	T	F	T	F	T	P1101
T	F	T	T	F	T	T	F	P1101
T	F	T	T	F	T	T	T	P1101
T	F	T	T	T	F	F	F	P0101
T	F	T	T	T	F	F	T	P0101
T	F	T	T	T	F	T	F	P0101
T	F	T	T	T	F	T	T	P0101
T	F	T	T	T	T	F	F	P1101
T	F	T	T	T	T	F	T	P1101
T	F	T	T	T	T	T	F	P1101
T	F	T	T	T	T	T	T	P1101
T	T	F	F	F	F	F	F	P1101
T	T	F	F	F	F	F	T	P1101
T	T	F	F	F	F	T	F	P1101
T	T	F	F	F	F	T	T	P0236
T	T	F	F	F	T	F	F	P1101
T	T	F	F	F	T	F	T	P0121
T	T	F	F	F	T	T	F	P1101
T	T	F	F	F	T	T	T	P0236
T	T	F	F	T	F	F	F	P1101
T	T	F	F	T	F	F	T	P1101
T	T	F	F	T	F	T	F	P1101
T	T	F	F	T	F	T	T	P0236
T	T	F	F	T	T	F	F	P1101
T	T	F	F	T	T	F	T	P0121
T	T	F	F	T	T	T	F	P1101
T	T	F	F	T	T	T	T	P0236
T	T	F	T	F	F	F	F	P1101
T	T	F	T	F	F	F	T	P1101
T	T	F	T	F	F	T	F	P1101
T	T	F	T	F	F	T	T	P1101
T	T	F	T	F	T	F	F	P1101
T	T	F	T	F	T	F	T	P1101
T	T	F	T	F	T	T	F	P1101
T	T	F	T	F	T	T	T	P1101
T	T	F	T	T	F	F	F	P1101
T	T	F	T	T	F	F	T	P1101
T	T	F	T	T	F	T	F	P1101
T	T	F	T	T	F	T	T	P1101
T	T	F	T	T	T	F	F	P1101
T	T	F	T	T	T	F	T	P1101
T	T	F	T	T	T	T	F	P1101
T	T	F	T	T	T	T	T	P1101
T	T	T	F	F	F	F	F	P1101
T	T	T	F	F	F	F	T	P1101
T	T	T	F	F	F	T	F	P1101
T	T	T	F	F	F	T	T	P1101
T	T	T	F	F	T	F	F	P1101
T	T	T	F	F	T	F	T	P1101
T	T	T	F	F	T	T	F	P1101
T	T	T	F	F	T	T	T	P1101
T	T	T	F	T	F	F	F	P1101
T	T	T	F	T	F	F	T	P1101
T	T	T	F	T	F	T	F	P1101
T	T	T	F	T	F	T	T	P1101
T	T	T	F	T	T	F	F	P1101
T	T	T	F	T	T	F	T	P1101
T	T	T	F	T	T	T	F	P1101
T	T	T	F	T	T	T	T	P1101
T	T	T	T	F	F	F	F	P1101
T	T	T	T	F	F	F	T	P1101
T	T	T	T	F	F	T	F	P1101
T	T	T	T	F	F	T	T	P1101

Turbocharger Intake Flow Rationality Diagnostic Failure Matrix (Con't)								
MAF Model Failure	MAP 1 Model Failure	MAP 2 Model Failure	MAP 3 Model Failure	TIAP 1 Model Failure	TPS Model Failure	TIAP Correlation Failure	TIAP Correlation Valid	DTC Set
T	T	T	T	F	T	F	F	P1101
T	T	T	T	F	T	F	T	P1101
T	T	T	T	F	T	T	F	P1101
T	T	T	T	F	T	T	T	P1101
T	T	T	T	T	F	F	F	P1101
T	T	T	T	T	F	F	T	P1101
T	T	T	T	T	F	T	F	P1101
T	T	T	T	T	F	T	T	P1101
T	T	T	T	T	T	F	F	P1101
T	T	T	T	T	T	F	T	P1101
T	T	T	T	T	T	T	F	P1101
T	T	T	T	T	T	T	T	P1101

P00B6: Fail if power up ECT exceeds RCT by these values

Z axis is the Fast Failure temp difference (° C)
X axis is IAT Temperature at Power up (° C)

-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
80	80	80	60	60	40	40	30	30	30	30	30	30	30	30	30	30

P0116: Fail if power up ECT exceeds IAT by these values

Z axis is the Fast Failure temp difference (° C)
X axis is IAT Temperature at Power up (° C)

-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
80	80	80	60	60	40	40	30	30	30	30	30	30	30	30	30	30

P0128: Maximum Total Energy transferred to Cooling System for IAT and Start-up ECT conditions

Z axis is the cooling system energy failure threshold (grams)
X axis is ECT Temperature at Power up (° C)
Y axis is IAT min during test (° C)

For applications with dual coolant sensor

	IAT Range											
	Low	Hi	-40	-28	-16	-4	8	20	32	44	56	68	80
Primary	10.0 ° C	52.0 ° C	14200	14200	14200	14200	14200	12640	11080	9520	7960	6400	4840
Alternate	-7.0 ° C	10.0 ° C	17431	15859	14287	12715	11143	9571	7999	6427	4850	4850	4850

P0128: Maximum Accumulated Airflow for IAT and Start-up ECT conditions

Z axis is the accumulated time failure threshold (seconds)
X axis is ECT Temperature at Power up (° C)
Y axis is IAT min during test (° C)

For applications with single coolant sensor	IAT Range												
	Low	Hi	-40	-28	-16	-4	8	20	32	44	56	68	80
Primary	10.0 ° C	54.5 ° C	950	865	780	695	610	525	440	355	270	185	100
Alternate	-7.0 ° C	10.0 ° C	870	785	700	615	530	445	360	275	190	105	20

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

Z axis is the pass/fail result (see note below)
X axis is Lean to Rich response time (msec)
Y axis is Rich to Lean response time (msec)
Note: If the cell contains a "0" then the fault is not indicated, if it contains a "1" a fault is indicated

	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
0.000	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
0.010	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
0.020	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
0.030	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
0.040	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.050	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.060	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
0.080	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
0.100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
0.120	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
0.130	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
0.140	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
0.150	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0
0.160	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0
0.170	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0
0.180	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0
2.000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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

Z axis is the pass/fail result (see note below)
X axis is Lean to Rich response time (msec)
Y axis is Rich to Lean response time (msec)
Note: If the cell contains a "0" then the fault is not indicated, if it contains a "1" a fault is indicated

	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
0.000	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
0.010	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
0.020	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
0.030	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
0.040	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.050	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.060	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
0.080	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
0.100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
0.120	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
0.130	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
0.140	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
0.150	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0
0.160	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0
0.170	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0
0.180	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0
2.000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

P1133 - O2S HC L to R Switches Limit Bank 1 Sensor 1" Pass/Fail Threshold table

Z axis is Limit for L/R HC switches
Y axis is Average flow during the response test (gps)
X axis is estimated Ethanol percentage
Note: The cell contains the minumum switches

	0.0	10.0	20.0	50.0	80.0
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

P1133 - O2S HC R to L Switches Limit Bank 1 Sensor 1" Pass/Fail Threshold table

Z axis is Limit for R/L HC switches
Y axis is Average flow during the response test (gps)
X axis is estimated Ethanol percentage
Note: The cell contains the minumum switches

	0.0	10.0	20.0	50.0	80.0
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

P1153 - O2S HC L to R Switches Limit Bank 2 Sensor 1" Pass/Fail Threshold table

Z axis is Limit for L/R HC switches
Y axis is Average flow during the response test (gps)
X axis is estimated Ethanol percentage
Note: The cell contains the minumum switches

	0.0	10.0	20.0	50.0	80.0
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

P1153 - O2S HC R to L Switches Limit Bank 2 Sensor 1" Pass/Fail Threshold table

Z axis is Limit for R/L HC switches
Y axis is Average flow during the response test (gps)
X axis is estimated Ethanol percentage
Note: The cell contains the minumum switches

	0.0	10.0	20.0	50.0	80.0
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

Green Sensor Delay Criteria:

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:

* B1S1 Airflow greater than 22 gps for 120000 grams of accumulated flow non-continuously.
* B1S2 Airflow greater than 22 gps for 120000 grams of accumulated flow non-continuously.
* B2S1 Airflow greater than 22 gps for 120000 grams of accumulated flow non-continuously.
* B2S2 Airflow greater than 22 gps for 120000 grams of accumulated flow non-continuously.

Note that all other enable criteria must be met on the next ignition cycle for the test to run on that ignition cycle.
Note: This feature is only enabled when the vehicle is new and cannot be enabled in service

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P0324/P0326 Abnormal Noise Threshold (same table used for both):

	X-axis: Engine Air Flow (mg per cylinder)			
Y-axis: Engine Speed (RPM)	100	300	700	1200
500	0.2900	0.2900	0.2900	0.2900
1000	0.2900	0.2900	0.2900	0.2900
1500	0.2900	0.2900	0.2900	0.2900
2000	0.2900	0.2900	0.2900	0.2900
2500	0.2900	0.2900	0.2900	0.2900
3000	0.3800	0.3800	0.3800	0.3800
3500	0.4400	0.4400	0.4400	0.4400
4000	0.5200	0.5200	0.5200	0.5200
4500	0.5900	0.5900	0.5900	0.5900
5000	0.5400	0.5400	0.5400	0.5400
5500	0.6300	0.6300	0.6300	0.6300
6000	0.6600	0.6600	0.6600	0.6600
6500	0.6600	0.6600	0.6600	0.6600
7000	0.6600	0.6600	0.6600	0.6600
7500	0.6600	0.6600	0.6600	0.6600
8000	0.6600	0.6600	0.6600	0.6600
8500	0.6600	0.6600	0.6600	0.6600

P0325/P0330

Two methods are used for the Knock Sensor Open Circuit Diagnostic:
1) 20 kHz Method: 20 kHz signal is internally injected on one sensor line (Signal) and the output of the differential op-amp is checked to verify the 20 kHz travels through the sensor and back to the second sensor
2) Normal Noise: The amplitude of the FFT (in the knock frequency range) is checked to verify there is a knock signal within an expected range

KtKNKD_e_OpenMethod is the cal table used to determine which Open Circuit method is used: '0' = Disabled; '1' = 20 kHz Method; '2' = Normal Noise Methoc

	X-axis: Engine Air Flow (mg per cylinder)			
Y-axis: Engine Speed (RPM)	100	300	700	1200
500	1	1	1	1
1000	1	1	1	1
1500	1	1	1	1
2000	1	1	1	1
2500	1	1	1	1
3000	1	1	1	1
3500	1	1	1	1
4000	1	1	1	1
4500	1	1	1	1
5000	1	1	1	1
5500	1	1	1	1
6000	1	1	1	1
6500	1	1	1	1
7000	1	1	1	1
7500	1	1	1	1
8000	1	1	1	1
8500	1	1	1	1

Open Circuit Thresholds:

1. 20 kHz Method:

Engine Speed (RPM):	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
OpenCktThrshMin:	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

Engine Speed (RPM):	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
OpenCktThrshMax:	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

2. Normal Noise Method:

Engine Speed (RPM):	2700	2900	3000	3250	3500	3750	4000	4250	4500	4750	5000	5500	6000	6500	7000	7500	8500
OpenCktThrshMin:	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

Engine Speed (RPM):	2700	2900	3000	3250	3500	3750	4000	4250	4500	4750	5000	5500	6000	6500	7000	7500	8500
OpenCktThrshMax:	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

P06B6/P06B7

Engine Speed (RPM):	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
OpenTestThreshLo	0.1992	0.1855	0.1758	0.1875	0.2227	0.2793	0.3848	0.5215	0.7012	0.9277	1.2070	1.5449	1.9434	2.4082	2.9453	3.5586	4.2520

Engine Speed (RPM):	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500
OpenTestThreshHi	0.6895	0.6895	0.6895	0.6895	0.7246	0.9805	1.3633	1.8867	2.5625	3.4063	4.4316	5.6504	7.0762	8.7266	10.6113	12.7441	15.1406

P0068: MAP / MAF / TPS Correleation

X-axis is TPS (%)
Data is MAP threshold (kPa)

X-axis	5.00	10.00	15.00	20.00	25.00	30.00	35.00	40.00	100.00
Data	21.45	22.81	22.56	18.69	19.59	19.23	100.00	100.00	100.00

X axis is TPS (%)
Data is MAF threshold (grams/sec)

X-axis	5.00	10.00	15.00	20.00	25.00	30.00	35.00	40.00	100.00
Data	15.43	19.72	25.32	26.87	36.79	45.05	255.00	255.00	255.00

X axis is Engine Speed (RPM)
Data is max MAF vs RPM (grams/sec)

X-axis	600.00	1400.00	2200.00	3000.00	3800.00	4600.00	5400.00	6200.00	7000.00
Data	25.00	60.00	100.00	140.00	180.00	220.00	250.00	280.00	300.00

X axis is Battery Voltage (V)
Data is max MAF vs Voltage (grams/sec)

X-axis	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00
Data	0.00	18.00	40.00	75.00	135.00	250.00	500.00	500.00	500.00

P1682: Ignition Voltage Correleation

X-axis is IAT (DegC)
Data is Voltage threshold (V)

X-axis	23.00	85.00	95.00	105.00	125.00
Data	7.00	8.70	9.00	9.20	10.00

P0606: Processor Performance Check - ETC software is not executed in proper order

X-axis is task loop time
Data is threshold (seconds)

	CePISR_e_6 p25msSeq	CePISR_e_1 2p5msSeq	CePISR_e_2 5msSeq	CePISR_e_L ORES_C
X-axis				
Data	0.175	0.175	0.175	409.594

X-axis is task loop time
Data indicates if feature is enabled

	CePISR_e_6 p25msSeq	CePISR_e_1 2p5msSeq	CePISR_e_2 5msSeq	CePISR_e_L ORES_C
X-axis				
Data	1	1	1	0

P16F3: No fast unmanaged retarded spark above the applied spark

X-axis is Erpm
Y-axis is Air per Clyinder (mg)
Data is spark delta threshold (kPa)

KtSPRK_phi_DeltTorqueScrtyAdv

APC/Erpm	500.00	980.74	1461.48	1942.23	2422.97	2903.71	3384.45	3865.20	4345.94	4826.68	5307.42	5788.16	6268.91	6749.65	7230.39	7711.13	8191.88
80.00	36.56	38.72	33.19	45.16	42.34	39.67	36.72	33.30	35.00	38.28	34.50	30.05	27.63	27.63	27.63	27.63	27.63
160.00	36.08	33.06	28.98	34.03	34.14	32.86	30.33	25.80	25.50	26.72	25.34	23.73	22.88	22.88	22.88	22.88	22.88
240.00	29.42	26.34	25.77	27.42	26.16	25.28	23.59	20.59	20.09	20.52	20.00	19.61	19.52	19.52	19.52	19.52	19.52
320.00	20.83	20.03	21.56	22.73	21.20	20.55	19.31	17.14	16.59	16.66	16.53	16.72	17.02	17.02	17.02	17.02	17.02
400.00	15.78	15.69	17.31	19.00	17.83	17.31	16.36	14.69	14.13	14.02	14.08	14.53	15.00	15.00	15.00	15.00	15.00
480.00	12.72	12.84	14.41	16.27	15.38	14.95	14.17	12.84	12.31	12.11	12.27	12.72	13.11	13.11	13.11	13.11	13.11
560.00	10.64	10.88	12.25	14.06	13.36	13.09	12.52	11.42	10.81	10.42	10.72	11.08	11.30	11.30	11.30	11.30	11.30
640.00	9.14	9.42	10.61	12.38	11.72	11.63	11.20	10.27	9.56	8.98	9.25	9.55	9.70	9.70	9.70	9.70	9.70
720.00	8.03	8.33	9.36	11.05	10.45	10.45	10.11	9.25	8.53	7.89	8.13	8.38	8.50	8.50	8.50	8.50	8.50
800.00	7.14	7.45	8.38	9.97	9.42	9.48	9.20	8.39	7.67	7.05	7.25	7.47	7.56	7.56	7.56	7.56	7.56
880.00	6.44	6.75	7.58	9.09	8.58	8.69	8.45	7.66	6.97	6.36	6.55	6.73	6.81	6.81	6.81	6.81	6.81
960.00	6.38	6.67	7.50	9.00	8.50	8.61	8.38	7.59	6.89	6.28	6.47	6.66	6.73	6.73	6.73	6.73	6.73
1040.00	6.38	6.67	7.50	9.00	8.50	8.61	8.38	7.59	6.89	6.28	6.47	6.66	6.73	6.73	6.73	6.73	6.73
1120.00	6.38	6.67	7.50	9.00	8.50	8.61	8.38	7.59	6.89	6.28	6.47	6.66	6.73	6.73	6.73	6.73	6.73
1200.00	6.38	6.67	7.50	9.00	8.50	8.61	8.38	7.59	6.89	6.28	6.47	6.66	6.73	6.73	6.73	6.73	6.73
1280.00	6.38	6.67	7.50	9.00	8.50	8.61	8.38	7.59	6.89	6.28	6.47	6.66	6.73	6.73	6.73	6.73	6.73
1360.00	6.38	6.67	7.50	9.00	8.50	8.61	8.38	7.59	6.89	6.28	6.47	6.66	6.73	6.73	6.73	6.73	6.73

P16F3: Absolute difference of the calculated Intake Manifold Pressure during engine event versus during time event

X-axis is engine torque (Nm)
Data is MAP delta threshold (kPa)

X-axis	0.00	50.00	100.00	150.00	200.00	300.00
Data	18.69	18.69	18.69	18.69	18.69	18.69

P16F3: Table to calculate limit for predicted torque for zero pedal determination.

X-axis is engine oil temp in C deg
Y-axis is engine speed RPM
Data is Torque (Nm)

	-40.00	-15.00	5.00	32.00	55.00	90.00
200.00	4096.00	4096.00	4096.00	4096.00	4096.00	4096.00
305.00	4096.00	4096.00	4096.00	4096.00	4096.00	4096.00
410.00	4096.00	4096.00	4096.00	4096.00	4096.00	4096.00
515.00	4096.00	4096.00	4096.00	4096.00	200.00	200.00
560.00	4096.00	4096.00	4096.00	4096.00	175.00	175.00
705.00	200.00	193.00	165.00	150.00	150.00	150.00
875.00	160.00	153.00	120.00	105.00	39.48	26.07
1050.00	105.00	105.00	105.00	105.00	50.16	35.14
1300.00	163.02	153.64	127.83	102.02	82.82	46.64
1600.00	154.43	145.05	117.43	90.13	51.93	50.43
2000.00	125.91	117.58	90.79	45.41	45.41	43.91
2500.00	96.76	89.47	43.38	38.26	38.26	36.76
3200.00	40.79	35.58	31.41	26.29	26.29	24.79
4000.00	23.56	18.35	14.19	9.06	9.06	7.56
5000.00	6.73	1.52	-2.65	-7.77	-7.77	-9.27
6100.00	-4.33	-9.54	-13.70	-18.83	-18.83	-20.33
8000.00	-5.30	-10.51	-14.68	-19.80	-19.80	-21.30

P0442: EONV Pressure Threshold Table (in Pascals)

X axis is fuel level in %
Y axis is temperature in deg C

	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	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
-4.3750	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
1.2500	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
6.8750	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
12.5000	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
18.1250	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
23.7500	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
29.3750	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
35.0000	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
40.6250	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
46.2500	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
51.8750	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
57.5000	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
63.1250	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
68.7500	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
74.3750	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
80.0000	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453

P0442: Estimate of Ambient Temperature Valid Conditioning Time

EAT Valid Conditioning Time (in seconds)
Axis is Ignition Off Time (in seconds)

Axis	Curve
0	200
600	300
1200	300
1800	300
2400	300
3000	300
3600	300
4200	300
4800	300
5400	300
6000	300
6600	300
7200	300
7800	295
8400	290
9000	285
9600	280
10200	275
10800	270
11700	265
12600	260
13500	255
14400	250
15300	245
16200	240
17100	235
18000	230
19200	225
20400	220
21600	215
22800	210
24000	205
25200	200

P0442: Engine Off Time Before Vehicle Off Maximum as a Function of Estimated Ambient Temperature

Engine Off Time Before Vehicle Off Maximum Table (in seconds) — **Axis is Estimated Ambient Coolant in Deg C**

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

P0496: Purge Valve Leak Test Engine Vacuum Test Time (Cold Start) as a Function of Fuel Level

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

Axis	Curve
0	70
6	67
12	65
19	62
25	59
31	57
37	54
44	52
50	49
56	46
62	44
69	41
75	39
81	36
87	34
94	31
100	28

P0461, P2066, P2636: Transfer Pump Enable

TransferPumpOnTimeLimit (in seconds)
Axis is Fuel Level in %

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

Tables supporting Engine Oil Temperature Sensor

P0521

EngSpeedWeightFactorTable — **AXIS is Engine RPM, Curve is Weight Factor**

Axis	0	500	900	1000	2000	3000	3500	4000	5000
Curve	0.00	0.00	0.00	0.45	0.45	0.45	0.45	0.20	0.00

EngOilTempWeightFactorTable — **AXIS is Engine Oil Temp Deg C, Curve is Weight Factor**

Axis	-10	-5	60	80	90	100	120	130	140
Curve	0.00	0.70	0.70	0.70	0.70	0.70	0.70	0.35	0.00

EngLoadStabilityWeightFactorTable — **AXIS is Engine RPM, Curve is Weight Factor**

Axis	0	5	10	20	30	50	100	200	399
Curve	1.00	1.00	1.00	0.30	0.00	0.00	0.00	0.00	0.00

EngOilPredictionWeightFacotrTable — **AXIS is Engine RPM, Curve is Engine Oil Prediction Weight Factor**

Axis	160	170	250	275	360	375	400	450	600
Curve	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00

Tables supporting Clutch Pedal Position Status (analog Clutch Pedal Position Sensor applications only):

Clutch Pedal Top of Travel Achieved criteria
The clutch pedal Top of Travel state will transition from FALSE to TRUE when the following occurs:

Clutch Pedal Position	<= 88 %	
for	> 3 counts	each count is equal to 12.5ms

Clutch Disengaged criteria
The clutch state will transition from engaged to disengaged when the following occurs:

Clutch Pedal Position	<= 40 %	
for	> 3 counts	each count is equal to 12.5ms

Clutch Pedal Bottom of Travel Achieved criteria
The clutch pedal Bottom of Travel state will transition from FALSE to TRUE when the following occurs:

Clutch Pedal Position	< 20 %	
for	> 3 counts	each count is equal to 12.5ms

FASD Section
P0171, P0172, P0174, P0175

The following table defines the Long Fuel Trim cells utilized for FASD diagnosis (cells identified with a "Yes" are enabled, and with a "NO" are disabled)

Long-Term Fuel Trim Cell Usage

Cell I.D.	CeFADR_e_Cell00_PurgOnAirMode5	CeFADR_e_Cell01_PurgOnAirMode4	CeFADR_e_Cell02_PurgOnAirMode3	CeFADR_e_Cell03_PurgOnAirMode2	CeFADR_e_Cell04_PurgOnAirMode1	CeFADR_e_Cell05_PurgOnAirMode0	CeFADR_e_Cell06_PurgOnIdle	CeFADR_e_Cell07_PurgOnDecel	CeFADR_e_Cell08_PurgOffAirMode5	CeFADR_e_Cell09_PurgOffAirMode4	CeFADR_e_Cell10_PurgOffAirMode3	CeFADR_e_Cell11_PurgOffAirMode2	CeFADR_e_Cell12_PurgOffAirMode1	CeFADR_e_Cell13_PurgOffAirMode0	CeFADR_e_Cell14_PurgOffIdle	CeFADR_e_Cell15_PurgOffDecel
FASD Cell Usage	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell
FASD Enabled In Cell?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

AFIM Section
P219A

KtOXYD_cmp_AFIM_LngthThrsh1

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000
80	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000
120	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000
160	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000
200	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000
240	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000
280	90000	90000	90000	90000	90000	90000	90000	14240	14240	15552	16864	16864	90000	90000	90000	90000	90000
320	90000	90000	90000	11808	11808	11584	11360	13376	14240	15552	16864	16864	90000	90000	90000	90000	90000
360	90000	90000	90000	11808	11808	11968	11360	12512	14960	15744	18480	22512	26544	90000	90000	90000	90000
400	90000	90000	90000	15376	15376	12736	12416	13072	15488	13808	20192	26544	26544	90000	90000	90000	90000
440	90000	90000	90000	18384	18384	14112	12608	14976	16208	13984	22384	30320	30320	90000	90000	90000	90000
480	90000	90000	90000	15616	15616	16048	13728	18032	17168	15712	23456	33296	33296	90000	90000	90000	90000
520	90000	90000	90000	17040	17040	21328	15312	18160	18368	17472	21872	27584	33296	90000	90000	90000	90000
560	90000	90000	90000	19552	19552	22624	16320	21552	18848	18672	23712	23712	90000	90000	90000	90000	90000
640	90000	90000	90000	20304	20304	20704	21664	26496	26864	27200	25456	23712	90000	90000	90000	90000	90000
720	90000	90000	90000	20304	20304	20704	21664	26496	26864	27200	27200	90000	90000	90000	90000	90000	90000
800	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000

P219B — **KtOXYD_cmp_AFIM_LngthThrsh2**

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000
80	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000
120	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000
160	90000	90000	90000	90000	90000	90000	90000	90000	90000	9648	9648	9648	90000	90000	90000	90000	90000
200	90000	90000	90000	90000	90000	90000	90000	90000	90000	9648	9648	9648	90000	90000	90000	90000	90000
240	90000	90000	90000	90000	90000	90000	90000	90000	90000	11312	11312	11312	16608	16608	90000	90000	90000
280	90000	90000	90000	90000	9552	9552	10944	12320	11376	12960	12960	14480	16608	16608	90000	90000	90000
320	90000	90000	90000	9488	9520	9552	11488	12320	11376	13056	14640	13872	15280	15280	90000	90000	90000
360	90000	90000	90000	9488	9488	9616	12576	11184	12592	13136	16768	14528	15584	15584	90000	90000	90000
400	90000	90000	90000	10096	10096	10688	12848	11856	12992	14304	19536	16032	18912	18912	90000	90000	90000
440	90000	90000	90000	11216	11216	11488	13040	11584	14144	15184	21200	16480	19424	19424	90000	90000	90000
480	90000	90000	90000	12976	12976	13072	13280	12112	16192	15824	21168	17376	22304	22304	90000	90000	90000
520	90000	90000	90000	15520	15520	14016	15488	13168	17072	16288	21824	17232	22528	22528	90000	90000	90000
560	90000	90000	90000	17136	17136	14848	17872	15072	18592	17520	23520	19776	24416	24416	90000	90000	90000
640	90000	90000	90000	15184	15184	18160	19888	19632	23856	22832	23424	20896	24304	24304	90000	90000	90000
720	90000	90000	90000	15184	15184	18160	19888	19632	23856	22832	23424	20896	24304	24304	90000	90000	90000
800	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000

P219A — **KtOXYD_K_AFIM_QualFactor1**

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
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	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
200	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
240	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
280	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
320	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	1.00	0.00	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	0.00	1.00	0.00	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	1.00	1.00	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	1.00	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	0.00	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	0.00	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00
720	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	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

P219B — **KtOXYD_K_AFIM_QualFactor2**

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
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	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
200	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
240	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.00	0.00
280	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00
320	0.00	0.00	0.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	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	1.00	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	1.00	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	1.00	1.00	1.00	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	1.00	1.00	1.00	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	1.00	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	1.00	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	1.00	0.00	0.00	0.00	0.00
720	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	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

Closed Loop Enable Criteria

Engine run time greater than
KtFSTA_t_ClosedLoopTime

Start-Up Coolant	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Close Loop Enable Time	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

and pre converter 02 sensor voltage less than
KfFULC_U_O2_SensorReadyThrshLo

< 1795
Voltage *milliVolts*

for
KcFULC_O2_SensorReadyEvents
(events * 12.5 milliseconds) *> 10 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

> 39 Celcius
Coolant

or less than
KfFCLL_T_AdaptiveHiCoolant

< 140
Coolant *Celcius*

and
KtFCLL_p_AdaptiveLowMAP_Limit

Barometric Pressure	65	70	75	80	85	90	95	100	105
Manifold Air Pressure	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0

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

EGRValvePerformance_FA	P0401	P042E							
EGRValveCircuit_FA	P0403	P0404	P0405	P0406					
EGRValve_FP	P0405	P0406	P042E						
EGRValveCircuit_TFTKO	P0403	P0404	P0405	P0406					
EGRValvePerformance_TFTKO	P0401	P042E							
CatalystSysEfficiencyLoB1_FA	P0420								
CatalystSysEfficiencyLoB2_FA	P0430								
EngineMisfireDetected_TFTKO	P0300	P0301	P0302	P0303	P0304	P0305	P0306	P0307	P0308
EngineMisfireDetected_FA	P0300	P0301	P0302	P0303	P0304	P0305	P0306	P0307	P0308
AAP_SnsrFA	naturally aspirated:	P2227	P2228	P2229	P2230				
	turbocharged:	P0237	P0238						
AAP_SnsrCktFP	naturally aspirated:	P2228	P2229						
	turbocharged:	P0237	P0238						
AAP_SnsrTFTKO	naturally aspirated:	P2227	P2228	P2229	P2230				
	turbocharged:	P0237	P0238						
AAP2_SnsrFA	P2227	P2228	P2229	P2230					
AAP2_SnsrCktFP	P2228	P2229							
AAP2_SnsrTFTKO	P2227	P2228	P2229	P2230					
TC_BoostPresSnsrCktFA	P0237	P0238							
TC_BoostPresSnsrFA	P0236	P0237	P0238						
AmbPresSnsrCktFA	P2228	P2229							
AmbPresSnsrCktFP	P2228	P2229							
AmbientAirDefault	baro or TIAP sensor:	P2227	P2228	P2229	P2230				
	no baro or TIAP sensor:	P0101	P0102	P0103	P0106	P0107	P0108	P0111	P0112
AmbPresDfltdStatus	baro or TIAP sensor:	P2227	P2228	P2229	P2230				
	no baro or TIAP sensor:	P0101	P0102	P0103	P0106	P0107	P0108	P0111	P0112
IAT_SensorCircuitTFTKO	P0112	P0113							

EGRValvePerformance_FA																				
EGRValveCircuit_FA																				
EGRValve_FP																				
EGRValveCircuit_TFTKO																				
EGRValvePerformance_TFTKO																				
CatalystSysEfficiencyLoB1_FA																				
CatalystSysEfficiencyLoB2_FA																				
EngineMisfireDetected_TFTKO																				
EngineMisfireDetected_FA																				
AAP_SnsrFA																				
AAP_SnsrCktFP																				
AAP_SnsrTFTKO																				
AAP2_SnsrFA																				
AAP2_SnsrCktFP																				
AAP2_SnsrTFTKO																				
TC_BoostPresSnsrCktFA																				
TC_BoostPresSnsrFA																				
AmbPresSnsrCktFA																				
AmbPresSnsrCktFP																				
AmbientAirDefault																				
	P0113	P0114	P0121	P0122	P0123	P012B	P012C	P012D	P0222	P0223	P1221									
AmbPresDfltdStatus																				
	P0113	P0114	P0121	P0122	P0123	P012B	P012C	P012D	P0222	P0223	P1221									
IAT_SensorCircuitTFTKO																				

IAT_SensorCircuitFA	P0112	P0113		
IAT_SensorCircuitFP	P0112	P0113		
IAT_SensorTFTKO	P0111	P0112	P0113	
IAT_SensorFA	P0111	P0112	P0113	
IAT2_SensorCktTFTKO	IAT2 Present	P0097	P0098	
	IAT2 Not Present	P0112	P0113	
IAT2_SensorCircuitFA	IAT2 Present	P0097	P0098	
	IAT2 Not Present	P0112	P0113	
IAT2_SensorcircuitFP	IAT2 Present	P0097	P0098	
	IAT2 Not Present	P0112	P0113	
IAT2_SensorTFTKO	IAT2 Present	P0096	P0097	P0098
	IAT2 Not Present	P0111	P0112	P0113
IAT2_SensorFA	IAT2 Present	P0096	P0097	P0098
	IAT2 Not Present	P0111	P0112	P0113
ThrotTempSensorTFTKO	IAT2 Present	P0096	P0097	P0098
	IAT2 Not Present	P0111	P0112	P0113
ThrotTempSensorFA	IAT2 Present	P0096	P0097	P0098
	IAT2 Not Present	P0111	P0112	P0113
SuperchargerBypassValveFA	P2261			
CylDeacSystemTFTKO	P3400			
MAF_SensorPerfFA	P0101			
MAF_SensorPerfTFTKO	P0101			
MAP_SensorPerfFA	P0106			
MAP_SensorPerfTFTKO	P0106			
SCIAP_SensorPerfFA	P012B			
SCIAP_SensorPerfTFTKO	P012B			
ThrottlePositionSnsrPerfFA	P0121			
ThrottlePositionSnsrPerfTFTKO	P0121			
TIAP_SensorPerfFA	P0236			

MAF_SensorFA	P0101	P0102	P0103									
MAF_SensorTFTKO	P0101	P0102	P0103									
MAF_SensorFP	P0102	P0103										
MAF_SensorCircuitFA	P0102	P0103										
MAF_SensorCircuitTFTKO	P0102	P0103										
MAP_SensorTFTKO	P0106	P0107	P0108									
MAP_SensorFA	P0106	P0107	P0108									
MAP_SensorCircuitFP	P0107	P0108										
SCIAP_SensorFA	P012B	P012C	P012D									
SCIAP_SensorTFTKO	P012B	P012C	P012D									
SCIAP_SensorCircuitFP	P012C	P012D										
AfterThrottlePressureFA	naturally aspirated, turbocharged supercharged	P0106 P012B	P0107 P012C	P0108 P012D									
AfterThrottleVacuumTFTKO	naturally aspirated, turbocharged supercharged	P0106 P012B	P0107 P012C	P0108 P012D									
SCIAP_SensorCircuitFA	P012C	P012D										
AfterThrottlePressTFTKO	naturally aspirated, turbocharged supercharged	P0106 P012B	P0107 P012C	P0108 P012D									
MAP_SensorCircuitFA	P0107	P0108										
MAP_EngineVacuumStatus	MAP_SensorFA OR P0107, P0108 Pending											
CrankCamCorrelationTFTKO	P0016	P0017	P0018	P0019								
CrankSensorFA	P0335	P0336										
CrankSensorTFTKO	P0335	P0336										
CamSensorFA	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391

CamSensorTFTKO	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391
CrankIntakeCamCorrelationFA	P0016	P0018										
CrankExhaustCamCorrelationFA	P0017	P0019										
IntakeCamSensorTFTKO	P0016	P0018	P0340	P0341	P0345	P0346						
IntakeCamSensorFA	P0016	P0018	P0340	P0341	P0345	P0346						
ExhaustCamSensorTFTKO	P0017	P0019	P0365	P0366	P0390	P0391						
ExhaustCamSensorFA	P0017	P0019	P0365	P0366	P0390	P0391						
IntakeCamSensor_FA	P0016	P0018	P0340	P0341	P0345	P0346						
IntakeCamSensor_TFTKO	P0016	P0018	P0340	P0341	P0345	P0346						
ExhaustCamSensor_FA	P0017	P0019	P0365	P0366	P0390	P0391						
ExhaustCamSensor_TFTKO	P0017	P0019	P0365	P0366	P0390	P0391						
CrankIntakeCamCorrFA	P0016	P0018										
CrankExhaustCamCorrFA	P0017	P0019										
CrankSensorFaultActive	P0335	P0336										
CrankSensor_FA	P0335	P0336										
CrankSensorTestFailedTKO	P0335	P0336										
CrankSensor_TFTKO	P0335	P0336										
CamSensor_FA	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391
CamSensorAnyLocationFA	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391
CamSensor_TFTKO	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391
EngModeNotRunTmErr	P2610											
ECT_Sensor_Ckt_FA	P0117	P0118	P0119									
ECT_Sensor_Ckt_TPTKO	P0117	P0118	P0119									
ECT_Sensor_Ckt_TFTKO	P0117	P0118	P0119									
ECT_Sensor_DefaultDetected	P0117	P0118	P0116	P0125								
ECT_Sensor_FA	P0117	P0118	P0116	P0125	P0128							
ECT_Sensor_TFTKO	P0117	P0118	P0116	P0125	P0119							
ECT_Sensor_Perf_FA	P0116											
ECT_Sensor_Ckt_FP	P0117	P0118										
ECT_Sensor_Ckt_High_FP	P0118											
ECT_Sensor_Ckt_Low_FP	P0117											
THMR_Insuff_Flow_FA	P00B7											
THMR_Therm_Control_FA	P0597	P0598	P0599									
THMR_RCT_Sensor_Ckt_FA	P00B3	P00B4										
THMR_ECT_Sensor_Ckt_FA	P0117	P0118	P0116	P0125	P00B6							
O2S_Bank_ 1_TFTKO	P0131	P0132	P0134	P2A00								
O2S_Bank_ 2_TFTKO	P0151	P0152	P0154	P2A03								
O2S_Bank_1_Sensor_1_FA	P2A00	P0131	P0132	P0133	P0134	P0135	P0053	P1133	P015A	P015B	P0030	
O2S_Bank_1_Sensor_2_FA	P013A	P013B	P013E	P013F	P2270	P2271	P0137	P0138	P0140	P0141	P0054	P0036
O2S_Bank_2_Sensor_1_FA	P2A03	P0151	P0152	P0153	P0154	P0155	P0059	P1153	P015C	P015D	P0050	
O2S_Bank_2_Sensor_2_FA	P013C	P013D	P014A	P014B	P2272	P2273	P0157	P0158	P0160	P0161	P0060	P0056
PO2S_Bank_1_Snsr_2_FA	P0137	P0138	P0140	P0036	P0054	P0141	P2270	P2271				
PO2S_Bank_2_Snsr_2_FA	P0157	P0158	P0160	P0056	P0060	P0161	P2272	P2273				

FuelInjectorCircuit_FA	P0201	P0202	P0203	P0204	P0205	P0206	P0207	P0208
	P0261	P0264	P0267	P0270	P0273	P0276	P0279	P0282
	P0262	P0265	P0268	P0271	P0274	P0277	P0280	P0283
	P2147	P2150	P2153	P2156	P216B	P216E	P217B	P217E
	P2148	P2151	P2154	P2157	P216C	P216F	P217C	P217F
	P1248	P1249	P124A	P124B	P124C	P124D	P124E	P124F
FuelInjectorCircuit_TFTKO	P0201	P0202	P0203	P0204	P0205	P0206	P0207	P0208
	P0261	P0264	P0267	P0270	P0273	P0276	P0279	P0282
	P0262	P0265	P0268	P0271	P0274	P0277	P0280	P0283
	P2147	P2150	P2153	P2156	P216B	P216E	P217B	P217E
	P2148	P2151	P2154	P2157	P216C	P216F	P217C	P217F
	P1248	P1249	P124A	P124B	P124C	P124D	P124E	P124F
FHPR_b_PumpCkt_FA	P0090	P0091	P0092	P00C8	P00C9	P00CA		
FHPR_b_PumpCkt_TFTKO	P0090	P0091	P0092	P00C8	P00C9	P00CA		
FHPR_b_FRP_SnsrCkt_FA	P0192	P0193						
FHPR_b_FRP_SnsrCkt_TFTKO	P0192	P0193						
EngineMetalOvertempActive	P1258							

BSTR_b_PCA_CktFA	P0033	P0034	P0035	P0045	P0047	P0048	P0243	P0245	P0246	P0247	P0249	P0250			
BSTR_b_PCA_CktTFTKO	P0033	P0034	P0035	P0045	P0047	P0048	P0243	P0245	P0246	P0247	P0249	P0250			
BSTR_b_PCA_CktLoTFTKO	P0034	P0047	P0245	P0249											
BSTR_b_PstnCntrlFA	P166D	P166E													
BSTR_b_PstnCntrlTooLoTFTKO	P166D	P166E													
BSTR_b_PstnCntrlTooHiTFTKO	P166D	P166E													
BSTR_b_PCA_PstnSnsrFA	P003A	P2564	P2565												
BSTR_b_PCA_PstnSnsrTFTKO	P003A	P2564	P2565												
BSTR_b_TurboBypassCktFA	P0033	P0034	P0035	P00C0	P00C1	P00C2									
BSTR_b_TurboBypassCktTFTKO	P0033	P0034	P0035	P00C0	P00C1	P00C2									
BSTR_b_IC_PmpCktFA	P023A	P023C													
BSTR_b_PCA_FA	P0234	P0299	P0033	P0034	P0035	P0045	P0047	P0048	P0243	P0245	P0246	P2261	P0247	P0249	P0250
BSTR_b_PCA_TFTKO	P0234	P0299	P0033	P0034	P0035	P0045	P0047	P0048	P0243	P0245	P0246	P2261	P0247	P0249	P0250
BSTR_b_ExcsvBstFA	P226B														
BSTR_b_ExcsvBstTFTKO	P226B														
BSTR_b_PresCntrlTooLoTFTKO	P0299														
BSTR_b_PresCntrlTooHiTFTKO	P0234														
BSTR_b_TurboBypB_CktFA	P00C0	P00C1	P00C2												
BSTR_b_TurboBypB_CktTFTKO	P00C0	P00C1	P00C2												

KS_Ckt_Perf_B1B2_FA	P0324	P0325	P0326	P0327	P0328	P0330	P0332	P0333	P06B6	P06B7		
IgnitionOutputDriver_FA	P0351	P0352	P0353	P0354	P0355	P0356	P0357	P0358				
IAC_SystemRPM_FA	P0506	P0507										
TCM_EngSpdReqCkt	P150C											
PPS1_OutOfRange_Composite	P2122	P2123	P06A3									
PPS2_OutOfRange_Composite	P2127	P2128	P0697									
PPS1_OutOfRange_Composite	P2122	P2123	P06A3									
PPS2_OutOfRange_Composite	P2127	P2128	P0697									
PPS1_OutOfRange	P2122	P2123										
PPS2_OutOfRange	P2127	P2128										
PPS1_OutOfRange	P2122	P2123										
PPS2_OutOfRange	P2127	P2128										
AcceleratorPedalFailure	P2122	P2123	P2127	P2128	P2138	P0697	P06A3					
ControllerRAM_Error_FA	P0604											
ControllerProcessorPerf_FA	P0606											
TPS1_OutOfRange_Composite	P0122	P0123	P06A3									
TPS2_OutOfRange_Composite	P0222	P0223	P06A3									
TPS_FA	P0122	P0123	P0222	P0223	P2135							
TPS_TFTKO	P0122	P0123	P0222	P0223	P2135							
TPS_Performance_FA	P0068	P0121	P1104	P2100	P2101	P2102	P2103					
TPS_Performance_TFTKO	P0068	P0121	P1104	P2100	P2101	P2102	P2103					
TPS_FaultPending	P0122	P0123	P0222	P0223	P2135							
TPS_FaultPending	P0122	P0123	P0222	P0223	P2135							
TPS_ThrottleAuthorityDefaulted	P0068	P0122	P0123	P0222	P0223	P16F3	P1104	P2100	P2101	P2102	P2103	P2135
EnginePowerLimited	P0068	P0122	P0123	P0222	P0223	P0606	P16F3	P1104	P2100	P2101	P2102	P2103
	P160E	P160D	P0191	P0192	P0193	P00C8	P00C9	P00CA	P0090	P0091	P0092	P228C
	P2135	P2138	P2122	P2123	P2127	P2128	P228D	P06A3	P0697			
5VoltReferenceA_FA	P0641											
5VoltReferenceB_FA	P0651											
5VoltReferenceMAP_OOR_Flt	P0697											
EvapPurgeSolenoidCircuit_FA	P0443											
EvapFlowDuringNonPurge_FA	P0496											
EvapVentSolenoidCircuit_FA	P0449											
EvapSmallLeak_FA	P0442											
EvapEmissionSystem_FA	P0455	P0446										
FuelTankPressureSnsrCkt_FA	P0452	P0453										
CoolingFanSpeedTooHigh_FA	P0495											
FanOutputDriver_FA	P0480	P0481	P0482									
FuelLevelDataFault	P0461	P0462	P0463	P2066	P2067	P2068						
PowertrainRelayFault	P1682											

PowertrainRelayStateOn_FA	P0685									
PowertrainRelayStateOn_Error	P0685									
IgnitionOffTimer_FA	P2610									
IgnitionOffTimeValid	P2610									
EngineModeNotRunTimerError	P2610									
EngineModeNotRunTimer_FA	P2610									
VehicleSpeedSensor_FA	P0502	P0503	P0722	P0723						
VehicleSpeedSensorError	P0502	P0503	P0722	P0723						
TransmissionGearDefaulted	MYD/MYC/MYB:	P182E	P1915							
	M30/M32/M70:	P1915	P182A	P182C	P182D	P182E	P182F			
TransmissionEngagedState_FA	MYD/MYC/MYB:	P182E	P1915							
	M30/M32/M70:	P1915	P182A	P182C	P182D	P182E	P182F			
Transmission Output Shaft Angular Velocity Validity	MYD/MYC/MYB:	P0722	P0723	P077D	P077C					
	M30/M32/M70:	P0722	P0723							
no validity name is assigned to this fault bundle		**P0751**	**P0752**	**P0756**	**P0757**	**P0973**	**P0974**	**P0976**	**P0977**	
Trans Output Rotations Rolling Count Validity		**P0722**	**P0723**	**P077C**	**P077D**					
Transmission Actual Gear Validity		**P0716**	**P0717**	**P0722**	**P0723**	**P077C**	**P077D**	**P07BF**	**P07C0**	**P182E**	**P1915**
Transmission Engaged State Validity		**P182E**	**P1915**							
Transmission Estimated Gear Validity		**P182E**	**P1915**							
Transmission Gear Ratio Validity		**P0716**	**P0717**	**P0722**	**P0723**	**P077C**	**P077D**	**P07BF**	**P07C0**	
Transmission Gear Selector Position Validity		**P182E**	**P1915**							
Transmission Oil Temperature Validity		**P0667**	**P0668**	**P0669**	**P0711**	**P0712**	**P0713**			
Transmission Overall Actual Torque Ratio Validity		**P0716**	**P0717**	**P0722**	**P0723**	**P077C**	**P077D**	**P07BF**	**P07C0**	**P182E**	**P1915**
Transmission Overall Estimated Torque Ratio Validity		**P0716**	**P0717**	**P0722**	**P0723**	**P077C**	**P077D**	**P07BF**	**P07C0**	**P182E**	**P1915**

Transmission Shift Lever Position Validity		**P182E**	**P1915**					
Transmission Turbine Angular Velocity Validity		**P0716**	**P0717**	**P07BF**	**P07C0**			
EngOilTempSensorCircuitFA	P0197	P0198						
EngOilModeledTempValid	ECT_Sensor_FA	IAT_SensorCircuitFA						
EngOilPressureSensorCktFA	P0522	P0523						
EngOilPressureSensorFA	P0521	P0522	P0523					
CylnderDeacDriverTFTKO	P3401	P3409	P3417	P3425	P3433	P3441	P3449	
BrakeBoosterSensorFA	P0556	P0557	P0558					
BrakeBoosterVacuumValid	P0556	P0557	P0558					
BrakeBoosterVacuumValid	VehicleSpeedSensor_FA	MAP_SensorFA						
CylnderDeacDriverTFTKO	P3401	P3409	P3417	P3425	P3433	P3441	P3449	
EngineTorqueEstInaccurate	EngineMisfireDetected_FA	FuelInjectorCircuit_FA	FuelInjectorCircuit_TFTKO	FuelTrimSystemB1_FA	FuelTrimSystemB2_FA	MAF_SensorTFTKO	MAP_SensorTFTKO	EGRValuePerformance_FA
FuelTrimSystemB1_FA	P0171	P0172						
FuelTrimSystemB2_FA	P0174	P0175						
FuelTrimSystemB1_TFTKO	P0171	P0172						
FuelTrimSystemB2_TFTKO	P0174	P0175						
A/F Imbalance Bank1	P219A							
A/F Imbalance Bank2	P219B							
AIRSystemPressureSensor FA	P2430	P2431	P2432	P2433	P2435	P2436	P2437	P2438
AIR System FA	P0411	P2440	P2444					
AIRValveControlCircuit FA	P0412							
AIRPumpControlCircuit FA	P0418							
Clutch Sensor FA	P0806	P0807	P0808					
ClutchPositionSensorCircuitLo FA	P0807							

ClutchPositionSensorCircuitHi FA	P0808
Ethanol Composition Sensor FA	P0178 P0179 P2269

LowFuelConditionDiagnostic	Flag set to TRUE if the fuel level < 10 % AND No Active DTCs: FuelLevelDataFault P0462 P0463 for at least 30 seconds.
Transfer Pump is Commanded On	Fuel Volume in Primary Fuel Tank < 0.0 liters AND Fuel Volume in Secondary Fuel Tank ≥ 100.0 liters AND Table AND Transfer Pump had been Off for at least 0.0 seconds AND Evap Diagnostic (Purge Valve Leak Test, Large Leak Test, and Waiting for Purge) is not running AND Engine Running

Long Name	Short Name
Bank	B
Brake	Brk
Circuit	Ckt
Engine	Eng
Fault Active	FA
Intake	Intk
Naturally Aspirated	NA
Performance	Perf
Position	Pstn
Pressure	Press
Sensor	Snsr
Supercharged	SC
System	Sys
Test Failed This Key On	TFTKO
Rough Road	RR