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 < 18 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type B 2 trips
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_CamPosErrorLimIc 1 Deg (see Supporting Table)	The following DTC's are NOT active: P0010 IntkCMP B1 Circuit P0340, P0341, Intake B1 Cam sensors P0335, P0336, Crank sensors P0016, P0017, P0018, P0019 Cam to crank rationality Engine is running VVT is enabled Desired camshaft position > 0 Power Take Off (PTO) not active	System Voltage > 11 Volts, and System Voltage < 18 Volts Desired cam position cannot vary more than 5.5 Cam Deg for at least KtPHSD_t_StablePositionTimeIc1 seconds	75 failures out of 150 samples 100 ms /sample	Type B 2 trips
Exhaust Camshaft Actuator Solenoid Circuit – Bank 1	P0013	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 < 18 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type B 2 trips
Exhaust Camshaft System Performance – Bank 1	P0014	Detects a VVT system error by comparing the desired and actual cam positions when VVT is activated	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive	(Exhaust cam Bank 1)Cam Position Error > KtPHSD_phi_CamPosErrorLimEc 1 Deg (see Supporting Table)	The following DTC's are NOT active: P0013 ExhCMP B1 Circuit P0365, P0366, Exh B1 Cam sensors P0335, P0336, Crank sensors P0016, P0017, P0018, P0019 Cam to crank rationality	System Voltage > 11 Volts, and System Voltage < 18 Volts Desired cam position cannot vary more than 5.5 Cam Deg for at least KtPHSD_t_StablePositionTimeEc1 seconds (see Supporting Table)	100 failures out of 150 samples	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Engine is running VVT is enabled Desired camshaft position > 0 Power Take Off (PTO) not active		100 ms /sample	
Crankshaft Position (CKP)-Camshaft Position (CMP) Correlation Bank 1 Sensor A	P0016	Detects cam to crank misalignment by monitoring if cam sensor pulse for bank 1 sensor A occurs during the incorrect crank position	4 cam sensor pulses more than 9 crank degrees before or 12 crank degrees after nominal position in one cam revolution.		Engine Speed Crankshaft and camshaft position signals are synchronized Cam phaser is in "parked" position No Active DTCs: No Pending DTCs: Engine is Spinning	< 1200 P0335, P0336 P0340, P0341 5VoltReferenceA_FA 5VoltReferenceB_FA P0341	25 failures out of 35 samples One sample per cam rotation	Type B 2 trips
Crankshaft Position (CKP)-Camshaft Position (CMP) Correlation Bank 1 Sensor B	P0017	Detects cam to crank misalignment by monitoring if cam sensor pulse for bank 1 sensor B occurs during the incorrect crank position	4 cam sensor pulses more than 9 crank degrees before or 12 crank degrees after nominal position in one cam revolution.		Engine Speed Crankshaft and camshaft position signals are synchronized Cam phaser is in "parked" position No Active DTCs: No Pending DTCs: Engine is Spinning	< 1200 P0335, P0336 P0365, P0366 5VoltReferenceA_FA 5VoltReferenceB_FA P0366	25 failures out of 35 samples One sample per cam rotation	Type B 2 trips

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 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).		Ign Switch position Ignition Voltage Engine Speed	= Crank or Run position 11.0 volts < Ign Voltage < 18.0 volts > 400 RPM	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips
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).		Ign Switch position Ignition Voltage Engine Speed	= Crank or Run position 11.0 volts < Ign Voltage < 18.0 volts > 400 RPM	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips
HO2S Heater Resistance Bank 1 Sensor 1	P0053	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Learned Heater Resistance.	Calculated Heater Resistance < 3.7 ohms -OR- Calculated Heater Resistance > 8.7 ohms	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 ≤ Coolant ≤ 45.0 ºC < 18.0 volts >= 0.20 seconds	Once per valid cold start	Type B 2 trips
HO2S Heater Resistance Bank 1 Sensor 2	P0054	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Learned Heater Resistance.	Calculated Heater Resistance < 3.6 ohms -OR- Calculated Heater Resistance > 10.3 ohms	No Active DTC's Coolant – IAT	ECT_Sensor_FA P2610 IAT_SensorFA < 8.0 ºC	Once per valid cold start	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Engine Soak Time Coolant Temp Ignition Voltage Engine Run Time	> 28800 seconds -30.0 ºC ≤ Coolant ≤ 45.0 ºC < 18.0 volts >= 0.20 seconds		
MAP / MAF / Throttle Position Correlation	P0068	Detect when MAP and MAF do not match estimated engine airflow as established by the TPS	1) Difference between measured 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 2) 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(TPS). See supporting tables Table, f(RPM). See supporting tables Table, f(Volts). See supporting tables	Engine Speed	> 800 RPM Run/crank voltage or Powertrain relay voltage > 6.00 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 sec Continuous in primary processor	Type: A 1 Trip
Mass Air Flow System Performance	P0101	Determines if the MAF sensor is stuck within the normal operating range	Filtered Throttle Model AND ABS(Measured Flow – Modeled Air Flow) Filtered	<= 250 kPa*(g/s) > 15 grams/sec	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp	>= 400 RPM <= 6600 RPM >= 70 Deg C <= 125 Deg C >= -20 Deg C	Continuous Calculation are performed every Engine Firing Event	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			AND		Intake Air Temp	<= 125 Deg C		
			ABS(Measured MAP – MAP Model 2) Filtered	> 20.0 kPa	Minimum total weight factor (all factors multiplied together)	>= 0.50 Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Estimate MAP Model 2 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_SensorCktFP		
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	<= 300 Hertz (~ .5 gm/sec)	Engine Run Time	>= 1.0 seconds	200 failures out of 250 samples	Type B 2 trips
					Engine Speed	>= 300 RPM		
					Ignition Voltage	>= 11.0 Volts		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Above criteria present for a period of time	>= 1.0 seconds	1 sample every cylinder firing event	
Mass Air Flow Sensor Circuit High Frequency	P0103	Detects a high frequency output from the MAF sensor	MAF Output	>= 11000 Hertz (~ 200 gm/sec)	Engine Run Time Engine Speed Ignition Voltage Above criteria present for a period of time	>= 1.0 seconds >= 300 RPM >= 11.0 Volts >= 1.0 seconds	200 failures out of 250 samples 1 sample every cylinder firing event	Type B 2 trips
Manifold Absolute Pressure Sensor Performance	P0106	Determines if the MAP sensor is stuck within the normal operating range	Filtered Throttle Model AND ABS(Measured MAP – MAP Model 1) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered	<= 250 kPa*(g/s) > 25.0 kPa > 20.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) No Active DTCs:	>= 400 RPM <= 6600 RPM > 70 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.50 Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM MAP Model 1 multiplied by MAP1 Residual Weight Factor based on RPM MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM See table "IFRD Residual Weighting Factors". MAP_SensorCircuitFA	Continuous Calculations are performed every Engine Firing Event	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA ECT_Sensor_Ckt_FP IAT_SensorFA IAT_SensorCktFP		
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	< 1.0 % of 5 Volt Range (0.1 Volts = 1.0 kPa)	Engine Speed OR No Active DTCs: AND ((Throttle Position AND Engine Speed OR (Throttle Position AND Engine Speed	<= 400 RPM TPS_FA TPS_FP TPS_Performance_FA >= 0.0 % <= 1000 RPM) >= 12.5 % > 1000 RPM))	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 = 115.0 kPa)	Engine Running Engine Run Time No Active DTCs: AND ((Throttle Position AND Engine Speed OR	>= Threshold as a function of Engine Coolant Temp See table "MAP Cold Run Time Threshold". TPS_FA TPS_FP TPS_Performance_FA < 1.0 % <= 1200 RPM)	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.
					(Throttle Position AND Engine Speed	< 20.0 % > 1200 RPM))		
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	< 58 Ohms (~150 deg C)	Engine Run Time Coolant Temp Vehicle Speed No Active DTCs:	> 10.0 seconds < 150 deg C >= 0 MPH ECT_Sensor_Ckt_FA ECT_Sensor_Ckt_FP VehicleSpeedSensorError	50 failures out of 63 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	> 163000 Ohms (~-60 deg C)	Engine Run Time Coolant Temp Vehicle Speed Engine Air Flow No Active DTCs:	> 10.0 seconds >= -40 deg C < 318 MPH < 512 gm/sec ECT_Sensor_Ckt_FA ECT_Sensor_Ckt_FP VehicleSpeedSensorError MAF_SensorFA MAF_SensorFP MAF_SensorTFTKO	50 failures out of 63 samples 1 sample every 100 msec	Type B 2 trips
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 25200 second soak (fast fail).	See "P0116: Fail if power up ECT exceeds IAT by these values" in the Supporting tables section	No Active DTC's Non-volatile memory initiation Test complete this trip Test aborted this trip	VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA IgnitionOffTimeValid TimeSinceEngineRunningValid = Not occurred = False = False	1 failure 500 msec/sample Once per valid cold start	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			2) ECT at power up > IAT at power up by 15.8 C after a minimum 25200 second soak and a block heater has not been detected. 3) ECT at power up > IAT at power up by 15.8 C after a minimum 25200 seconds soak and the time spent cranking the engine without starting is greater than 10.0 seconds with the LowFuelConditionDiag	= False	IAT Low Fuel Condition Diag **Diagnostic is aborted when Block Heater is detected. Block Heater is detected when the following occurs:** 1) ECT at power up > IAT at power up by 2) Cranking time 3) Power up IAT 4a) Vehicle drive time 4b) Vehicle speed 4c) IAT drops from power up IAT	≥ -7 ºC = False > 15.8 ºC < 10.0 Seconds > -7 ºC > 400 Seconds > 14.9 MPH ≥ 5.3 ºC		
Engine Coolant Temp Sensor Circuit Low	P0117	This DTC detects a short to ground in the ECT signal circuit or the ECT sensor.	ECT Resistance (@ 150ºC)	< 47 Ohms			5 failures out of 6 samples 1 sec/sample Continuous	Type B 2 trips
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)	> 420000 Ohms	Or IAT min	> 10.0 seconds ≥ 0.0 °C	5 failures out of 6 samples 1 sec/sample Continuous	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Throttle Position Sensor Performance	P0121	Determines if the Throttle Position Sensor input is stuck within the normal operating range	Filtered Throttle Model AND ABS(Measured Flow – Modeled Air Flow) Filtered	> 250 kPa*(g/s) > 15 grams/sec	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) No Active DTCs:	>= 400 RPM <= 6600 RPM > 70 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.50 Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Estimate 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_SensorCktFP	Continuous Calculation are performed every Engine Firing Event	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
TPS1 Circuit	P0120	Detects a continuous or intermittent short or open in TPS1 circuit on the secondary processor but sensor is in range on the primary processor	Secondary TPS1 Voltage < or Secondary TPS1 Voltage >	0.325 4.75		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions No 5 V reference error No 5 V reference DTCs	19/39 counts or 13 counts continuous; 12.5 msec/count in the secondary processor	Type: A 1 Trip
TPS1 Circuit Low	P0122	Detects a continuous or intermittent short or open in TPS1 circuit on both processors or just the primary processor	Primary TPS1 Voltage < Secondary TPS1 Voltage <	0.325 0.325		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions No 5 V reference error No 5 V reference DTCs	79/159 counts; 57 counts continuous; 3.125 msec /count in the Primary processor 19/39 counts or 13 counts continuous; 12.5 msec/count in the Secondary processor	Type: A 1 Trip
TPS1 Circuit High	P0123	Detects a continuous or intermittent short in TPS1 circuit on both processors or just the primary processor	Primary TPS1 Voltage > Secondary TPS1 Voltage >	4.75 4.75		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions No 5 V reference error No 5 V reference DTCs	79/159 counts; 57 counts continuous; 3.125 msec /count in the Primary processor 19/39 counts or 13 counts continuous; 12.5 msec/count in the Secondary processor	Type: A 1 Trip

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Engine Coolant Temperature Below Stat Regulating Temperature	P0128	This DTC detects if the engine coolant temperature rises too slowly due to an ECT or Cooling system fault	Actual accumulated airflow is > predicted accumulated airflow before: Range #1 (Primary) ECT reaches 71.0 °C when IAT min is ≤ 54.5°C and ≥ 10.0°C. Range #2 (Alternate) ECT reaches 71.0 °C when IAT min is < 10.0°C and ≥ -7.0°C.	See "P0128: Maximum Accumulated Airflow for IAT and Start-up ECT conditions" in the Supporting tables section	No Active DTC's Engine run time Fuel Condition **Range #1 (Primary) Test** ECT at start run Average Airflow Vehicle speed **Range #2 (Alternate) Test** ECT at start run Average Airflow Vehicle speed **Accumulated Airflow Adjustments** 1) Max. airflow amount added when accumulating airflow is 2) Zero Airflow accumulated when airflow is 3) With AFM active Airflow added to accumulated is multiplied by	MAP_SensorFA MAF_SensorFA TPS_Performance_FA TPS_FA TPS_ThrottleAuthorityDefaulted IAT_SensorFA ECT_Sensor_Ckt_FA ECT_Sensor_Perf_FA VehicleSpeedSensor_FA 30 ≤ Eng Run Tme ≤ 1800 seconds Ethanol ≤ 100% ≤ 66.0 °C ≥ 1.0 gps > 5 mph for at least 0.8 miles ≤ 66.0 °C ≥ 1.0 gps > 5 mph for at least 0.8 miles 30.0 gps < 2.0 gps	30 failures to set DTC 1 sec/sample Once per ignition cycle	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					4) With Decel Fuel Cut Off active, accumulated airflow is reduced by multiplying actual airflow by	50.00% 1.00 times		
O2S Circuit Low Voltage Bank 1 Sensor 1	P0131	This DTC determines if the O2 sensor circuit is shorted to low.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is < 50 mvolts	No Active DTC's AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control	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 < system voltage< 18.0 volts = Not active = Not active = Not active = Not active	380 failures out of 475 samples Frequency: Continuous in 100 milli - second loop	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Low Fuel Condition Diag	= False		
					Equivalence Ratio	0.9912 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	15 % <= Throttle <= 50 %		
					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 Time	> 5.0 seconds		
O2S Circuit High Voltage Bank 1 Sensor 1	P0132	This DTC determines if the O2 sensor circuit is shorted to high.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is > 1050 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted	100 failures out of 125 samples	Type B 2 trips
						MAP_SensorFA		
						MAF_SensorFA		
						EvapPurgeSolenoidCircuit_FA	Frequency: Continuous in 100 milli - second loop	
						EvapFlowDuringNonPurge_FA		
						EvapVentSolenoidCircuit_FA		
						EvapSmallLeak_FA		
						EvapEmissionSystem_F		
						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 < system voltage< 18.0 volts		
					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	0.9912 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	0.0 % <= Throttle <= 50.0 %		
					Fuel Control State	= Closed Loop		
					Fuel Control State	not = Power Enrichment		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel State	DFCO not active		
					Fuel Condition	Ethanol <= 87%		
					All of the above met for Time	> 5 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 calculated 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 AIR System FA	Sample time is 60 seconds Frequency: Once per trip Green Sensor Delay Criteria The diagnostic will not be enabled until the next ignition cycle after the following has been met: Airflow greater than 22 gps for 120000 grams of accumulated flow	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						EthanolCompositionSensor_FA	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	
						EngineMisfireDetected_FA		
					Bank 1 Sensor 1 DTC's not active	= P0131, P0132 or P0134		
					System Voltage	10.0 volts < system voltage< 18.0 volts		
					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		
					O2 Heater on for	>= 40 seconds		
					Learned Htr resistance	= Valid		
					Engine Coolant	> 70 ºC		
					IAT	> -40 ºC		
					Engine Run Time	> 120 seconds		
					Purge duty cycle	>= 0 % duty cycle		
					Engine airflow	14 gps <= engine airflow <= 40 gps		
					Engine speed	1000 <= RPM <= 3500		
					Fuel	< 87 % Ethanol		
					Baro	> 70 kpa		
					Throttle Position	>= 3 %		
					Low Fuel Condition Diag	= False		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					LTM fuel cell	= Enabled		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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	> 3.0 seconds		
O2S Circuit Insufficient Activity Bank 1 Sensor 1	P0134	This DTC determines if the O2 sensor circuit is open.	Measure Oxygen Sensor Signal.	400 mvolts < Oxygen Sensor signal < 500 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted MAF_SensorFA EthanolCompositionSensor_FA	400 failures out of 500 samples.	Type B 2 trips
					System Voltage	10.0 volts < system voltage< 18.0 volts	Minimum of 0 delta TPS changes required to report fail. Delta TPS is incremented when the TPS % change >= 1.0 %	
					AFM Status	= All Cylinders active		
					Heater Warm-up delay	= Complete		
					Predicted Exhaust Temp (by location)	= Wamed Up		
					Engine Run Time	> 200 seconds		
					Fuel	<= 87 % Ethanol		
							Frequency: Continuous	
							100msec loop	
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.	Measured Heater Current.	Measured Heater current < 0.3 amps -OR- Measured Heater current > 2.5 amps	No Active DTC's	ECT_Sensor_FA	8 failures out of 10 samples	Type B 2 trips
					System Voltage	10.0 volts < system voltage< 18.0 volts	Frequency: 2 tests per trip	
					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	= Not active	30 seconds delay between tests and 1 second execution rate	
					B1S1 O2S Heater Duty Cycle	> zero		
					All of the above met for Time	> 120 seconds		
O2S Circuit Low Voltage Bank 1 Sensor 2	P0137	This DTC determines if the O2 sensor circuit is shorted to low.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is < 50 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted	430 failures out of 540 samples	Type B 2 trips
						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 < system voltage< 18.0 volts		
					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		
					Equivalence Ratio	0.9912 ≤ equiv. ratio ≤ 1.0137		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Throttle Position	15 % <= Throttle <= 50 %		
					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 Time	> 5.0 seconds		
O2S Circuit High Voltage Bank 1 Sensor 2	P0138	This DTC determines if the O2 sensor circuit is shorted to high.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is > 1050 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted	100 failures out of 125 samples	Type B 2 trips
						MAP_SensorFA		
						MAF_SensorFA		
						EvapPurgeSolenoidCircuit_FA	Frequency: Continuous in 100 milli - second loop	
						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 < system voltage< 18.0 volts		
					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		
					Equivalence Ratio	0.9912 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	5.2 % <= Throttle <= 50.0 %		
					Fuel Control State	= Closed Loop		
					Fuel Control State	not = Power Enrichment		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel State	DFCO not active		
					Fuel Condition	Ethanol <= 87%		
					All of the above met for Time	> 5 seconds		
O2 Sensor Delayed Response Rich to Lean Bank 1 Sensor 2 <NOTE: This is a POPD DTC description>	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 cannot go below the threshold voltage. AND The Accumulated mass air flow monitored during the Delayed Response Test is greater than the threshold.	1) Post O2S signal > 450 mvolts AND 2) Accumulated air flow during stuck rich test > 20 grams.	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	Type B 2 trips
					B1S2 Failed this key cycle	P013A, P013B, P013F, P2270 or P2271		
					System Voltage	10.0 volts < system voltage< 18.0 volts		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Post fuel cell DTC's Passed After above conditions are met: DFCO mode entered (wo driver initiated pedal input).	= Valid = Not Valid = Not Valid = False = enabled = P2270 and P2272 (if applicable)	Green Sensor Delay Criteria The diagnostic will not be enabled until the next ignition cycle after the following has been met: 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	
O2 Sensor Slow Response Rich to Lean Bank 1 Sensor 2 <NOTE: This is a POPD DTC description>	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 is greater than the threshold. OR The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds) is greater than the airflow threshold.	1) B1S2 EWMA normalized integral value > 7.1 units OR 2) Accumulated air flow during slow rich to lean test > 15 grams (upper threshold is 450 mvolts and lower threshold is 150 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	Type A 1 trip 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	P013B, P013E, P013F, P2270 or P2271		
					System Voltage	10.0 volts < system voltage< 18.0 volts		
					Learned heater resistance	= Valid	Green Sensor Delay Criteria	
					ICAT MAT Burnoff delay	= Not Valid	The diagnostic will not be enabled until the next ignition cycle after the following has been met: 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	
					Green O2S Condition	= Not Valid		
					Low Fuel Condition Diag	= False		
					Post fuel cell	= enabled		
					DTC's Passed	= P2270 (and P2272 (if applicable))		
					DTC's Passed	= P013E (and P014A (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 Slow Response Lean to Rich Bank 1 Sensor 2 <NOTE: This is a POPD DTC description>	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 is greater than the threshold. OR The Accumulated mass air flow monitored during the Slow Response Test (between the lower and upper voltage thresholds) is greater than the airflow threshold.	1) B1S2 EWMA normalized integral value > 8.1 units OR 2) Accumulated air flow during slow lean to rich test > 280 grams (lower threshold is 300 mvolts and upper threshold is 600 mvolts)	No Active DTC's B1S2 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 DTC's Passed DTC's Passed 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 P013A, P013E, P013F, P2270 or P2271 10.0 volts < system voltage< 18.0 volts = Valid = Not Valid = Not Valid = False = enabled = P2270 (and P2272 (if applicable)) = P013E (and P014A (if applicable)) = P013A (and P013C (if applicable)) = P2271 (and P2273 (if applicable))	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed Green Sensor Delay Criteria The diagnostic will not be enabled until the next ignition cycle after the following has been met: 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	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	= P013F (and P014B (if applicable))	when the vehicle is new and cannot be enabled in service	
					After above conditions are met: Fuel Enrich mode continued.			
O2 Sensor Delayed Response Lean to Rich Bank 1 Sensor 2 <NOTE: This is a POPD DTC description, remove this section for POVD applications>	P013F	This DTC determines if the post catalyst O2 sensor has an initial delayed response to an A/F change from Lean to Rich. The diagnostic is an intrusive test which increases the delivered A/F ratio to achieve the required rich threshold.	Post O2 sensor cannot go above the threshold voltage. AND The Accumulated mass air flow monitored during the Delayed Response Test is greater than the threshold.	1) Post O2S signal < 300 mvolts AND 2) Accumulated air flow during lean to rich test > 635 grams.	No Active DTC's B1S2 Failed this key cycle System Voltage	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, P2270 or P2271 10.0 volts < system voltage< 18.0 volts	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Post fuel cell DTC's Passed DTC's Passed DTC's Passed DTC's Passed After above conditions are met: Fuel Enrich mode entered.	= Valid = Not Valid = Not Valid = False = enabled = P2270 (and P2272 (if applicable)) = P013E (and P014A (if applicable)) = P013A (and P013C (if applicable)) = P2271 (and P2273 (if applicable))	Green Sensor Delay Criteria The diagnostic will not be enabled until the next ignition cycle after the following has been met: 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	
O2S Circuit Insufficient Activity Bank 1 Sensor 2	P0140	This DTC determines if the O2 sensor circuit is open.	Measure Oxygen Sensor Signal.	400 mvolts < Oxygen Sensor signal < 500 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted MAF_SensorFA	1175 failures out of 1225 samples.	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						EthanolCompositionSensor_FA	Minimum of 3 delta TPS changes required to report fail. Delta TPS is incremented when the TPS % change >= 1.0 %	
					System Voltage	10.0 volts < system voltage< 18.0 volts		
					AFM Status	= All Cylinders active		
					Heater Warm-up delay	= Complete		
					Predicted Exhaust Temp (by location)	= Wamed Up		
					Engine Run Time	> 200 seconds		
					Fuel	<= 87 % Ethanol		
							Frequency: Once per trip for post sensors	
							100msec loop	
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.	Measured Heater Current.	Measured Heater current < 0.3 amps -OR- Measured Heater current > 2.5 amps	No Active DTC's	ECT_Sensor_FA	8 failures out of 10 samples	Type B 2 trips
					System Voltage	10.0 volts < system voltage< 18.0 volts	Frequency: 2 tests per trip	
					Heater Warm-up delay	= Complete		
					O2S Heater device control	= Not active	30 seconds delay between tests and 1 second execution rate	
					B1S1 O2S Heater Duty Cycle	> zero		
					All of the above met for Time	> 120 seconds		
Fuel System Too Lean Bank 1 (LONG TERM ONLY)	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	≥ **Long Term Trim Lean** Table	Engine speed	400 <rpm< 6600	> 100 ms Frequency: Continuous	Type B 2 trips
					BARO	> 70 kPa		
					Coolant Temp	-38 <°C< 130		
					MAP	15 <kPa< 256	Development data	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Inlet Air Temp	-20 <°C< 150	indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during 70.7 % 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.	
					MAF	1.0 <g/s< 512.0		
					VSS	< 318 mph		
					Fuel Level	> 10 % or if fuel sender is faulty		
					Long Fuel Trim data accumulation:	> 44.0 seconds of data must accumulate on each trip, with at least 14.0 seconds of data in the current fuel trim cell before a pass or fail decision can be made.		
					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.**			
					Closed loop fueling Enabled A Function of Coolant Temperature based on Start-up coolant temp. and a function of Time also based on Start-up coolant temp. **Please see "Supporting Tables" Tab**			
					Long Fuel Trim enabled	Closed Loop Enabled and coolant temp > 40 and < 120		
					EGR Flow Diag. Intrusive Test Not Active Catalyst Monitor Diag. Intrusive Test Not Active Post O2 Diag. Intrusive Test Not Active Device Control Not Active EVAP Diag. “tank pull down” Not Active fuel trim diagnosed during decels? No			
					No active DTCs:	IAC_SystemRPM_FA MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR System FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSensorCircuit_FA Ethanol Composition Sensor FA FuelInjectorCircuit_FA EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit_FA MAP_EngineVacuumStatus AmbientAirDefault_NA		
Fuel System Too Rich Bank 1 (LONG TERM ONLY)	P0172	Determines if the fuel control system is in a rich condition, based on the filtered long-term fuel trim metric. There are two different, yet related tests that are used to determine a Rich fault, they are Passive and Intrusive and are described below:			BARO Coolant Temp MAP IAT MAF VSS	> 70 kPa -38 <°C< 130 15 <kPa< 256 -20 <°C< 150 1.0 <g/s< 512.0 < 318 mph	> 100 ms Frequency: Continuous Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during 70.7 % 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.	Type B 2 trips
					Long Fuel Trim data accumulation:	> 44.0 seconds of data must accumulate on each trip, with at least 14.0 seconds of data in the current fuel trim cell before a pass or fail decision can be made.		
					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.**			
					Closed loop fueling Enabled A Function of Coolant Temperature based on Start-up coolant temp. and a function of Time also based on Start-up coolant temp. **Please see "Supporting Tables" Tab**			
					Long Fuel Trim enabled	Closed Loop Enabled and coolant temp > 40 and < 120		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		Passive Test: Non-purge cells are monitored to determine if a rich condition exists.	The filtered Non-Purge Long Term Fuel Trim metric	≤ **Non Purge Rich Limit** Table				
		Intrusive Test- When the Purge Long Term fuel trim metric is ≤ **the Purge Rich Limit Table,** Purge is ramped off to determine if excess purge vapor is the cause of the Rich condition. If the filtered Purge-on Long Term fuel trim > **Purge Rich Limit Table** the test passes without checking the Non-Purge Long Term fuel trim metric.	If the Purge Long Term Fuel Trim metric AND The filtered Non-Purge Long Term Fuel Trim metric	≤ **Purge Rich Limit** Table ≤ **Non Purge Rich Limit** Table	A Passive Test decision cannot be made when Purge is enabled.	Fail determinations require that the Malfunction Criteria be satisfied for 2 out of 3 intrusive segments.		
			Segment Definition - Segments can last up to 35, and are separated by the lesser of 30 seconds of purge-on time or enough time to purge 18 grams of vapor. A maximum of 3 completed segments or 30 intrusive 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 60 seconds, indicating that the canister has been purged. Performing intrusive tests too frequently may also affect EVAP and EPAIII emissions, and the execution frequency of other diagnostics.				
					EGR Flow Diag. Intrusive Test Not Active Catalyst Monitor Diag. Intrusive Test Not Active Post O2 Diag. Intrusive Test Not Active Device Control Not Active EVAP Diag. “tank pull down” Not Active fuel trim diagnosed during decels? No			
					No active DTCs:	IAC_SystemRPM_FA MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR System FA 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 FuelTankPressureSensorCircuit_FA Ethanol Composition Sensor FA FuelInjectorCircuit_FA EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit_FA MAP_EngineVacuumStatus AmbientAirDefault_NA		
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 circuit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 18 volts greater than 1 seconds	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips
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 circuit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 18 volts greater than 1 seconds	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips
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 circuit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 18 volts greater than 1 seconds	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips
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 circuit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 18 volts greater than 1 seconds	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips
TPS2 Circuit	P0220	Detects a continuous or intermittent short or open in TPS2 circuit on the secondary processor but sensor is in range on the primary processor	Secondary TPS2 Voltage < or Secondary TPS2 Voltage >	0.25 4.59		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions No 5 V reference error	19/39 counts or 13 counts continuous; 12.5 msec/count in the Secondary processor	Type: A 1 Trip

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						No 5 V reference DTCs		
TPS2 Circuit Low	P0222	Detects a continuous or intermittent short in TPS2 circuit on both processors or just the primary processor	Primary TPS2 Voltage <	0.25		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions No 5 V reference error	79/159 counts; 57 counts continuous; 3.125 msec /count in the Primary processor	Type: A 1 Trip
			Secondary TPS2 Voltage <	0.25		No 5 V reference DTCs	19/39 counts or 13 counts continuous; 12.5 msec/count in the Secondary processor	
TPS2 Circuit High	P0223	Detects a continuous or intermittent short or open in TPS2 circuit on both processors or just the primary processor	Primary TPS2 Voltage >	4.59		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions No 5 V reference error	79/159 counts; 57 counts continuous; 3.125 msec /count in the Primary processor	Type: A 1 Trip
			Secondary TPS2 Voltage >	4.59		No 5 V reference DTCs	19/39 counts or 13 counts continuous; 12.5 msec/count in the Secondary processor	
Fuel Pump Primary Circuit (ODM)	P0230	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 Engine Speed	11 volts ≤ Voltage ≤ 18 volts ≥ 0 RPM	8 failures out of 10 samples 250 ms /sample Continuous	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Random Misfire Detected Cylinder 1 Misfire Detected Cylinder 2 Misfire Detected Cylinder 3 Misfire Detected Cylinder 4 Misfire Detected Cylinder 5 Misfire Detected Cylinder 6 Misfire Detected Cylinder 7 Misfire Detected Cylinder 8 Misfire Detected	P0300 P0301 P0302 P0303 P0304 P0305 P0306 P0307 P0308	These DTC's will determine if a random or a cylinder specific misfire is occurring by monitoring 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 < 125ºC < -7ºC 21ºC < ECT < 125ºC 9.00<volts<18.00 < 95.00% per 25 ms < 95.00% per 25 ms	Emission Exceedence = (5) failed 200 rev blocks of 16. Failure reported with (1) Exceedence in 1st (16) 200 rev block, or (4) Exceedences thereafter. 1st Catalyst Exceedence = (1) 200 rev block as data supports for catalyst damage. 2nd and 3rd Catalyst Exceedence = (1) 200 rev block with catalyst damage. Failure reported with (3) Exceedences in FTP, or (1) Exceedence outside FTP. Continuous	Type B 2 trips (Mil Flashes with Catalyst Damaging Misfire)
			Misfire Percent Emission Failure Threshold Misfire Percent Catalyst Damage	≥ 1.60% P0300 ≥ 1.60% emission >"Catalyst Damaging Misfire Percentage" Table				

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Engine Speed	450 < rpm < 6250 Engine speed limit is a function of inputs like Gear and temperature typical Engine Speed Limit = 6650 rpm	4 cycle delay	
				disable conditions:	No active DTCs:	TPS_FA EnginePowerLimited MAF_SensorTFTKO n IAT_SensorTFTKO ECT_Sensor_Ckt_TFTKO 5VoltReferenceB_FA CrankSensorTestFailedTKO CrankSensorFaultActive CrankIntakeCamCorrelationFA CrankExhaustCamCorrelationFA CrankCamCorrelationTFTKO AnyCamPhaser_FA AnyCamPhaser_TFTKO	4 cycle delay	
					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	4 cycle delay	
					Fuel System Status	≠ Fuel Cut	4 cycle delay	
					Active Fuel Management	Transition in progress	0 cycle delay	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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 (area) Veh Speed	 ≤ 0% > 318 MPH	4 cycle delay	
					EGR Intrusive test	Active	12 cycle delay	
					Manual Trans	Clutch shift	4 cycle delay	
					Throttle Position AND Automatic transmission shift	> 200.00%	0 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:	7 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	> 3 % > 1000 rpm > 3 mph		
					SCD Cyl Mode Rev Mode	= 2 consecutive cyls = 2 consecutive cyls = 2 consecutive cyls		
					Monitor ABS	0 (1=Yes)		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Crankshaft Position System Variation Not Learned	P0315	Monitor for valid crankshaft error compensation factors	Sum of Compensation factors	≥ 2.0040 OR ≤ 1.9960	OBD Manufacturer Enable Counter	0	0.50 seconds Frequency Continuous 100 msec	Type: A 1 Trip
Knock Sensor (KS) Module Performance	P0324	This diagnostic will detect a failed internal ECM component associated with knock control	Any Cylinder's Avg Gain Signal **or** All Cylinder's Actual Signals	> 4.50 Volts ≤ 0.20 Volts	Engine Speed Cylinder Air Mass No Active DTC's Engine Speed Cylinder Air Mass No Active DTC's	≥ 600 RPM > 10 milligrams KS_Ckt_Perf_B1B2_FA ≥ 600 RPM > 10 milligrams KS_Ckt_Perf_B1B2_FA	50 Failures out of 63 Samples 100 msec rate	Type: A 1 Trip
Knock Sensor (KS) Circuit Bank 1	P0325	This diagnostic checks for an open in the knock sensor circuit	Gated Low Pass Filter Voltage	> 4.0 Volts or < 1.24 Volts	Diagnostic Enabled (1 = Enabled) ECT Engine Run Time No Active DTC's Power Take Off	= 1 ≥ -40 deg. C ≥ 1 seconds KS_Ckt_Perf_B1B2_FA = Not Active	50 Failures out of 63 Samples 100 msec rate	Type: B 2 Trips
Knock Sensor (KS) Performance Bank 1	P0326	This diagnostic checks for an overactive knock sensor caused by excessive knock or noisy engine components	Knock Fast Retard (spark degrees) > KeKNOC_phi_FastRtdDiagThrsh	> (FastRtdMax + 4.0 degrees - 1.0) degrees spark See Supporting Tables for FastRtdMax	Diagnostic Enabled (1 = Enabled) Knock Detection Enabled	= 1 > 0 **Knock Detection Enabled** is calculated by multiplying the following three factors: FastAttackRate FastAttackCoolGain FastAttackBaroGain (see Supporting Tables)	31 Failures out of 63 Samples 100 msec rate	Type: B 2 Trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Engine Speed MAP No Active DTC's Power Take Off	≥ 600 RPM ≥ 10 kPa TPS_ThrottleAuthorityDefaulted = Not Active		
Knock Sensor (KS) Circuit Low Bank 1	P0327	This diagnostic checks for an out of range low knock sensor signal	Sensor Input Signal Line **or** Sensor Return Signal Line	> 2.86 Volts < 1.48 Volts	ECT Engine Run Time	≥ -40 deg. C ≥ 1 seconds	50 Failures out of 63 Samples 100 msec rate	Type: B 2 Trips
Knock Sensor (KS) Circuit High Bank 1	P0328	This diagnostic checks for an out of range high knock sensor signal	Sensor Input Signal Line **or** Sensor Return Signal Line	< 2.02 Volts > 3.76 Volts	ECT Engine Run Time	≥ -40 deg. C ≥ 1 seconds	50 Failures out of 63 Samples 100 msec rate	Type: B 2 Trips
Crankshaft Position (CKP) Sensor A Circuit	P0335	Determines if a fault exists with the crank position sensor signal	Engine-Cranking Crankshaft Test: Time since last crankshaft position sensor pulse received Time-Based Crankshaft Test:	>= 4.0 seconds	Engine-Cranking Crankshaft Test: Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow Time-Based Crankshaft Test:	= FALSE = FALSE = FALSE > 3.0 grams/second))	Engine-Cranking Crankshaft Test: Continuous every 100 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 pulses received	>= 1.0 seconds	Engine is Running Starter is not engaged No DTC Active:	5VoltReferenceB_FA	Continuous every 12.5 msec	
			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 P0365 P0366	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 20 or more crank re synchronizations occur	< 25.0 seconds	Crank Re-synchronization Test: Engine Air Flow Cam-based engine speed No DTC Active:	>= 3.0 grams/second > 450 RPM 5VoltReferenceB_FA P0335	Crank Re-synchronization Test: Continuous every 250 msec	Type B 2 trips
			Time-Based Crankshaft Test: No crankshaft synchronization gap found	>= 0.4 seconds	Time-Based Crankshaft Test: Engine is Running Starter is not engaged No DTC Active:	5VoltReferenceB_FA	Time-Based Crankshaft Test: Continuous every 12.5 msec	
			Engine Start Test during Crank:		Engine Start Test during Crank:		Engine Start Test during Crank:	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Time since starter engaged without detecting crankshaft synchronization gap	>= 1.5 seconds	Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow	 = FALSE = FALSE = FALSE > 3.0 grams/second))	Continuous every 100 msec	
			Event-Based Crankshaft Test: Crank Pulses received in one engine revolution OR Crank Pulses received in one engine revolution	 < 51 > 65	Event-Based Crankshaft Test: Engine is Running OR Starter is engaged No DTC Active:	 5VoltReferenceA_FA 5VoltReferenceB_FA P0365 P0366	Event-Based Crankshaft Test: 8 failures out of 10 samples 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	 >= 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	 = FALSE = FALSE = FALSE > 3.0 grams/second))	Engine Cranking Camshaft Test: Continuous 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.
			Time-Based Camshaft Test:		Time-Based Camshaft Test:		Time-Based Camshaft Test:	
			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:		Fast Event-Based Camshaft Test:		Fast Event-Based Camshaft Test:	
			No camshaft pulses received during first 12 MEDRES events (There are 12 MEDRES events per engine cycle)		Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged		Continuous every MEDRES event	
					No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA		
			Slow Event-Based Camshaft Test:		Slow Event-Based Camshaft Test:		Slow Event-Based Camshaft Test:	
			The number of camshaft pulses received during 100 engine cycles	= 0	Crankshaft is synchronized No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor A	P0341	Determines if a performance fault exists with the cam position bank 1 sensor A signal	<u>Fast Event-Based Camshaft Test:</u> The number of camshaft pulses received during first 12 MEDRES events is less than 4 or greater than 10 (There are 12 MEDRES events per engine cycle) <u>Slow Event-Based Camshaft Test:</u> The number of camshaft pulses received during 100 engine cycles OR	 < 398 > 402	<u>Fast Event-Based Camshaft Test:</u> 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: <u>Slow Event-Based Camshaft Test:</u> Crankshaft is synchronized No DTC Active:	 5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA 5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	<u>Fast Event-Based Camshaft Test:</u> Continuous every MEDRES event <u>Slow Event-Based Camshaft Test:</u> 8 failures out of 10 samples Continuous every engine cycle	Type B 2 trips
IGNITION CONTROL #1 CIRCUIT	P0351	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 1 (Cylinders 1 and 4 for V6 with waste spark)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	> 6.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B 2 Trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
IGNITION CONTROL #2 CIRCUIT	P0352	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 2 (Cylinders 2 and 5 for V6 with waste spark)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	 > 6.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B 2 Trips
IGNITION CONTROL #3 CIRCUIT	P0353	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 3 (Cylinders 3 and 6 for V6 with waste spark)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	 > 6.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B 2 Trips
IGNITION CONTROL #4 CIRCUIT	P0354	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 4 (if applicable)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	 > 6.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B 2 Trips
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor B	P0365	Determines if a fault exists with the cam position bank 1 sensor B signal	<u>Engine Cranking Camshaft Test:</u> Time since last camshaft position sensor pulse received	 >= 5.5 seconds	<u>Engine Cranking Camshaft Test:</u> Starter engaged AND (cam pulses being received		<u>Engine Cranking Camshaft Test:</u> Continuous 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.
			OR Time that starter has been engaged without a camshaft sensor pulse	>= 4.0 seconds	OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow	= FALSE = FALSE = FALSE > 3.0 grams/second))		
			Time-Based Camshaft Test: Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Time-Based Camshaft Test: Engine is Running Starter is not engaged No DTC Active:	5VoltReferenceA_FA	Time-Based Camshaft Test: Continuous every 100 msec	
			Fast Event-Based Camshaft Test: No camshaft pulses received during first 12 MEDRES events (There are 12 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	
					No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA		
			Slow Event-Based Camshaft Test:		Slow Event-Based Camshaft Test:		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 B	P0366	Determines if a performance fault exists with the cam position bank 1 sensor B signal	<u>Fast Event-Based Camshaft Test:</u> The number of camshaft pulses received during first 12 MEDRES events is less than 4 or greater than 10 (There are 12 MEDRES events per engine cycle) <u>Slow Event-Based Camshaft Test:</u> The number of camshaft pulses received during 100 engine cycles OR	< 398 > 402	<u>Fast Event-Based Camshaft Test:</u> 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: <u>Slow Event-Based Camshaft Test:</u> Crankshaft is synchronized No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA 5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	<u>Fast Event-Based Camshaft Test:</u> Continuous every MEDRES event <u>Slow Event-Based Camshaft Test:</u> 8 failures out of 10 samples Continuous every engine cycle	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Catalyst System Low Efficiency Bank 1	P0420	Oxygen Storage (Stored Oxygen Release Monitor or STORM)	OSC Mass EWMA (EWMA filtered)	<= 0.900 grams air	***Diagnostic Enable Conditions***		Minimum of 1 test per trip Maximum of 14 tests per trip Frequency: 12.5 ms continuous	Type A 1 Trip
		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. The catalyst diagnostic's strategy is to essentially measure this through a forced Rich A/F excursion following a decel fuel cutoff event. OSC Period = HO2S2 Resp Time – HO2S1 Resp Time – Inert Catalyst Transport Delay. OSC Mass = Integrate{ MAF(Bank,t) * [EquivalenceRatio(t)/FuelTrim LT – 1]} @ t, t=0 to OSC Period. Normalized OSC Mass = OSC Mass *Catalyst Temperature Compensation Factor. (Compensation table to the OSC Mass based on Cat Temp. Refer to "Supporting Tables")	Test Completion: HO2S1 ≥ 600 mV and HO2S2 ≥ 200 mV OR HO2S2 Response Time - HO2S1 Response Time > 1.06 seconds	This diagnostic has the ability to run as a stand alone diagnostic or following the Post O2 Performance Diagnostic (POPD) depending on the calibration value below: Stand Alone Diagnostic: 1 (a value of 1 means the diagnostic is running in the stand alone state and a value of 0 means the diagnostic is running following POPD's completion of the rich to lean portion of the diagnostic). If calibrated to run stand alone then the catalyst diagnostic must not have completed for trip. If calibrated to run following POPD's completion of the rich to lean portion of the diagnostic (i.e. Stand Alone Diagnostic = 0) then POPD must make the request for decel fuel cutoff through the catalyst diagnostic.			
		The Catalyst Monitoring Test is done during a deceleration. 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.			Predicted Catalyst Temperature	≥ 550 degC for > 30 seconds		
					Engine speed and Vehicle Speed	≥ 1200 RPM and > 18 MPH respectively for a minimum of 30 seconds		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Predicted Catalyst Temperature	≥ 550 degC and ≤ 900 degC		
					Tests attempted this trip	< 255		
					The catalyst diagnostic has not yet completed for the current trip.			
					Device control is Disabled			
					Green Converter Delay	Not Active		
					Induction Air	*-20 ≤ °C ≤ 250*		
					Fuel Level	≥ 2 percent (if there is no fuel level fault present) or ≥ 0 percent if there is a fuel level fault active		
					RunCrank Voltage	≥ 11.00 Volts		
					Minimum Learn Enable Time to ensure stable BLM and PLM values	≥ 100 seconds or ≥ 100 seconds if the fuel tank level increases by ≥ 10 percent or following a code clearing event		
					ECT	*71 ≤ °C ≤ 125*		
					Barometric Pressure	≥ 70 KPA		
					Rapid Step Response (RSR) feature will initiate multiple tests:			
					If the difference between current EWMA value and the current OSC Normalized Mass value is > 0.850 and the current Normalized OSC Mass value is < 1.352			
					Maximum of 40 RSR tests to detect failure when RSR is enabled.			
					Green Converter Delay Criteria			
					This is part of the check for the Diagnostic Enable Conditions section			
					The diagnostic will not be enabled until the following has been met:			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Predicted catalyst temperature > 500 ° C for 3600 seconds non-continuously. Note: this feature is only enabled when the vehicle is new and cannot be enabled in service			
					Valid DFCO Period Criteria			
					Prior Enable Criteria Met			
					Decel Fuel Cutoff Time	≥ 1.75 seconds		
					HO2S1 (pre-O2 sensor)	≤ 325.000 mV prior to DFCO exit		
					HO2S2 (post-O2 sensor)	≤ 100 mV for 2.00 seconds prior to DFCO exit		
					Valid DFCO Exit Criteria			
					Cumulative Throttle Movement	< 15.00 percent		
					Equivalence Ratio	≥ 1.00		
					General Enable			
					DTC's Not Set			
					MAF_SensorFA			
					MAF_SensorTFTKO			
					GetAAPR_e_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			
					GetFADR_b_FuelTrimSysB1_TFTKO			
					FuelTrimSystemB2_FA			
					GetFADR_b_FuelTrimSysB2_TFTKO			
					EngineMisfireDetected_FA			
					EvapPurgeSolenoidCircuit_FA			
					GetSPDR_b_IAC_SysRPM_FA			
					EGRValvePerformance_FA			
					EGRValveCircuit_FA			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					CamSensorAnyLocationFA			
					CrankSensor_FA			
					TPS_Performance_FA			
					GetSRAR_b_EnginePowerLimited			
					VehicleSpeedSensor_FA			
					GetPTOR_b_PTO_Active	**AmbientAirDefault_NoSnsr**		
Evaporative Emission (EVAP) System Small Leak Detected	P0442	This DTC will detect a small leak (≥ 0.020") 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 Time since last complete test if normalized result and EWMA is passing OR Time since last complete test if normalized result or EWMA is failing Estimated ambient temperature at end of drive Estimate of Ambient Air Temperature Valid	10 % ≤ Percent ≤ 90 % ≥ 600 seconds ≥ 7.1 miles ≥ 70 °C ≥ 70 kPa ≥ 10.0 miles ≥ 17 hours ≥ 10 hours 0 °C ≤ Temperature ≤ 34 °C	Once per trip, during hot soak (up to 2400 sec.). No more than 2 unsuccessful attempts between completed tests.	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		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.	When EWMA is , the DTC light is illuminated. The DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 2 additional consecutive trips.	> 0.65 (EWMA Fail Threshold) ≤ 0.35 (EWMA Re-Pass Threshold)	**Conditions for Estimate of Ambient Air Temperature (EAT) to be valid:** **1. Cold Start** Startup delta deg C (ECT-IAT) OR **2. Short Soak and Previous EAT Valid** Previous time since engine off OR **3. Not a Cold Start and Previous EAT Valid and between Short and Long Soak** Previous time since engine off AND Must expire Estimate of Ambient Temperature Valid Conditioning Time. **Please see "P0442: Estimate of Ambient Temperature Valid Conditioning Time" in Supporting Tables Tab.** **4. Not a Cold Start and Previous EAT Not Valid and less than Long Soak** Previous time since engine off AND	 ≤ 8 °C ≤ 7200 seconds 7200 seconds < Time < 25200 seconds Vehicle Speed ≥ 19.9 mph AND Mass Air Flow ≥ 0 g/sec < 25200 seconds		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Must expire maximum value in Estimate of Ambient Temperature Valid Conditioning Time. **Please see "P0442: Estimate of Ambient Temperature Valid Conditioning Time" in Supporting Tables Tab.**	Vehicle Speed ≥ 19.9 mph AND Mass Air Flow ≥ 0 g/sec		
					OR			
					5. Long Soak			
					Previous time since engine off	≥ 25200 seconds		
				Abort Conditions:	**1. High Fuel Volatility**			
					During the volatility phase, pressure in the fuel tank is integrated vs. time. If the integrated pressure is	> -5		
					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			

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 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.		Run/Crank Voltage	11 volts ≤ Voltage ≤ 18 volts	20 failures out of 25 samples 250 ms /sample Continuous with solenoid operation	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
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 Vent Restriction Test: Tank Vacuum for 5 seconds BEFORE Purge Volume 2 liters of fuel must be consumed after setting the DTC active the first time to set the DTC active the second time.	< -623 Pa > 1245 Pa > 2989 Pa ≥ 10 liters	Fuel Level System Voltage Startup IAT Startup ECT BARO No active DTCs:	10% ≤ Percent ≤ 90% 11 volts ≤ Voltage ≤ 18 volts 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C ≥ 70 kPa 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	Type B 2 trips
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	11 volts ≤ Voltage ≤ 18 volts	20 failures out of 25 samples 250 ms / sample Continuous with solenoid operation	Type B 2 trips

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 , 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.	0.2 volts 0.2 volts > 0.73 (EWMA Fail Threshold) ≤ 0.40 (EWMA Re-Pass Threshold)	This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off natural vacuum small leak test. The number of times that it executes can range from zero to two per engine-off period. The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete.	Type A 1 trip 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.
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	is 0.10 seconds	80 failures out of 100 samples 100 ms / sample Continuous	Type B 2 trips
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		80 failures out of 100 samples 100 ms / sample Continuous	Type B 2 trips
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.		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.	Type A 1 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			The abrupt change is defined as a change in vacuum: in the span of 1.0 seconds. A refueling event is confirmed if the fuel level has a persistent change for 30 seconds.	112 Pa < Vacuum < 249 Pa of 10 %			The test will report a failure if 2 out of 3 samples are failures.	
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 BEFORE Tank vacuum 2 liters of fuel must be consumed after setting the DTC active the first time to set the DTC active the second time. <u>Weak Vacuum Follow-up Test</u> (fuel cap replacement test) Weak Vacuum Test failed. Passes if tank vacuum Note: Weak Vacuum Follow-up Test can only report a pass.	> 30 liters ≤ 1993 Pa ≥ 1993 Pa	Fuel Level System Voltage BARO No active DTCs: <u>Cold Start Test</u> If ECT > IAT, Startup temperature delta (ECT-IAT): Cold Test Timer	10% ≤ Percent ≤ 90% 11 volts ≤ Voltage ≤ 18 volts ≥ 70 kPa MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454 ≤ 8 °C ≤ 1000 seconds	Once per cold start Time is dependent on driving conditions Maximum time before test abort is 1000 seconds <u>Weak Vacuum Follow-up Test</u> With large leak detected, the follow-up test is limited to 1300 seconds. Once	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Startup IAT Temperature Startup ECT Weak Vacuum Follow-up Test This test can run following a weak vacuum failure or on a hot restart.	4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C	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 203 miles.	< 3 liters	Engine Running No active DTCs:	 VehicleSpeedSensor_FA	250 ms / sample Continuous	Type B 2 trips
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	11 volts ≤ Voltage ≤ 18 volts	180 failures out of 225 samples 100 ms / sample Continuous	Type B 2 trips
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	11 volts ≤ Voltage ≤ 18 volts	180 failures out of 225 samples 100 ms / sample Continuous	Type B 2 trips
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.		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.	Type A 1 trip

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			An intermittent 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 %			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.	
Cooling Fan 1 Relay Control Circuit (ODM)	P0480	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 Engine Speed	11 volts ≤ Voltage ≤ 18 volts ≥ 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous with fan operation	Type B 2 trips Not used on systems with Mechanical Fan)
Cooling Fan 2 Relay Control Circuit (ODM)	P0481	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 ≤ 18 volts	20 failures out of 25 samples	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Engine Speed	≥ 400 RPM	250 ms / sample Continuous with fan operation	Not used on systems with Mechanical Fan)
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 ≥ 100 seconds (on cold start)	Fuel Level System Voltage BARO Startup IAT Temperature Startup ECT No active DTCs:	10% ≤ Percent ≤ 90% 11 volts ≤ Voltage ≤ 18 volts ≥ 70 kPa 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C 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	Type B 2 trips
Low Engine Speed Idle System	P0506	This DTC will determine if a low idle exists	Filtered Engine Speed Error filter coefficient	< 76.00 rpm 0.00175	Baro Coolant Temp Engine run time Ignition voltage Time since gear change Time since a TCC mode change	> 70 kPa > 60 °C and < 120 °C ≥ 60 sec 18 ≥ volts ≥ 11 ≥ 3 sec > 3 sec	Diagnostic runs in every 12.5 ms loop Diagnostic reports pass or fail in 10 sec once all enable	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					IAT	> -20 °C	conditions are met	
					Vehicle speed	≤ 1.67 mph		
					Commanded RPM delta	≤ 25 rpm		
						PTO not active		
						Transfer Case not in 4WD LowState		
						Off-vehicle device control (service bay control) must not be active.		
					No active DTCs	AmbientAirDefault		
						ECT_Sensor_FA		
						EGRValveCircuit_FA		
						EGRValvePerformance_FA		
						IAT_SensorCircuitFA		
						EvapFlowDuringNonPurge_FA		
						FuelTrimSystemB1_FA		
						FuelTrimSystemB2_FA		
						FuelInjectorCircuit_FA		
						MAF_SensorFA		
						EngineMisfireDetected_FA		
						IgnitionOutputDriver_FA		
						EnginePowerLimited		
						TPS_FA		
						TPS_Performance_FA		
						VehicleSpeedSensor_FA		
						FuelLevelDataFault		
						LowFuelConditionDiagnostic		
						Clutch Sensor FA		
					All of the above met for Idle time	> 5 sec		
High Engine Speed Idle System	P0507	This DTC will determine if a high idle exists	Filtered Engine Speed Error	> -152.00 rpm	Baro	> 70 kPa	Diagnostic runs in	Type B 2 trips
			filter coefficient	0.00175	Coolant Temp	> 60 °C and < 120 °C	every 12.5 ms loop	
					Engine run time	≥ 60 sec	Diagnostic reports	
					Ignition voltage	18 ≥ volts ≥ 11	pass or fail in	
					Time since gear change	≥ 3 sec	10 sec	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Time since a TCC mode change	> 3 sec	once all enable conditions are met	
					IAT	> -20 °C		
					Vehicle speed	≤ 1.67 mph		
					Commanded RPM delta	≤ 25 rpm		
						PTO not active		
						Transfer Case not in 4WD LowState		
						Off-vehicle device control (service bay control) must not be active.		
					No active DTCs	AmbientAirDefault		
						ECT_Sensor_FA		
						EGRValveCircuit_FA		
						EGRValvePerformance_FA		
						IAT_SensorCircuitFA		
						EvapFlowDuringNonPurge_FA		
						FuelTrimSystemB1_FA		
						FuelTrimSystemB2_FA		
						FuelInjectorCircuit_FA		
						MAF_SensorFA		
						EngineMisfireDetected_FA		
						IgnitionOutputDriver_FA		
						EnginePowerLimited		
						TPS_FA		
						TPS_Performance_FA		
						VehicleSpeedSensor_FA		
						FuelLevelDataFault		
						LowFuelConditionDiagnostic		
						Clutch Sensor FA		
					All of the above met for Idle time	> 5 sec		
System Voltage Low	P0562	This DTC determines if the current system voltage is below the minimum required voltage for proper ECM operation.	System voltage	≤ 9 volts	Ignition is “ON”		5 failures out of 6 samples	Special Type C 1 trip
					Engine Speed	≥ 400 RPM	1 second / sample	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
							Continuous	
System Voltage High	P0563	This DTC determines if the current system voltage is above the maximum allowed voltage for proper ECM operation.	System voltage	≥ 18 volts	Ignition is “ON”		5 failures out of 6 samples 1 second / sample Continuous	Special Type C 1 trip
Cruise Control Input Circuit	P0575	Detects rolling count or protection value errors in Cruise Control Switch Status serial data signal	If x of y rolling count / protection value faults occur, disable cruise for duration of fault			Switch architecture CeCRZG_e_CAN is CAN, DTC enable cal 1 is TRUE	10/16 counts	Special Type C 1 trip MIL: NO
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if the calibration check sum is incorrect	1) The Primary Processor's calculated checksum does not match the stored checksum value. Covers all software and calibrations. 2) The Secondary Processor's calculated checksum does not match the stored checksum value. Covers all software and calibrations.	1) 1 failure if the fault is detected during the first pass. 5 failures if the fault occurs after the first pass is complete. 2) 2 failures within the same ROM region.			1) Diagnostic runs continuously in the background 2) Diagnostic runs continuously in the background	Type A 1 trip

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Control Module Not Programmed	P0602	This DTC will be stored if the PCM is a service PCM that has not been programmed.	Output state invalid		PCM State	= crank or run PCM is identified through calibration as a Service PCM	Diagnostic runs at powerup	Type A 1 trip
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up does not match checksum at power-down				Diagnostic runs at powerup Diagnostic reports a fault if 1 failure occurs	Type A 1 trip
ECM RAM Failure	P0604	Indicates that the ECM is unable to correctly read data from or write data to RAM	1. Primary processor data pattern written doesn't match the pattern read for a count >	1 count if found on first memory scan. 5counts if found on subsequent scans.			1. Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously	Type A 1 trip
			2. Secondary processor battery backed RAM failed checksum twice for original values at power up and the defaulted values				2. Completion at initialization, <500 ms	
			3. Secondary processor copy of calibration area to RAM failed for a count >	2counts			3. Completion at initialization, <500 ms	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			4. Secondary Processor data pattern written doesn't match the pattern read consecutive times				4. Will finish within 30 seconds at all engine conditions.	
			5. Secondary Processor TPS or APPS minimum learned values fail compliment check continuously				5. 0.0625sec continuous	
ECM Processor	P0606	Indicates that the ECM has detected an internal processor integrity fault						Type A 1 trip
1. Processor Performance Check - Throttle limiting Fault			When drag is active Secondary processor detects Primary's calculated throttle position is greater > than Secondary Processor calculated Throttle Position by Secondary processor detects Primary's calculated throttle position is greater > than Secondary's calculated Throttle Position when driver is commanding the throttle from APP by	0.00%. 8.12%.		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	1. 0.1875sec in the Secondary Processor	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Secondary processor detects Primary's calculated throttle position is greater > than Secondary's calculated Throttle Position when reduce engine power is active by	44.62%.				
2. Processor Performance Check - ETC software is not executed or it is not executed in in proper order			Software tasks on the Primary Processor in the 12.5 ms loop were not executed or were not executed in the correct order.	0.0625sec continuous		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	2. 0.0625sec continuous	
			Software tasks on the Primary Processor in the 25 ms loop were not executed or were not executed in the correct order.	0.1250sec continuous			0.1250sec continuous	
			Software tasks on the Primary Processor in the 50 ms loop were not executed or were not executed in the correct order.	0.2500sec continuous			0.2500sec continuous	
			Software tasks on the Primary Processor in the 100 ms loop were not executed or were not executed in the correct order.	0.5000sec continuous			0.5000sec continuous	
			Software tasks on the Primary Processor in the 250 ms loop were not executed or were not executed in the correct order.	1.2500sec continuous			1.2500sec continuous	
			The first completion of the RAM diagnostic on the Primary Processor was completed > the amount of time	360.0000sec continuous			360.0000sec continuous	
			The first completion of the ROM diagnostic on the Primary Processor was completed > the amount of time	360.0000sec continuous			360.0000sec continuous	
			Software tasks on the Secondary Processor were not executed or were not executed in the correct order.	Two Consecutive Loops (12.5ms * 2) 25ms			25 ms	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
3. Processor Performance Check - SPI Failure			Loss or invalid message of SPI communication from the Secondary Processor at initialization detected by the Primary Processor or loss or invalid message of SPI communication from the Secondary Processor after a valid message was received by the Primary Processor Loss or invalid message of SPI communication from the Primary Processor at initialization detected by the Secondary Processor or loss or invalid message of SPI communication from the Primary Processor after a valid message was received by the Secondary Processor			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	In the primary processor, 159/400 counts intermittent or 15 counts continuous; 39 counts continuous @ initialization In the secondary processor 0.4750sec at initialization, 0.1750sec continuous or 20/200 intermittent.	
4. Processor Performance Check - Secondary Processor state of health (Main)			Primary processor check of the secondary processor by verifying the hardware line toggle between the two processors toggles within the threshold values	9.3750msec and 15.6250msec		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	9counts continuous at initialization or 9 counts continuous; 12.5 msec /count in the Primary processor	
5. Processor Performance Check - Primary Processor Learn Corruption Fault			Primary Processor TPS or APPS minimum learned values fail compliment check			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	0.1000sec continuous	
6. Processor Performance Check - Primary Processor Clock Fault			The ocillator failed for the Primary processor where the clock is outside the threshold	27.85 kHz and 37.68 kHz		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	100ms continuous	
9. Processor Performance Check - Secondary Processor ALU Fault			The secondary check of the ALU failed to compute the expected result			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	12.5ms continuous	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
10. Processor Performance Check - Secondary Processor Register Configuration Fault			Secondary processor failed configuration check of the registers.			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	12.5ms continuous	
11. Processor Performance Check - Secondary Processor StackFault			Secondary processor checks stack beginning and end point for pattern written at initialization .			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	12.5ms continuous	
12. Processor Performance Check - Secondary Processor MAIN Processor Fault			Secondary processor check that the Primary processor hasn't set a select combination of internal processor faults			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	12.5ms continuous	
13. Processor Performance Check - Primary Processor ALU Fault			The primary processor check of the ALU failed to compute the expected result	Two Consecutive Times			12.5ms continuous	
14. Processor Performance Check - Primary Processor Register Configuration Fault			Primary processor failed configuration check of the registers.				12.5ms continuous	
Main & MHC state of health fault	P0607	Primary state of health (SOH) discrete line is not toggling between the two processors for a time >	0.4875sec			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	0.4875sec continuous	Special Type: C
Control Module Accelerator Pedal Position (APP) System Performance	P060D	Verify that the indicated accelerator pedal position calculation is correct	1. PPS sensor switch fault - When the APP sensor 2 is shorted to ground, the sensor value is >	41		1. Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	Consecutive checks within 200ms or 2/2 counts; 175msec/count	Type: A 1 Trip

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			2. Difference between primary processor indicated accelerator pedal position and secondary indicated accelerator pedal position is >	5		Engine Running TPS minimum learn is not active No Pedal related errors or diagnostic faults. Diagnostic is enabled (Only applicable for Legacy accelerator pedals) 2. Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions Primary processor Pedal Sync Error is FALSE	44/40 counts or 39 counts continuous; 12.5 msec/count in the Secondary processor	
Control Module EEPROM Error	P062F	Indicates that the NVM Error flag has not been cleared	Last EEPROM write did not complete		Ignition State	#NAME?	1 test failure Diagnostic runs once at powerup	Type: A 1 Trip
5 Volt Reference #1 Circuit	P0641	Detects a continuous or intermittent short on the 5 volt reference circuit #1	Primary Processor Vref1 <	4.875		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	19/39 counts or 0.1875sec continuous; 12.5 msec/count in Primary processor	Type: A 1 Trip
			Primary Processor Vref1 >	5.125				

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Secondary Processor Vref1 <	4.875			19/39 counts or 15 counts continuous; 12.5 msec/count in Secondary processor	
			Secondary Processor Vref1 >	5.125				
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 ≤ 18 volts	20 failures out of 25 samples 250 ms / sample Continuous	Type B 2 trips
5 Volt Reference #2 Circuit	P0651	Detects a continuous or intermittent short on the 5 volt reference circuit #2	Primary Processor Vref2 <	4.875		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	19/39 counts or 0.1875sec continuous; 12.5 msec/count in main /Secondary processor	Type: A 1 Trip
			or Primary Processor Vref2 >	5.125				
			Secondary Processor Vref1 <	4.875			19/39 counts or 15 counts continuous; 12.5 msec/count in Secondary processor	
			Secondary Processor Vref1 >	5.125				

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Powertrain Relay Control (ODM)	P0685	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage	11 volts ≤ Voltage ≤ 18 volts	8 failures out of 10 samples 250 ms / sample Continuous	Type B 2 trips
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_Error	5 failures out of 6 samples 1second / sample Stuck Test: 100 ms/ sample Continuous failures ≥ 2 seconds	Type B 2 trips
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 trip
Traction Control Torque Request Circuit	P0856	Determines if torque request from the EBTCM is valid	Serial Communication 2's complement message - ($140 for PPEI2 or $1C9 for PPEI3)		Serial communication to EBTCM (U0108) Power Mode	No loss of communication = Run	Count of 2's complement values not equal >= 20	Special Type C 1 trip

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
				Message <> 2's complement of message	Engine Running	= True		
			OR		Status of traction in GMLAN message ($380 for PPEI2 or $4E9 for PPEI3)		**OR**	
			Serial Communication message ($140 for PPEI2 or $1C9 for PPEI3) rolling count value	Message rolling count value <> previous message rolling count value plus one		= Traction Present	10 rolling count failures out of 10 samples Performed every 25 msec	
Inlet Airflow System Performance	P1101	Determines if there are multiple air induction problems affecting airflow and/or manifold pressure.	Filtered Throttle Model AND (ABS(Measured Flow – Modeled Air Flow) Filtered OR ABS(Measured MAP – MAP Model 1) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered	<= 250 kPa*(g/s) > 15 grams/sec > 25.0 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)	>= 400 RPM <= 6600 RPM > 70 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.50 Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Estimate	Continuous Calculation are performed every Engine Firing Event	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 multiplied by MAP1 Residual Weight Factor based on RPM MAP Model 2 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_SensorCktFP		
O2S Insufficient Switching Bank 1 Sensor 1	P1133	This DTC determines if the O2 sensor is no longer sufficiently switching.	Fault condition present if Half Cycle L/R or R/L Switches are below the threshold. OR If Slope Time 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) OR S/T L/R switches < 5, or S/T R/L switches < 5	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	Sample time is 60 seconds Frequency: Once per trip Green Sensor Delay Criteria The diagnostic will not be enabled until the next	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						EvapEmissionSystem_FA	ignition cycle after the following has been met: 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	
						FuelTankPressureSnsrCkt_FA		
						FuelInjectorCircuit_FA		
						AIR System FA		
						EthanolCompositionSensor_FA		
						EngineMisfireDetected_FA		
					Bank 1 Sensor 1 DTC's not active	= P0131, P0132 or P0134		
					System Voltage	10.0 volts < system voltage< 18.0 volts		
					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		
					O2 Heater on for	>= 40 seconds		
					Learned Htr resistance	= Valid		
					Engine Coolant	> 70 ºC		
					IAT	> -40 ºC		
					Engine Run Time	> 120 seconds		
					Purge duty cycle	>= 0 % duty cycle		
					Engine airflow	14 gps <= engine airflow <= 40 gps		
					Engine speed	1000 <= RPM <= 3500		
					Fuel	< 87 % Ethanol		
					Baro	> 70 kpa		
					Throttle Position	>= 3 %		

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 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	> 3.0 seconds		
Air Fuel Imbalance Bank 1	P1174	Determines if the air-fuel delivery system is imbalanced by monitoring the pre and post catalyst O2 sensor voltage characteristics	[Bank 1 Filtered Length Ratio variable OR Bank 1 AFM Filtered Length Ratio variable (AFM applications only)] 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.	> 0.93 > 0.01 2010 and 10 millivolts	System Voltage	*10 <= V <= 18 for >= 4 seconds*	Frequency: Continuous Monitoring of O2 voltage signal in 12.5ms loop	Type B 2 Trip(s)
		Note: The AFIM Filtered Length Ratio is determined by calculating the difference between the measured O2 voltage length (accumulated O2 voltage over a 2.50 second period) and an emissions-correlated threshold value, divided by the threshold 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 resulting ratio is then filtered utilizing a first-order lag filter.			Engine Run Time	>= 3 seconds	AFIM Filtered Length Ratio variable is updated after every 2.50 seconds of valid data.	
					ECT	> 10 ºC		
					Engine speed	*500 <= rpm <= 4000*		
					Mass Airflow	*6.0 <= g/s <= 600.0*		

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	*< 100 g/s*		
					Note: This protects against false diagnosis during severe transient maneuvers.			
					PerCent Ethanol	<= 100 %		
					Positive (rising) Delta O2 voltage during previous 12.5ms is OR Negative (falling) Delta O2 voltage during previous 12.5ms is	> 5.0 millivolts		
					O2 sensor switches	>= 2 times during current 2.50 second sample period		
					Quality Factor (see **KtOXYD_K_AFIM_QualFactor1** table in "**Supporting Tables**")	> 0 *in the current operating region*		
					For AFM (Cylinder Deactivation) equipped vehicles only	No AFM state change during current 2.50 second sample period.		
					To improve S/N, pre-catalyst O2 voltages between 300 and 600 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.			
					The first report is delayed for 90 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.			
					Closed Loop fueling enabled			
					Fuel System Status	***LONG FT Enabled***		
					No EngineMisfireDetected_FA			
					No MAP_SensorFA			
					No MAF_SensorFA			
					No ECT_Sensor_FA			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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 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			
Cold Start Emissions Reduction System Fault	P1400	Model based test computes power from exhaust flow and thermal energy resulting from elevated idle speed and retarded spark advance. Detects if the cold start emission reduction system has failed resulting in the delivered power being out of range.	Average desired accumulated exhaust power - Average estimated accumulated exhaust power OR Average desired accumulated exhaust power - Average estimated accumulated exhaust power (EWMA filtered)	< -5.50 KJ/s (high RPM failure mode) > 0.20 KJ/s (low RPM failure mode)	**Cold Start Emission Reduction Strategy Is Active. The strategy is considered active if either the Spark cat light off or Idle cat light off strategies are considered active.** **Spark CLO is considered active when the CatLightOffDesiredSparkRetard (function of idle RPM and air per cylinder and scaled based on coolant and engine run time) <= 3.00 degrees of Spark** **Idle CLO is considered active if the desired RPM exceeds a base RPM value (function of coolant) plus an RPM offset. The amount of RPM offset to be considered catalyst light off is also a function of coolant temperature. Refer to "Supporting Tables" for details.**		Runs once per trip when the cold start emission reduction strategy is active Frequency: 100ms Loop Test completes after 14 seconds of accumulated qualified data.	Type A 1 Trip

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Vehicle Speed	< 1.2 MPH		
					Throttle Position	< 1.00 percent		
					A change in throttle position (tip-in/tip-out) will initiate a delay in the calculation of the average qualified residual value. When the delay timer > 5.00 seconds the diagnostic will continue the calculation.			
					For Manual Transmission vehicles, the clutch must be fully engaged. Clutch Pedal Position < 5.00 OR The clutch must be fully disengaged. Clutch Pedal Position > 5.00			
					General Enable			
					DTC's Not Set			
					MAF_SensorFA			
					MAP_SensorFA			
					IAT_SensorCircuitFA			
					IAT2_SensorCircuitFA			
					ECT_Sensor_FA			
					CrankSensorFaultActive			
					IAC_SystemRPM_FA			
					TPS_FA			
					VehicleSpeedSensor_FA			
					EngineMisfireDetected_FA			
					IgnitionOutputDriver_FA			
					ControllerProcessorPerf_FA			
					5VoltReferenceA_FA			
					5VoltReferenceB_FA			
					FuelInjectorCircuit_FA			
					Clutch Sensor FA			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Transmission Engine Speed Request Circuit	P150C	Determines if engine speed request from the TCM is valid	Serial Communication rolling count value Transmission engine speed protection	+ 1 from previous $19D message (PTEI3) not equal to 2's complement of transmission engine speed request + Transmission alive rolling count	Diagnostic enable bit Engine run time # of Protect Errors # of Alive Rolling Errors No idle diagnostic 506/507 code No Serial communication loss to TCM Engine Running Power mode	1 0.5 10 6 IAC_SystemRPM_FA (U0101) = TRUE Run Crank Active	Diagnostic runs in 25 ms loop	Type B 2 trips
Throttle Actuator Control - Position Performance	P1516	1) Detect a throttle positioning error	The throttle model and actual Throttle position differ by > or The throttle model and actual Throttle position differ by >	8.716%. 8.716%.	Engine Running or Ignition Voltage > and Ignition Voltage > and Throttle is being Controlled and Communication Fault (SPI is not set) and TPS minimum learn is not active Ignition voltage failure is false (P1682)	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions 11 5.4	0.1875sec in the Secondary processor	Type: A 1 Trip

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		2) Detect throttle control is driving the throttle in the incorrect direction	Throttle Position >	45.120%.	(Throttle is being Controlled and TPS minimum learn is active) or Reduce Engine Power is Active	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	0.1375sec continuous	
		3) Degraded Motor	Desired throttle position is stable within 0.25% for 4.0000sec and the delta between Indicated throttle position and desired throttle position in greater than 2.00%		Engine Running or Ignition Voltage > and Ignition Voltage > and Throttle is being Controlled and Communication Fault (SPI is not set) and TPS minimum learn is not active Ignition voltage failure is false (P1682)	11 5.4	0.4875sec continuous on secondary processor	
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| >	3.00Volts	Powertrain commanded on and Run/crank voltage > and Run/crank voltage >	Table, f(IAT). See supporting tables 5.5	14/14 counts; 12.5 msec/count in main processor	Type: A 1 Trip

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Control Module Throttle Actuator Position Performance	P2101	1) Detect a throttle positioning error	Difference between measured throttle position and modeled throttle position >	8.72%.	TPS minimum learn is not active and Throttle is being Controlled and	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	1. 15/15 counts; 12.5 msec/count in the primary processor	Type: A 1 Trip
			Difference between measured throttle position and modeled	8.72%.	(Engine Running or Ignition Voltage > or Ignition Voltage >) Ignition voltage failure is false (P1682)	11 5.5		
		2) Detect throttle control is driving the throttle in the incorrect direction or exceed the reduced power limit	Throttle Position >	44.62%.	TPS minimum learn is active		2. 11counts; 12.5 msec/count in the primary processor	
			Throttle Position >	44.42%.	Reduced Power is True			
Throttle return to default	P2119	Throttle unable to return to default throttle position after de-energizing ETC motor.	TPS1 Voltage >	1.94		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	0.4969sec continuous	Type: A 1 Trip
Accelerator Pedal Position (APP) Sensor #1	P2120	Detects a continuous or intermittent short or open in APP1 circuit on the secondary processor but sensor is in range on the primary processor	Secondary APP1 Voltage <	0.463		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	19/39counts or 13counts continuous; 12.5 msec/count in the secondary processor	Type: A 1 Trip
			or Secondary APP1 Voltage >	4.75	No 5 V reference 2 error No 5 V reference 2 fault (P0651)			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Accelerator Pedal Position (APP) Sensor 1 Lo	P2122	Detects a continuous or intermittent short or open in APP1 circuit on both processors or just the primary processor	1. Primary APP1 Voltage <	0.463	No 5 V reference 2 error	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	1. 19/39counts or 14counts continuous; 12.5 msec/count in the primary processor	Type: A 1 Trip
			2. Secondary APP1 Voltage <	0.463	No 5 V reference 2 fault (P0651)		2. 19/39counts or 13counts continuous; 12.5 msec/count in the secondary processor	
Accelerator Pedal Position (APP) Sensor 1 Hi	P2123	Detect a continuous or intermittent short in the APP1 sensor on on both processors or just the primary processor	1. Primary APP1 Voltage >	4.75		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	1. 19/39counts or 14counts continuous; 12.5 msec/count in the primary processor	Type: A 1 Trip
			2. Secondary APP1 Voltage >	4.75	No 5 V reference 2 error No 5 V reference 2 fault (P0651)		2. 19/39counts or 13counts continuous; 12.5 msec/count in the secondary processor	
Accelerator Pedal Position (APP) Sensor 2	P2125	Detects a continuous or intermittent short or open in APP2 circuit on the secondary processor but sensor is in range on the primary processor	Secondary APP2 Voltage <	0.325		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	19/39counts or 13counts continuous; 12.5 msec/count in the secondary processor	Type: A 1 Trip

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			or Secondary APP2 Voltage >	2.6	No 5 V reference 1 error No 5 V reference 1 fault (P0641)			
Accelerator Pedal Position (APP) Sensor 2 Lo	P2127	Detects a continuous or intermittent short or open in APP2 circuit on both processors or just the primary processor	1. Primary APP2 Voltage <	0.325		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	1. 19/39counts or 14counts continuous; 12.5 msec/count in the primary processor	Type: A 1 Trip
			2. Secondary APP2 Voltage <	0.325	No 5 V reference 1 error No 5 V reference 1 fault (P0641)		2. 19/39counts or 13counts continuous; 12.5 msec/count in the secondary processor	
Accelerator Pedal Position (APP) Sensor 2 Hi	P2128	Detect a continuous or intermittent short in the APP2 sensor on on both processors or just the primary processor	1. Primary APP2 Voltage >	2.6	No 5 V reference 1 error	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	1. 19/39 counts or 14counts continuous; 12.5 msec/count in the primary processor	Type: A 1 Trip
			2. Secondary APP2 Voltage >	2.6	No 5 V reference 1 fault (P0641)		2. 19/39counts or 13counts continuous; 12.5 msec/count in the secondary processor	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Throttle Position (TP) Sensor 1-2 Correlation	P2135	Detects a continuous or intermittent correlation fault between TP sensors #1 and #2 on either processor	1. On the Primary processor, the difference between TPS1 displaced and TPS2 displaced >	7.266% offset at min. throttle position with it linearly increasing to 10% at max. throttle position	No TPS Sensor Faults No 5 V reference DTCs	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	79/159 counts or 58 counts continuous; 3.125 msec/count in the primary processor	Type: A 1 Trip
			On the Secondary processor, the difference between TPS1 displaced and TPS2 displaced >	7.27% offset at min. throttle position with it linearly increasing to 10% at max. throttle position				
			2. On the primary processor, the difference between (raw min TPS1) and (raw_min TPS2) >	4.999%.	No TPS Sensor Faults No 5 V reference DTCs	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	19/39 counts or 15 counts continuous; 12.5 msec/count in the secondary processor	
			On the secondary processor, the difference between (raw min TPS1) and (raw_min TPS2) >	5.000%.				

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Accelerator Pedal Position (APP) Sensor 1-2 Correlation	P2138	Detects a continuous or intermittent correlation fault between APP sensors #1 and #2 on either processor	1. On the primary processor, the difference between APP 1 displaced and APP 2 displaced is >	10.001% offset at min. throttle position with it linearly increasing to 10% at max pedal position	No APP Sensor Faults	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	1. 19/39 counts intermittent or 15 counts continuous, 12.5 msec/count in the primary processor	Type: A 1 Trip
			On the secondary processor, the difference between APP 1 displaced and APP 2 displaced is >	10.00% offset at min. throttle position with it linearly increasing to 10% at max pedal position	No 5 V reference DTCs			
			2. On the primary processor, the difference between the learned PPS1 min and PPS2 min >	5.000%.		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	2. 19/39 counts intermittent or 15 counts continuous, 12.5 msec/count in the secondary processor	
			On the primary processor, the difference between the learned PPS1 min and PPS2 min >	5.000%.				
Minimum Throttle Position Not Learned	P2176	TP sensors were not in the minimum learn window after multiple attempts to learn the minimum.	During TPS min learn on the Primary processor, TPS Voltage >	17.200%.		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	2.0secs continuous	Type: A 1 Trip
			or					
			During TPS min learn on the Secondary processor, TPS Voltage >	17.200%.	No TPS circuit errors No TPS circuit faults Ignition voltage failure is false (P1682)			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Minimum TPS learn active			
			and					
			Number of learn attempts >	10counts				
			AND		Throttle de-energized			
			TPS2 Voltage >	1.94	No TPS circuit faults			
			On the Primary processor		PT Relay Voltage >	5.5		
			OR					
			TPS1 Voltage >	1.94				
			AND					
			TPS2 Voltage >	1.94				
			On the Secondary processor					
O2 Sensor Signal Stuck Lean Bank 1 Sensor 2 <NOTE: This is a POPD DTC description, remove this section for POVD applications>	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 cannot achieve the rich threshold voltage. AND The Accumulated mass air flow monitored during the Stuck Lean Voltage Test is greater than the threshold before the above voltage threshold is met.	1) Post O2S signal < 740 mvolts AND 2) Accumulated air flow during stuck lean test > 49 grams.	No Active DTC's B1S2 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 P013A, P013B, P013E, P013F, P2270 or P2271 10.0 volts < system voltage< 18.0 volts = 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. Green Sensor Delay Criteria The diagnostic will not be enabled until the next	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Green O2S Condition Low Fuel Condition Diag Engine Speed to enable test Engine Airflow Vehicle Speed to enable test Closed loop integral 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 All of the above met for at least 1.0 seconds, and then the Force Cat Rich intrusive stage is requested.	= Not Valid = False 1250 <= RPM <= 1950 3 gps <= Airflow <= 12 gps 34.2 mph <= Veh Speed <= 74.6 mph 0.90 <= C/L Int <= 1.07 = TRUE not in control of purge not in estimate mode = enabled = not active = not active = not active >= 120.0 sec 650 ºC <= Cat Temp <= 900 ºC = DFCO possible	ignition cycle after the following has been met: 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	
O2 Sensor Signal Stuck Rich Bank 1 Sensor 2 <NOTE: This is a POPD DTC description, remove this section for POVD applications>	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	Post O2 sensor cannot achieve the lean threshold voltage. AND The Accumulated mass air flow monitored during the Stuck Rich	1) Post O2S signal > 100 mvolts AND 2) Accumulated air flow during stuck rich test > 26 grams.	No Active DTC's	TPS_ThrottleAuthority Defaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		which requests the DFCO mode to achieve the required lean threshold.	Voltage Test is greater than the threshold before the above voltage threshold is met.			AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA	OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	
					B1S2 Failed this key cycle	P013A, P013B, P013E, P013F or P2270		
					System Voltage	10.0 volts < system voltage< 18.0 volts		
					Learned heater resistance	= Valid	Green Sensor Delay Criteria	
					ICAT MAT Burnoff delay	= Not Valid	The diagnostic will not be enabled until the next ignition cycle after the following has been met: 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	
					Green O2S Condition	= Not Valid		
					Low Fuel Condition Diag	= False		
					Engine Speed	1250 <= RPM <= 1950		
					Engine Airflow	3 gps <= Airflow <= 12 gps		
					Vehicle Speed	34.2 mph <= Veh Speed <= 74.6 mph		
					Closed loop integral	0.90 <= C/L Int <= 1.07		
					Closed Loop Active	= TRUE		
					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		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					O2S Heater on Time	>= 120.0 sec		
					Predicted Catalyst temp	650 ºC <= Cat Temp <= 900 ºC		
					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).			
Transmission Control Torque Request Circuit	P2544	Determines if the torque request from the TCM is valid	**Protect error** - Serial Communication message - ($150 - PTEI2, $199 - PTEI3)	Message <> two's complement of message			>= 16 Protect errors during key cycle	Type B 2 trips
			OR					
			Rolling count error - Serial Communication message ($150 - PPEI2, $199 - PPEI3) rolling count value	Message <> previous message rolling count value + one	Diagnostic enabled/disabled	Enabled	>= 6 Rolling count errors out of ten samples	
			OR		Power Mode	= Run		
			RAM Error - Serial Communication message ($150 - PPEI2, $199 - PPEI3)	Trans torque reduction or type request portion of message 2's complement values <>	Engine Running	= True	>= 3 RAM errors during key cycle	
			OR		Run/Crank Active	> 0.50 Sec		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			TCM Requested Torque Increase message $199	> 8192 Nm			>= 3 range out of 10 samples Performed every 12.5 msec	
ECM/PCM Internal Engine Off Timer Performance	P2610	This DTC determines if the engine off timer does not initialize or count properly. Clock rate test: Checks the accuracy of the 1 second timer by comparing it with the 12.5 ms timer	Initial value test: Initial ignition off timer value OR Initial ignition off timer value Clock rate test: Time between ignition off timer increments Time between ignition off timer increments Time since last ignition off timer increment Current ignition off time < old ignition off time Current ignition off timer minus old ignition off timer	< 0 seconds > 10 seconds < 0.8 seconds > 1.2 seconds ≥ 1.375 seconds ≠ 1	ECM is powered down IAT Temperature	-40 °C ≤ Temperature ≤ 125 °C	Initial value test: 3 failures 1.375 sec / sample Clock rate test: 8 failures out of 10 samples 1second / sample test runs once each key-off	Type B 2 trips DTC sets on next key cycle if failure detected
O2Sensor Circuit Range/ Performance Bank 1 Sensor 1	P2A00	This DTC determines if the O2 sensor voltage is not meeting the voltage criteria to enable closed loop fueling.	Closed Loop O2S ready flag A) O2S signal must be 1) O2S signal OR 2) O2S signal To set Closed Loop ready flag Closed Loop O2S ready flag B) Once set to ready O2S cannot be 1) O2S signal AND 2) O2S signal	= False > 550 mvolts < 350 mvolts = True = True > 350 mvolts < 550 mvolts	No Active DTC's System Voltage Engine Speed Engine Airflow Engine Coolant	TPS_ThrottleAuthority Defaulted MAP_SensorFA ECT_Sensor_FA FuelInjectorCircuit_FA P0131, P0151 P0132, P0152 10.0 volts < system voltage< 18.0 volts 500 RPM <= Engine speed <= 3400 RPM 3.2 gps <= Engine Airflow<= 30.0 gps >= 70.0 ºC	200 failures out of 250 samples. Frequency: Continuous 100msec loop	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			for time Then set Closed Loop ready flag	> 5.0 seconds = False	Engine Metal Overtemp Active Converter Overtemp Active	= False = False		
					Fuel State AFM Status	DFCO not active = All Cylinders active		
					Predicted Exhaust Temp (B1S1) Engine run time Fuel Enrichment	>= 0.0 ºC > 100 seconds = Not Active		
					All of the above met for Time	 > 5 seconds		
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures out of these samples	≥ 5 counts ≥ 5 counts	CAN hardware is bus OFF for	≥ 0.0375 seconds	Diagnostic runs in 1000 ms loop	Type B 2 trips
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 many counts out of these samples	12 counts 12 counts	Run/Crank Voltage Power mode is RUN 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 A message has been selected to monitor.	11 volts ≤ Voltage ≤ 18 volts > 3.0000 seconds	The diagnostic runs	Type B 2 trips
Lost Communication With Battery Energy Control Module A	U0111	This DTC monitors for a loss of communication with the battery energy control module.	Message is not received from controller for this many counts out of these samples	12 counts 12 counts	Run/Crank Voltage Power mode is RUN	11 volts ≤ Voltage ≤ 18 volts	The diagnostic runs in the 1000 ms loop	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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 A message has been selected to monitor.	 > 3.0000 seconds		
Lost Communication with Starter/ Generator Control Module	U0120	This DTC monitors for a loss of communication with the starter/generator control module.	Message is not received from controller for this many counts out of these samples	12 counts 12 counts	Run/Crank Voltage Power mode is RUN 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 A message has been selected to monitor.	11 volts ≤ Voltage ≤ 18 volts > 3.0000 seconds	The diagnostic runs in the 1000 ms loop	Type B 2 trips
Lost Communication With Anti-Lock Brake System (ABS) Control Module	U0121	This DTC monitors for a loss of communication with the ABS control module.	Message is not received from controller for this many counts out of these samples	12 counts 12 counts	Run/Crank Voltage Power mode is RUN 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 A message has been selected to monitor.	11 volts ≤ Voltage ≤ 18 volts > 3.0000 seconds	The diagnostic runs in the 1000 ms loop	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
The following codes apply to the other applications within group 8. These diagnostic do not apply to the cert pick.								
Crankshaft Position (CKP)-Camshaft Position (CMP) Correlation Bank 2 Sensor A	P0018	Detects cam to crank misalignment by monitoring if cam sensor pulse for bank 2 sensor A occurs during the incorrect crank position	4 cam sensor pulses more than 10 crank degrees before or 11 crank degrees after nominal position in one cam revolution.		Engine Speed Crankshaft and camshaft position signals are synchronized Cam phaser is in "parked" position No Active DTCs: No Pending DTCs:	< 1200 P0335, P0336 P0345, P0346 5VoltReferenceA_FA 5VoltReferenceB_FA P0346	4 failures out of 5 samples if the engine is being assisted by the starter 25 failures out of 35 samples if the engine is running without assistance from the starter One sample per cam rotation	Type B 2 trips
Crankshaft Position (CKP)-Camshaft Position (CMP) Correlation Bank 2 Sensor B	P0019	Detects cam to crank misalignment by monitoring if cam sensor pulse for bank 2 sensor B occurs during the incorrect crank position	4 cam sensor pulses more than 10 crank degrees before or 11 crank degrees after nominal position in one cam revolution.		Engine Speed Crankshaft and camshaft position signals are synchronized Cam phaser is in "parked" position No Active DTCs: No Pending DTCs:	< 1200 P0335, P0336 P0390, P0391 5VoltReferenceA_FA 5VoltReferenceB_FA P0391	4 failures out of 5 samples if the engine is being assisted by the starter 25 failures out of 35 samples if the engine is running without assistance from the starter	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
							One sample per cam rotation	
Crankshaft - Sprocket Correlation Diagnostic (for intermediate sprocket)	P0016, P0017, P0018 and P0019	On engines with an intermediate sprocket between the crankshaft and the camshafts, this diagnostic detects a timing misalignment between the crankshaft and the sprocket	Bank 1 Cam Sensor A pulses more than 7 crank degrees before or 9 crank degrees after nominal position in one cam revolution. + Bank 1 Cam Sensor B pulses more than 7 crank degrees before or 9 crank degrees after nominal position in one cam revolution. + Bank 2 Cam Sensor A pulses more than 7 crank degrees before or 9 crank degrees after nominal position in one cam revolution. + Bank 2 Cam Sensor B pulses more than 7 crank degrees before or 9 crank degrees after nominal position in one cam revolution.	>= 16	Engine Speed Crankshaft and camshaft position signals are synchronized Cam phasers are in "parked" position No Active DTCs: No Pending DTCs:	< 1200 P0335, P0336 P0340, P0341 P0345, P0346 P0365, P0366 P0390, P0391 5VoltReferenceA_FA 5VoltReferenceB_FA P0341, P0346, P0366, P0391	25 failures out of 35 samples if the engine is running without assistance from the starter One sample per cam rotation	Type B 2 trips
Intake Camshaft Actuator Solenoid Circuit – Bank 2	P0020	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 < 18 Volts	90 failures out of 100 samples 250 ms /sample, continuous	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Intake Camshaft System Performance – Bank 2	P0021	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 2)Cam Position Error > KtPHSD_phi_CamPosErrorLimIc 2 Deg (see Supporting Table)	The following DTC's are NOT active: P0020 IntkCMP B2 Circuit P0345, P0346, Intake B2 Cam sensors P0335, P0336, Crank sensors P0016, P0017, P0018, P0019 Cam to crank rationality Engine is running VVT is enabled Desired camshaft position > 0 Power Take Off (PTO) not active	System Voltage > 11 Volts, and System Voltage < 18 Volts Desired cam position cannot vary more than 3.5 Cam Deg for at least KtPHSD_t_StablePositionTimeIc2 seconds (see Supporting Table) 100 ms /sample	100 failures out of 300 samples	Type B 2 trips
Exhaust Camshaft Actuator Solenoid Circuit – Bank 2	P0023	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 < 18 Volts	90 failures out of 100 samples 250 ms /sample, continuous	Type B 2 trips
Exhaust Camshaft System Performance – Bank 2	P0024	Detects a VVT system error by comparing the desired and actual cam positions when VVT is activated	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive	(Exhaust cam Bank 2)Cam Position Error > KtPHSD_phi_CamPosErrorLimEc 2 Deg (see Supporting Table)	The following DTC's are NOT active: P0023 ExhCMP B2 Circuit P0390, P0391, Exh B2 Cam sensors P0335, P0336, Crank sensors P0016, P0017, P0018, P0019 Cam to crank rationality Engine is running VVT is enabled Desired camshaft position > 0 Power Take Off (PTO) not active	System Voltage > 11 Volts, and System Voltage < 18 Volts Desired cam position cannot vary more than 3.5 Cam Deg for at least KtPHSD_t_StablePositionTimeEc2 seconds (see Supporting Table) 100 ms /sample	100 failures out of 300 samples	Type B 2 trips
Supercharger Bypass Valve Control Circuit	P0033	Electrical Integrity of Supercharger Bypass Valve Control Circuitry	ECM detects that commanded and actual states of output driver do not match		Ignition Voltage Ignition Voltage Engine Speed	>= 11.00 Volts <= 18.00 Volts > 0	20 failures out of 25 samples	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
							1 sample every 250 msec	
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).		Ign Switch position Ignition Voltage Engine Speed	= Crank or Run position 11.0 volts < Ign Voltage < 32.0 volts > 400 RPM	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips
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).		Ign Switch position Ignition Voltage Engine Speed	= Crank or Run position 11.0 volts < Ign Voltage < 32.0 volts > 400 RPM	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips
HO2S Heater Resistance Bank 2 Sensor 1	P0059	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Learned Heater Resistance.	Calculated Heater Resistance < 3.1 ohms -OR- Calculated Heater Resistance > 9.3 ohms	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 ≤ Coolant ≤ 45.0 ºC < 18.0 volts >= 0.17 seconds	Once per valid cold start	Type B 2 trips
HO2S Heater Resistance Bank 2 Sensor 2	P0060	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Learned Heater Resistance.	Calculated Heater Resistance < 3.1 ohms -OR- Calculated Heater Resistance > 9.3 ohms	No Active DTC's Coolant – IAT	ECT_Sensor_FA P2610 IAT_SensorFA < 8.0 ºC	Once per valid cold start	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Engine Soak Time Coolant Temp Ignition Voltage Engine Run Time	> 28800 seconds -30.0 ºC ≤ Coolant ≤ 45.0 ºC < 18.0 volts >= 0.17 seconds		
Barometric Pressure (BARO) - Supercharger Inlet Pressure Correlation (supercharged application)	P006D	Compares baro sensor to the calculated baro estimate (part throttle calculation or unthrottled Supercharger Inlet Pressure)	Difference between baro sensor reading and estimated baro when distance since last estimated baro update OR Difference between baro sensor reading and estimated baro when distance since last estimated baro update	> 15.0 kPa <= 0.01 kilometers > 20.0 kPa > 0.01 kilometers	No Active DTCs:	AmbientAirPressCktFA ECT_Sensor_Ckt_FA IAT_SensorFA MAF_SensorFA AfterThrottlePressureFA_SC TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA	20 failures out of 25 samples 1 sample every 250 msec	Type B 2 trips
Intake Air Temperature Sensor 2 Circuit Performance	P0096	Detects an IAT2 sensor that has stuck in range by comparing to IAT and engine coolant temperature at startup	ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up ECT – Power Up IAT2) > ABS(Power Up ECT – Power Up IAT)	> 20 deg C	Time between current ignition cycle and the last time the engine was running No Active DTCs:	> 28800 seconds ECT_Sensor_FA ECT_Sensor_Ckt_FA IAT_SensorFA	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			AND P0116 is passing			IAT2_SensorFA P0116 Test Aborted = FALSE P0116 Test Complete = TRUE		
Intake Air Temperature Sensor 2 Circuit Low (High Temperature)	P0097	Detects a continuous short to ground in the IAT 2 signal circuit or the IAT 2 sensor	Raw IAT 2 Input	< 48 Ohms (~150 deg C)	Engine Run Time Coolant Temp Vehicle Speed No Active DTCs:	> 10.0 seconds < 150 deg C >= 0 MPH ECT_Sensor_Ckt_FA ECT_Sensor_Ckt_FP VehicleSpeedSensorError	50 failures out of 63 samples 1 sample every 100 msec	Type B 2 trips
Intake Air Temperature Sensor 2 Circuit High (Low Temperature)	P0098	Detects a continuous open circuit in the IAT 2 signal circuit or the IAT 2 sensor	Raw IAT 2 Input	> 420000 Ohms (~-60 deg C)	Engine Run Time Coolant Temp Vehicle Speed Engine Air Flow No Active DTCs:	> 10.0 seconds > -40 deg C <= 320 MPH >= 512 gm/sec ECT_Sensor_Ckt_FA ECT_Sensor_Ckt_FP VehicleSpeedSensorError MAF_SensorFA MAF_SensorFP MAF_SensorTFTKO	50 failures out of 63 samples 1 sample every 100 msec	Type B 2 trips
Mass Air Flow System Performance (supercharged)	P0101	Determines if the MAF sensor is stuck within the normal operating range	See table "Supercharger Intake Flow Rationality Diagnostic Failure Matrix" for combinations of model failures that can set this DTC.		Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	 >= 500 RPM <= 5000 RPM > 70 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.
			Filtered Throttle Model	> 500 kPa/(g/s)		< 0.26		
			AND					
			ABS(Measured Flow – Modeled Air Flow) Filtered	> 21 grams/sec		Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM		
			AND					
			ABS(Measured MAP – MAP Model 1) Filtered	> 22.0 kPa		Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Estimate		
			AND					
			ABS(Measured MAP – MAP Model 2) Filtered	> 16.0 kPa				
			AND					
			ABS(Measured SCIAP – SCIAP Model 1) Filtered	> 17.0 kPa		MAP Model 1 multiplied by MAP1 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost		
			AND					
			ABS(Measured SCIAP – SCIAP Model 2) Filtered	> 24.0 kPa		MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost		
						SCIAP Model 1 multiplied by SCIAP1 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost		
						SCIAP Model 2 multiplied by SCIAP2 Residual Weight Factor based on RPM and		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						Boost Residual Weight Factor based on % of Boost See table "IFRD Residual Weighting Factors". MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensorFA ECT_sensor_FA ECT_Sensor_FP IAT_SensorFA IAT_SensorCircuitFP CylDeacSystemTFTKO IAT2_SensorFA IAT2_SensorCircuitFP SCIAP_SensorCircuitFA SCIAP_SensorCircuitFP AmbientAirDefault_SC		
Manifold Absolute Pressure Sensor Performance (supercharged)	P0106	Determines if the MAP sensor is stuck within the normal operating range	See table "Supercharger Intake Flow Rationality Diagnostic Failure Matrix" for combinations of model failures that can set this DTC.		Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 500 RPM <= 5000 RPM > 70 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.
			Filtered Throttle Model AND ABS(Measured Flow – Modeled Air Flow) Filtered AND ABS(Measured MAP – MAP Model 1) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered AND ABS(Measured SCIAP – SCIAP Model 1) Filtered AND ABS(Measured SCIAP – SCIAP Model 2) Filtered	> 500 kPa/(g/s) > 21 grams/sec > 22.0 kPa > 16.0 kPa > 17.0 kPa > 24.0 kPa		< 0.26 Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Estimate MAP Model 1 multiplied by MAP1 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost SCIAP Model 1 multiplied by SCIAP1 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost SCIAP Model 2 multiplied by SCIAP2 Residual Weight Factor based on RPM and		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						Boost Residual Weight Factor based on % of Boost See table "IFRD Residual Weighting Factors".		
					No Active DTCs:	MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensorFA ECT_sensor_FA ECT_Sensor_FP IAT_SensorFA IAT_SensorCircuitFP CylDeacSystemTFTKO IAT2_SensorFA IAT2_SensorCircuitFP SCIAP_SensorCircuitFA SCIAP_SensorCircuitFP AmbientAirDefault_SC		
Manifold Absolute Pressure Sensor Circuit Low (sensor without deadbands)	P0107	Detects a continuous short to low or open in either the signal circuit or the MAP sensor.	MAP Voltage	< 2.0 % of 5 Volt Range (0.1 Volts = 12.0 kPa)	MAP Model 1 Engine Running OR Engine Cranking No Active DTCs:	> 30.0 kPa TPS_FA TPS_Performance_FA MAF_SensorFA	320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips
Manifold Absolute Pressure Sensor Circuit High (sensor without deadbands)	P0108	Detects an open sensor ground or continuous short to high in either the signal circuit or the MAP sensor.	MAP Voltage	> 97.0 % of 5 Volt Range (4.9 Volts = 202.0 kPa)	MAP Model 1	< 142.0 kPa	320 failures out of 400 samples	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Engine Run Time Engine Running OR Engine Cranking No Active DTCs:	>= Threshold as a function of Engine Coolant Temp See table "MAP/SCIAP Cold Run Time Threshold". TPS_FA TPS_Performance_FA MAF_SensorFA	1 sample every 12.5 msec	
Intake Air Temperature Sensor Circuit Performance	P0111	Detects an IAT sensor that has stuck in range by comparing to IAT2 and engine coolant temperature at startup	ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up ECT – Power Up IAT) > ABS(Power Up ECT – Power Up IAT2) AND P0116 is failing	> 20 deg C	Time between current ignition cycle and the last time the engine was running No Active DTCs:	 > 28800 seconds ECTSensor_FA ECT_Sensor_Ckt_FA IAT_SensorCircuitFA IAT2_SensorCircuitFA P0116 Test Aborted = FALSE P0116 Test Complete = TRUE	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B 2 trips
Throttle Position Sensor Performance (supercharged)	P0121	Determines if the Throttle Position Sensor input is stuck within the normal operating range	See table "Supercharger Intake Flow Rationality Diagnostic Failure Matrix" for combinations of model failures that can set this DTC.		Engine Speed Engine Speed Coolant Temp Coolant Temp	 >= 500 RPM <= 5000 RPM > 70 Deg C < 125 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.
					Intake Air Temp	> -20 Deg C		
					Intake Air Temp	< 100 Deg C		
					Minimum total weight factor (all factors multiplied together)			
			Filtered Throttle Model	> 500 kPa/(g/s)		< 0.26		
			AND					
			ABS(Measured Flow – Modeled Air Flow) Filtered	> 21 grams/sec		Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM		
			AND					
			ABS(Measured MAP – MAP Model 1) Filtered	> 22.0 kPa		Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Estimate		
			AND					
			ABS(Measured MAP – MAP Model 2) Filtered	> 16.0 kPa				
			AND					
			ABS(Measured SCIAP – SCIAP Model 1) Filtered	> 17.0 kPa		MAP Model 1 multiplied by MAP1 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost		
			AND					
			ABS(Measured SCIAP – SCIAP Model 2) Filtered	> 24.0 kPa		MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost		
						SCIAP Model 1 multiplied by SCIAP1 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						SCIAP Model 2 multiplied by SCIAP2 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost See table "IFRD Residual Weighting Factors".		
					No Active DTCs:	MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensorFA ECT_sensor_FA ECT_Sensor_FP IAT_SensorFA IAT_SensorCircuitFP CylDeacSystemTFTKO IAT2_SensorFA IAT2_SensorCircuitFP SCIAP_SensorCircuitFA SCIAP_SensorCircuitFP AmbientAirDefault_SC		
Supercharger Inlet Absolute Pressure (SCIAP) Sensor Performance	P012B	Determines if the Supercharger Inlet Absolute Pressure Sensor input is stuck within the normal operating range	See table "Supercharger Intake Flow Rationality Diagnostic Failure Matrix" for combinations of model failures that can set this DTC.		Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	 >= 500 RPM <= 5000 RPM > 70 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.
			Filtered Throttle Model AND ABS(Measured Flow – Modeled Air Flow) Filtered AND ABS(Measured MAP – MAP Model 1) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered AND ABS(Measured SCIAP – SCIAP Model 1) Filtered AND ABS(Measured SCIAP – SCIAP Model 2) Filtered	> 500 kPa/(g/s) > 21 grams/sec > 22.0 kPa > 16.0 kPa > 17.0 kPa > 24.0 kPa		< 0.26 Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Estimate MAP Model 1 multiplied by MAP1 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost SCIAP Model 1 multiplied by SCIAP1 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost SCIAP Model 2 multiplied by SCIAP2 Residual Weight Factor		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						based on RPM and Boost Residual Weight Factor based on % of Boost See table "IFRD Residual Weighting Factors".		
					No Active DTCs: MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensorFA ECT_sensor_FA ECT_Sensor_FP IAT_SensorFA IAT_SensorCircuitFP CylDeacSystemTFTKO IAT2_SensorFA IAT2_SensorCircuitFP SCIAP_SensorCircuitFA SCIAP_SensorCircuitFP AmbientAirDefault_SC			
Supercharger Inlet Absolute Pressure (SCIAP) Sensor Performance	P012B	Determines if the Supercharger Inlet Absolute Pressure Sensor input is stuck within the normal operating range	See table "Supercharger Intake Flow Rationality Diagnostic Failure Matrix" for combinations of model failures that can set this DTC.		Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 500 RPM <= 5000 RPM > 70 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.
			Filtered Throttle Model AND ABS(Measured Flow – Modeled Air Flow) Filtered AND ABS(Measured MAP – MAP Model 1) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered AND ABS(Measured SCIAP – SCIAP Model 1) Filtered AND ABS(Measured SCIAP – SCIAP Model 2) Filtered	> 500 kPa/(g/s) > 21 grams/sec > 22.0 kPa > 16.0 kPa > 17.0 kPa > 24.0 kPa		< 0.26 Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Estimate MAP Model 1 multiplied by MAP1 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost SCIAP Model 1 multiplied by SCIAP1 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost SCIAP Model 2 multiplied by SCIAP2 Residual Weight Factor		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						based on RPM and Boost Residual Weight Factor based on % of Boost See table "IFRD Residual Weighting Factors".		
					No Active DTCs:	MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensorFA ECT_sensor_FA ECT_Sensor_FP IAT_SensorFA IAT_SensorCircuitFP CylDeacSystemTFTKO IAT2_SensorFA IAT2_SensorCircuitFP SCIAP_SensorCircuitFA SCIAP_SensorCircuitFP AmbientAirDefault_SC		
Supercharger Inlet Absolute Pressure (SCIAP) Sensor Circuit Low (sensor without deadbands)	P012C	Detects a continuous short to low or open in either the signal circuit or the SCIAP sensor.	SCIAP Voltage	< 2.0 % of 5 Volt Range (0.1 Volts = 12.2 kPa)	MAP Model 1 Engine Running OR Engine Cranking No Active DTCs:	> 40.0 kPa TPS_FA TPS_Performance_FA MAF_SensorFA	320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips
Supercharger Inlet Absolute Pressure (SCIAP) Sensor Circuit High (sensor without	P012D	Detects an open sensor ground or continuous short to high in either the signal circuit or the SCIAP	SCIAP Voltage	> 98.0 % of 5 Volt Range (4.9 Volts = 102.9 kPa)	MAP Model 1	< 80.0 kPa	320 failures out of 400 samples	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
deadbands)		sensor.			Engine Run Time Engine Running OR Engine Cranking No Active DTCs:	>= Threshold as a function of Engine Coolant Temp See table "MAP/SCIAP Cold Run Time Threshold". TPS_FA TPS_Performance_FA MAF_SensorFA	1 sample every 12.5 msec	
O2S Circuit High Voltage Bank 1 Sensor 2	P0138	This DTC determines if the O2 sensor circuit is shorted to high.	Measure Oxygen Sensor Signal.	> 175 mvolts	System Voltage Engine Run Time All Fuel Injectors for active Cylinders Fuel State **All of the above met for** Time	10.0 volts < system voltage< 18.0 volts >=200 sec Disabled (Off) DFCO active > 3 seconds	80 failures out of 100 samples Frequency: Continuous in 100 milli - second loop	Type B 2 trips
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 is greater than the threshold. OR The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds) is greater than the airflow threshold.	1) B1S2 EWMA normalized integral value > 8.0 units OR 2) Accumulated air flow during slow rich to lean test > 32 grams (upper threshold is 450 mvolts and lower threshold is 150 mvolts)	No Active DTC's	TPS_ThrottleAuthority Defaulted ECT_Sensor_FA	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	Type A 1 trip EWMA

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA		
					B2S2 Failed this key cycle	P013D, P014A, P014B, P2272 or P2273		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					Learned heater resistance	= Valid	Green Sensor Delay Criteria	
					ICAT MAT Burnoff delay	= Not Valid	The diagnostic will not be enabled until the next ignition cycle after the following has been met: 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	
					Green O2S Condition	= Not Valid		
					Low Fuel Condition Diag	= False		
					Post fuel cell	= enabled		
					DTC's Passed	= P2270 (and P2272 (if applicable))		
					DTC's Passed	= P013E (and P014A (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 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 is greater than the threshold. OR The Accumulated mass air flow monitored during the Slow Response Test (between the lower and upper voltage thresholds) is greater than the airflow threshold.	1) B1S2 EWMA normalized integral value > 8.0 units OR 2) Accumulated air flow during slow lean to rich test > 100 grams (lower threshold is 350 mvolts and upper threshold is 600 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	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, 10.0 volts < system = Valid = Not Valid = Not Valid = False	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed Green Sensor Delay Criteria The diagnostic will not be enabled until the next ignition cycle after the following has been met: Airflow greater than	Type A 1 trip EWMA

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Post fuel cell DTC's Passed DTC's Passed DTC's Passed DTC's Passed DTC's Passed After above conditions are met: Fuel Enrich mode continued.	= enabled = P2270 (and P2272 (if applicable)) = P013E (and P014A (if applicable)) = P013A (and P013C (if applicable)) = P2271 (and P2273 (if applicable)) = P013F (and P014B (if applicable))	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	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
O2 Sensor Delayed Response Rich to Lean Bank 2 Sensor 2	P014A	This DTC determines if the post catalyst O2 sensor has an initial delayed response to an A/F change from Rich to Lean. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	Post O2 sensor cannot go below the threshold voltage. AND The Accumulated mass air flow monitored during the Delayed Response Test is greater than the threshold.	1) Post O2S signal > 450 mvolts AND 2) Accumulated air flow during stuck rich test > 30 grams.	No Active DTC's		Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	Type B 2 trips
						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		
					B2S2 Failed this key cycle	P013C, P013D, P014B, P2272 or		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					Learned heater resistance	= Valid	Green Sensor Delay Criteria	
					ICAT MAT Burnoff delay	= Not Valid	The diagnostic will not be enabled until the next ignition cycle after the following has	
					Green O2S Condition	= Not Valid		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Low Fuel Condition Diag Post fuel cell DTC's Passed After above conditions are met: DFCO mode entered (wo driver initiated pedal input).	= False = enabled = P2270 and P2272 (if applicable)	been met: 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	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
O2 Sensor Delayed Response Lean to Rich Bank 2 Sensor 2	P014B	This DTC determines if the post catalyst O2 sensor has an initial delayed response to an A/F change from Lean to Rich. The diagnostic is an intrusive test which increases the delivered A/F ratio to achieve the required rich threshold.	Post O2 sensor cannot go above the threshold voltage. AND The Accumulated mass air flow monitored during the Delayed Response Test is greater than the threshold.	1) Post O2S signal < 350 mvolts AND 2) Accumulated air flow during Lean to Rich test > 110 grams.	No Active DTC's		Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	Type B 2 trips
						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		
					B2S2 Failed this key cycle	P013C, P013D, P014A, P2272 or		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					Learned heater resistance	= Valid	Green Sensor Delay Criteria	
					ICAT MAT Burnoff delay	= Not Valid	The diagnostic will not be enabled until the next ignition cycle after the following has	
					Green O2S Condition	= Not Valid		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Low Fuel Condition Diag Post fuel cell DTC's Passed DTC's Passed DTC's Passed DTC's Passed After above conditions are met: Fuel Enrich mode entered.	= False = enabled = P2270 (and P2272 (if applicable)) = P013E (and P014A (if applicable)) = P013A (and P013C (if applicable)) = P2271 (and P2273 (if applicable))	been met: 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	
O2S Circuit Low Voltage Bank 2 Sensor 1	P0151	This DTC determines if the O2 sensor circuit is shorted to low.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is < 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	380 failures out of 475 samples Frequency: Continuous in 100 milli - second loop	Type B 2 trips

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 intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					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		
					Equivalence Ratio	0.9199 ≤ equiv. ratio ≤ 1.0801		
					Throttle Position	2 % <= Throttle <= 45 %		
					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			
					Time	> 2.0 seconds		
O2S Circuit High Voltage Bank 2 Sensor 1	P0152	This DTC determines if the O2 sensor circuit is shorted to high.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is > 1050 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted	100 failures out of 125 samples	Type B 2 trips
						MAP_SensorFA		
						MAF_SensorFA		
						EvapPurgeSolenoidCircuit_FA	Frequency: Continuous in 100	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						EvapFlowDuringNonPurge_FA	milli - second loop	
						EvapVentSolenoidCircuit_FA		
						EvapSmallLeak_FA		
						EvapEmissionSystem_F		
						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 < system voltage< 32.0 volts		
					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		
					Equivalence Ratio	0.9199 ≤ equiv. ratio ≤ 1.0801		
					Throttle Position	0.0 % <= Throttle <= 45.0 %		
					Fuel Control State	= Closed Loop		
					Fuel Control State	not = Power Enrichment		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel State	DFCO not active		
					Fuel Condition	Ethanol <= 87%		
					All of the above met for			
					Time	> 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 calculated 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 = P0151, P0152 or P0154	Sample time is 60 seconds Frequency: Once per trip Green Sensor Delay Criteria The diagnostic will not be enabled until the next ignition cycle after the following has been met: 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	Type B 2 trips
					Bank 2 Sensor 1 DTC's not active			
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					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		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					O2 Heater on for	>= 40 seconds		
					Learned Htr resistance	= Valid		
					Engine Coolant	> 50 ºC		
					IAT	> -40 ºC		
					Engine Run Time	> 120 seconds		
					Time since any AFM status change	> 1.5 seconds		
					Time since Purge On to Off change	> 0.0 seconds		
					Time since Purge Off to On change	> 1.5 seconds		
					Purge duty cycle	>= 0 % duty cycle		
					Engine airflow	15 gps <= engine airflow <= 45 gps		
					Engine speed	1250 <= RPM <= 2550		
					Fuel	< 87 % Ethanol		
					Baro	> 70 kpa		
					Throttle Position	>= 5 %		
					Low Fuel Condition Diag	= False		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					LTM fuel cell	= Enabled		
					Transient Fuel Mass	<= 2.5 mgrams		
					Baro	= Not Defaulted		
					Fuel Control State	not = Power Enrichment		
					Fuel State	DFCO not active		
					Commanded Proportional Gain	>= 0.0 %		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					All of the above met for			
					Time	> 4.5 seconds		
O2S Circuit Insufficient Activity Bank 2 Sensor 1	P0154	This DTC determines if the O2 sensor circuit is open.	Measure Oxygen Sensor Signal.	380 mvolts < Oxygen Sensor signal < 520 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted MAF_SensorFA EthanolCompositionSensor_FA	400 failures out of 500 samples. Minimum of 0 delta TPS changes required to report fail. Delta TPS is incremented when the TPS % change >= 3.0 % Frequency: Continuous 100msec loop	Type B 2 trips
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					AFM Status	= All Cylinders active		
					Heater Warm-up delay	= Complete		
					Predicted Exhaust Temp (by location)	= Wamed Up		
					Engine Run Time	> 124 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.	Measured Heater Current.	Measured Heater current < 0.3 amps -OR- Measured Heater current > 1.5 amps	No Active DTC's	ECT_Sensor_FA	8 failures out of 10 samples Frequency: 1 tests per trip 10 seconds delay between tests and 1 second execution rate	Type B 2 trips
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					Heater Warm-up delay	= Complete		
					O2S Heater device control	= Not active		
					B1S1 O2S Heater Duty Cycle	> zero		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					All of the above met for			
					Time	> 120 seconds		
O2S Circuit Low Voltage Bank 2 Sensor 2	P0157	This DTC determines if the O2 sensor circuit is shorted to low.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is < 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	Type B 2 trips
					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 < system voltage< 32.0 volts		
					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		
					Equivalence Ratio	0.9199 ≤ equiv. ratio ≤ 1.0801		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Throttle Position	2 % <= Throttle <= 45 %		
					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			
					Time	> 4.0 seconds		
O2S Circuit High Voltage Bank 2 Sensor 2	P0158	This DTC determines if the O2 sensor circuit is shorted to high.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is > 1050 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted	100 failures out of 125 samples	Type B 2 trips
						MAP_SensorFA		
						MAF_SensorFA		
						EvapPurgeSolenoidCircuit_FA	Frequency: Continuous in 100 milli - second loop	
						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 < system voltage< 32.0 volts		
					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	0.9199 ≤ equiv. ratio ≤ 1.0801		
					Throttle Position	2.5 % <= Throttle <= 45.0 %		
					Fuel Control State	= Closed Loop		
					Fuel Control State	not = Power Enrichment		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel State	DFCO not active		
					Fuel Condition	Ethanol <= 87%		
					All of the above met for			
					Time	> 4 seconds		
O2S Circuit Insufficient Activity Bank 2 Sensor 2	P0160	This DTC determines if the O2 sensor circuit is open.	Measure Oxygen Sensor Signal.	380 mvolts < Oxygen Sensor signal < 520 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted MAF_SensorFA EthanolCompositionSensor_FA	621 failures out of 740 samples.	Type B 2 trips
					System Voltage	10.0 volts < system voltage< 32.0 volts	Minimum of 1 delta TPS changes required to report fail. Delta TPS is incremented when the TPS % change >= 3.0 %	
					AFM Status	= All Cylinders active		
					Heater Warm-up delay	= Complete		
					Predicted Exhaust Temp (by location)	= Wamed Up		
					Engine Run Time	> 124 seconds		
					Fuel	<= 87 % Ethanol		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
							Frequency: Once per trip for post sensors 100msec loop	
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.	Measured Heater Current.	Measured Heater current < 0.3 amps -OR- Measured Heater current > 1.5 amps	No Active DTC's	ECT_Sensor_FA	8 failures out of 10 samples Frequency: 1 tests per trip 10 seconds delay between tests and 1 second execution rate	Type B 2 trips
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					Heater Warm-up delay	= Complete		
					O2S Heater device control	= Not active		
					B1S1 O2S Heater Duty Cycle	> zero		
					All of the above met for			
					Time	> 120 seconds		
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	≥ **Long Term Trim Lean** Table	Engine speed	400 <rpm< 7000	> 100 ms Frequency: Continuous Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during 89 % 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.	Type B 2 Trip(s)
					BARO	> 70 kPa		
					Coolant Temp	-38 <°C< 150		
					MAP	10 <kPa< 255		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Inlet Air Temp	-20 <°C< 150		
					MAF	1.0 <g/s< 510.0		
					VSS	< 186 mph		
					Fuel Level	> 10 % or if fuel sender is faulty		
					Long Fuel Trim data accumulation:	> 40 seconds of data must accumulate on each trip, with at least 10 seconds of data in the current fuel trim cell before a pass or fail decision can be made.		
					Closed loop fueling Enabled A Function of Coolant Temperature based on Start-up coolant temp. and a function of Time also based on Start-up coolant temp. **Please see "Supporting Tables" Tab**			
					Long Fuel Trim enabled	Closed Loop Enabled and coolant temp > 50 and < 120		
				disable	Engine speed	rpm< 400 or rpm> 7000		
				conditions:	Fuel Level	< 10 % for at least 30 seconds		
					EGR Flow Diag. Intrusive Test Active			
					Catalyst Monitor Diag. Intrusive Test Active			
					Post O2 Diag. Intrusive Test Active			
					Device Control Active			
					EVAP Diag. “tank pull down” portion of the test Active			
					fuel trim metric updated during decels? Yes			
					No active DTCs:	IAC_SystemRPM_FA		
						MAP_SensorFA		
						MAF_SensorFA		
						MAF_SensorTFTKO		
						AIR System FA		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						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_NA		
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 different, yet related tests that are used to determine a Rich fault, they are Passive and Intrusive and are described below:			BARO Coolant Temp MAP IAT MAF VSS Fuel Level Long Fuel Trim data accumulation: **Closed loop fueling Enabled** A Function of Coolant Temperature based on Start-up coolant temp. and a function of Time also based on Start-up coolant temp. **Please see "Supporting Tables" Tab**	> 70 kPa -38 <°C< 150 10 <kPa< 255 -20 <°C< 150 1.0 <g/s< 510.0 < 186 mph > 10 % or if fuel sender is faulty > 40 seconds of data must accumulate on each trip, with at least 10 seconds of data in the current fuel trim cell before a pass or fail decision can be made.	> 100 ms Frequency: Continuous	Type B 2 Trip(s)

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Long Fuel Trim enabled	Closed Loop Enabled and coolant temp > 50 and < 120		
		Passive Test: Non-purge cells are monitored to determine if a rich condition exists.	The filtered Non-Purge Long Term Fuel Trim metric	≤ **Non Purge Rich Limit** Table				
		Intrusive Test- When the Purge Long Term fuel trim metric is ≤ **the Purge Rich Limit Table,** Purge is ramped off to determine if excess purge vapor is the cause of the Rich condition. If the filtered Purge-on Long Term fuel trim > **Purge Rich Limit Table** the test passes without checking the Non-Purge Long Term fuel trim metric.	If the Purge Long Term Fuel Trim metric AND The filtered Non-Purge Long Term Fuel Trim metric	≤ **Purge Rich Limit** Table ≤ **Non Purge Rich Limit** Table		Passive Test decision cannot be made. A passive decision cannot be made when Purge is enabled.	Fail determinations require that the Malfunction Criteria be satisfied for 2 out of 3 intrusive segments.	
			Segment Definition - Segments can last up to 60, and are separated by the lesser of 20 seconds of purge-on time or enough time to purge 6 grams of vapor. A maximum of 3 completed segments or 20 intrusive 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. Performing intrusive tests too frequently may also affect EVAP and EPAIII emissions, and the execution frequency of other diagnostics.					

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
				disable	Engine speed	rpm< 400 or rpm> 7000	Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during 89 % 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.	
				conditions:	EGR Flow Diag. Intrusive Test Not Active			
					Fuel Level	< 10 % for at least 30 seconds		
					Catalyst Monitor Diag. Intrusive Test Not Active			
					Post O2 Diag. Intrusive Test Not Active			
					Device Control Not Active			
					EVAP Diag. “tank pull down” portion of the test Not Active			
					fuel trim metric updated during decels? Yes			
					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		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						FuelTankPressureSensorCircuit_FA Ethanol Composition Sensor FA FuelInjectorCircuit_FA EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit_FA MAP_EngineVacuumStatus AmbientAirDefault_NA		
Fuel System Too Lean Bank 1 (LONG TERM AND SHORT TERM)	P0171	Determines if the fuel control system is in a lean condition, based on the filtered combined fuel trim correction of the long-term fuel trim and the short-term fuel trim.	The filtered combined fuel trim metric. Before a pass or fail decision can be made. Greater than 55 seconds of data must accumulate on each trip, with at least 10 seconds of data in the current fuel trim cell and the short term fuel trim is stable (at least 10.0 seconds since the last fuel trim cell change or the short fuel trim has not changed by more than 0.04 in the past 3.0 seconds.) OR Greater than 10 seconds of data must accumulate on each trip, with at least 0 seconds of data in the current fuel trim cell and the combined fuel trim is stable (it has not changed by more than 0.04 in 4.0 seconds.)	> **Combined Fuel Trim Lean Threshold Table**	Engine speed BARO Coolant Temp MAP Inlet Air Temp MAF VSS Fuel Level Long Fuel Trim data accumulation:	400 <rpm< 6000 > 70 kPa -38 <°C< 150 5 <kPa< 255 -20 <°C< 150 0.5 <g/s< 510.0 < 255 mph > 10 % or if fuel sender is faulty > 55 seconds of data must accumulate on each trip, with at least 10 seconds of data in the current fuel trim cell before a pass or fail decision can be made.	> 100 ms Frequency: Continuous Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during 90 % 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.	Type B 2 Trip(s)
					Closed loop fueling Enabled A Function of Coolant Temperature based on Start-up coolant temp. and a function of Time also based on Start-up coolant temp. **Please see "Supporting Tables" Tab**			
					Long Fuel Trim enabled	Closed Loop Enabled and coolant temp > -10 and < 120		
				disable **conditions:**	Engine speed Fuel Level EGR Flow Diag. Intrusive Test Active	rpm< 400 or rpm> 6000 < 10 % for at least 30 seconds		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Catalyst Monitor Diag. Intrusive Test Active Post O2 Diag. Intrusive Test Active Device Control Active EVAP Diag. “tank pull down” portion of the test Active fuel trim metric updated during decels? NO 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 FuelInjectorCircuit_FA EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit_FA MAP_EngineVacuumStatus AmbientAirDefault_NA		
Fuel System Too Rich Bank 1 (LONG TERM AND SHORT TERM)	P0172	Determines if the fuel control system is in a rich condition, based on the filtered combined fuel trim correction of the long-term fuel trim and the short-term fuel trim. There are two different, yet related tests that are used to determine a Rich fault, they are Passive and Intrusive and are described below:	Before a Passive or an Intrusive test pass or fail decision can be made. Greater than 55 seconds of data must accumulate on each trip, with at least 10 seconds of data in the current fuel trim cell and the short term fuel trim is stable (at least 10.0 seconds since the last fuel trim cell change or the short fuel trim has not changed by more than 0.04 in the past 3.0 seconds.) OR Greater than 10 seconds of data must accumulate on each trip, with at least 0 seconds of data in the current fuel trim cell and the combined fuel trim is stable (it has not changed by more than 0.04 in 4.0 seconds.)		BARO Coolant Temp MAP IAT MAF VSS Fuel Level	> 70 kPa -38 <°C< 150 5 <kPa< 255 -20 <°C< 150 0.5 <g/s< 510.0 < 255 mph < 10 % for at least 30 seconds		Type B 2 Trip(s)

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Long Fuel Trim data accumulation:	> 55 seconds of data must accumulate on each trip, with at least 10 seconds of data in the current fuel trim cell before a pass or fail decision can be made.		
					Closed loop fueling Enabled A Function of Coolant Temperature based on Start-up coolant temp. and a function of Time also based on Start-up coolant temp. **Please see "Supporting Tables" Tab**			
					Long Fuel Trim enabled	Closed Loop Enabled and coolant temp > -10 and < 120		
		Passive Test: Non-purge cells are monitored to determine if a rich condition exists.	The filtered Combined Non-Purge Fuel Trim metric	≤ **Combined Non-Purge Rich Limit** Table			> 100 ms Frequency: Continuous	
		Intrusive Test- When the filtered Combined Purge-On Fuel Trim metric is ≤ **the Combined Purge-On Rich Limit Table,** Purge is ramped off to determine if excess purge vapor is the cause of the Rich condition. If the filtered Combined Purge-on Fuel Trim metric > **Combined Purge-On Rich Limit Table** the test passes without checking the Combined Non-Purge Fuel Trim metric.	If the Combined Purge-On Fuel Trim metric AND The filtered Combined Non-Purge Fuel Trim metric	≤ **Combined Purge-On Rich Limit** Table ≤ **Combined Non-Purge Rich Limit**Table		Passive Test decision cannot be made. A passive decision cannot be made when Purge is enabled.	Fail determinations require that the Malfunction Criteria be satisfied for 2 out of 3 intrusive segments.	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Segment Definition - Segments can last up to 60, and are separated by the lesser of 10 seconds of purge-on time or enough time to purge 5 grams of vapor. A maximum of 3 completed segments or 20 intrusive 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. Performing intrusive tests too frequently may also affect EVAP and EPAIII emissions, and the execution frequency of other diagnostics.					
				disable **conditions:**	Engine speed EGR Flow Diag. Intrusive Test Not Active Fuel Level Catalyst Monitor Diag. Intrusive Test Not Active Post O2 Diag. Intrusive Test Not Active Device Control Not Active EVAP Diag. “tank pull down” portion of the test Not Active fuel trim metric updated during decels? NO No active DTCs:	rpm< 400 or rpm> 6000 < 10 % for at least 30 seconds 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 FuelInjectorCircuit_FA	Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during 90 % 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.	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit_FA MAP_EngineVacuumStatus AmbientAirDefault_NA		
Fuel System Too Lean Bank 2 (LONG TERM AND SHORT TERM)	P0174	Determines if the fuel control system is in a lean condition, based on the filtered combined fuel trim correction of the long-term fuel trim and the short-term fuel trim.	The filtered combined fuel trim metric.	> **Combined Fuel Trim Lean Threshold Table**	Engine speed BARO Coolant Temp MAP Inlet Air Temp MAF VSS Fuel Level Long Fuel Trim data accumulation:	400 <rpm< 6000 > 70 kPa -38 <°C< 150 5 <kPa< 255 -20 <°C< 150 0.5 <g/s< 510.0 < 255 mph > 10 % or if fuel sender is faulty > 55 seconds of data must accumulate on each trip, with at least 10 seconds of data in the current fuel trim cell before a pass or fail decision can be made.	> 100 ms Frequency: Continuous Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during 90 % 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.	Type B 2 Trip(s)
			Before a pass or fail decision can be made. Greater than 55 seconds of data must accumulate on each trip, with at least 10 seconds of data in the current fuel trim cell and the short term fuel trim is stable (at least 10.0 seconds since the last fuel trim cell change or the short fuel trim has not changed by more than 0.04 in the past 3.0 seconds.) OR Greater than 10 seconds of data must accumulate on each trip, with at least 0 seconds of data in the current fuel trim cell and the combined fuel trim is stable (it has not changed by more than 0.04 in 4.0 seconds.)		**Closed loop fueling Enabled** A Function of Coolant Temperature based on Start-up coolant temp. and a function of Time also based on Start-up coolant temp. **Please see "Supporting Tables" Tab**			
					Long Fuel Trim enabled	Closed Loop Enabled and coolant temp > -10 and < 120		
				disable **conditions:**	Engine speed Fuel Level	rpm< 400 or rpm> 6000 < 10 % for at least 30 seconds		
					EGR Flow Diag. Intrusive Test Active			
					Catalyst Monitor Diag. Intrusive Test Active			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Post O2 Diag. Intrusive Test Active Device Control Active EVAP Diag. “tank pull down” portion of the test Active fuel trim metric updated during decels? NO 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 FuelInjectorCircuit_FA EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit_FA MAP_EngineVacuumStatus AmbientAirDefault_NA		
Fuel System Too Rich Bank 2 (LONG TERM AND SHORT TERM)	P0175	Determines if the fuel control system is in a rich condition, based on the filtered combined fuel trim correction of the long-term fuel trim and the short-term fuel trim. There are two different, yet related tests that are used to determine a Rich fault, they are Passive and Intrusive and are described below:	Before a Passive or an Intrusive test pass or fail decision can be made. Greater than 55 seconds of data must accumulate on each trip, with at least 10 seconds of data in the current fuel trim cell and the short term fuel trim is stable (at least 10.0 seconds since the last fuel trim cell change or the short fuel trim has not changed by more than 0.04 in the past 3.0 seconds.) OR Greater than 10 seconds of data must accumulate on each trip, with at least 0 seconds of data in the current fuel trim cell and the combined fuel trim is stable (it has not changed by more than 0.04 in 4.0 seconds.)		BARO Coolant Temp MAP IAT MAF VSS Fuel Level Long Fuel Trim data accumulation:	> 70 kPa -38 <°C< 150 5 <kPa< 255 -20 <°C< 150 0.5 <g/s< 510.0 < 255 mph < 10 % for at least 30 seconds > 55 seconds of data must accumulate on each trip, with at least 10 seconds of data in the current fuel trim cell before a pass or fail decision can be made.		Type B 2 Trip(s)

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Closed loop fueling Enabled A Function of Coolant Temperature based on Start-up coolant temp. and a function of Time also based on Start-up coolant temp. **Please see "Supporting Tables" Tab**			
					Long Fuel Trim enabled	Closed Loop Enabled and coolant temp > -10 and < 120		
		Passive Test: Non-purge cells are monitored to determine if a rich condition exists.	The filtered Combined Non-Purge Fuel Trim metric	≤ **Combined Non-Purge Rich Limit** Table			> 100 ms Frequency: Continuous	
		Intrusive Test- When the filtered Combined Purge-On Fuel Trim metric is ≤ **the Combined Purge-On Rich Limit Table,** Purge is ramped off to determine if excess purge vapor is the cause of the Rich condition. If the filtered Combined Purge-on Fuel Trim metric > **Combined Purge-On Rich Limit Table** the test passes without checking the Combined Non-Purge Fuel Trim metric.	If the Combined Purge-On Fuel Trim metric AND	≤ **Combined Purge-On Rich Limit** Table		Passive Test decision cannot be made. A passive decision cannot be made when Purge is enabled.	Fail determinations require that the Malfunction Criteria be satisfied for 2 out of 3 intrusive segments.	
			The filtered Combined Non-Purge Fuel Trim metric	≤ **Combined Non-Purge Rich Limit**Table				
			Segment Definition - Segments can last up to 60, and are separated by the lesser of 10 seconds of purge-on time or enough time to purge 5 grams of vapor. A maximum of 3 completed segments or 20 intrusive 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. Performing intrusive tests too frequently may also affect EVAP and EPAIII emissions, and the execution frequency of other diagnostics.				
				disable **conditions:**	Engine speed	rpm< 400 or rpm> 6000	Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during 90 % of the EPAIII drive cycle. This is also typical of real-world driving, however values will vary (higher or	
					EGR Flow Diag. Intrusive Test Not Active			
					Fuel Level	< 10 % for at least 30 seconds		
					Catalyst Monitor Diag. Intrusive Test Not Active			
					Post O2 Diag. Intrusive Test Not Active			
					Device Control Not Active			
					EVAP Diag. “tank pull down” portion of the test Not Active			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					fuel trim metric updated during decels? NO			
					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 FuelInjectorCircuit_FA EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit_FA MAP_EngineVacuumStatus AmbientAirDefault_NA	lower) based on the actual conditions present during the drive cycle.	
Engine Oil Temperature Sensor Performance	P0196	Determines if the engine oil temperature (EOT) sensor is stuck or biased in range. Three independent tests can be used.	**Fast Cold Start Test Pass** Absolute value of Powerup EOT - Powerup ECT <= 16 Deg C Absolute value of Powerup EOT - IAT <= 16 Deg C		**All three tests (Cold/Warm/Continuous)** EOP Diagnostic main enable Engine Running	 Enabled = True	<u>Cold Start (Fast/Regular) and Warm up Tests</u> - one failure out of one sample - test performed once per second	Type B 2 Trips
			Regular Cold Start Test Pass Vehicle speed	 > 9.3 MPH	**<u>Cold Start EOT Test</u>** Use Cold Start Diagnostic	 Enabled		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		1) Cold Start Test Compares EOT to ECT and IAT at powerup after a long soak (Fast and regular tests)	for	> 400 seconds	Engine Off Time	> 540 Seconds		
			Note:					
			Vehicle speed	< 9.3 MPH	**Warm Up EOT Test**			
			for resets above timer	> 20 seconds	Use Warm Up EOT Diagnostic	Disabled		
			AND		Power up ECT	> 200 Deg C		
		2) Warm Up Test Compares EOT to a target EOT after a large enough accumulated airflow has occurred	Absolute value of Powerup EOT - Powerup ECT	<= 16 Deg C	Power up ECT	<= 200 Deg C		
			Absolute value of power up EOT - min. observed IAT	<= 16 Deg C	**Continuous EOT Test**			
			OR		Use Continuous Diagnostic	Enabled		
			Absolute value of Powerup EOT - Powerup ECT	> 16 Deg C	Power up ECT	>= -7 and <= 105 Deg C	Continuous Test - 70 failures out of 100 samples performed once per second	
		3) Continuous Test Compares the measured EOT to modeled EOT on a continuous basis on a warm engine	**AND**		ECT	>= 45 and <= 95 Deg C		
			IAT minimum observed	<= 30 Deg C	**All of three criteria above AND**			
			OR		EOT Model	>= 70 Deg C		
			IAT minimum observed	<= -10 Deg C	**OR**			
			Absolute value of power up IAT - min. observed IAT	> 5 Deg C	Use quick transition to equilibrium state	Enabled		
					ECT	>= ECT from 5 sec previous		
			Warm Up Test Pass		**DISABLE CONDITIONS (for all three tests)**			
			Total accumulated engine flow		No active DTC's	Fault bundles: IAT_SensorFA ECT_Sensor_Ckt_FA MAF_SensorFA EngOilTempSensorCircuitFA IgnitionOffTimer_FA VehicleSpeedSensor_FA		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
				>= TotalAccumulatedFlow - See details on Supporting Tables Tab (P0196 Section)				
			EOT	>= 70 Deg C				
			Continuous Test Pass					
			EOT Sensed - EOT Model	>= 0 Deg C and <= 40 Deg C				
			OR					
			EOT Sensed - EOT Model	< 0 Deg C				
			Absolute value of EOT Sensed - EOT Model	<= 40 Deg C				
			Fast Cold Start Test Fail					
			Absolute value of Powerup EOT - Powerup ECT	> FastFailTempDiff See details on Supporting Tables Tab (P0196 Section)				
			Absolute value of power up ECT - IAT	<= 16 Deg C				
			Regular Cold Start Test Fail					
			Vehicle speed	> 9.3 MPH				
			for	> 400 seconds				
			Note:					
			Vehicle speed	< 9.3 MPH				
			for resets above timer	> 20 seconds				
			AND					
			Absolute value of Powerup EOT - Powerup ECT	> 16 Deg C				

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			IAT minimum observed	> 30 Deg C				
			AND					
			IAT minimum observed	> -10 Deg C				
			OR					
			Power up IAT - minimum observed IAT	<= 5 Deg C				
			AND					
			Absolute value of Power up EOT - Power up IAT	> 16 Deg C				
			OR					
			Absolute value of Power up EOT - Min. observed IAT	> 16 Deg C				
			AND					
			Absolute value of Power up ECT - Power up IAT	> 16 Deg C				
			OR					
			Absolute value of Power up ECT - Min. observed IAT	> 16 Deg C				
			Warm Up Test Fail					
			Total accumulated engine flow	>= TotalAccumulatedFlow - See details on Supporting Tables Tab (P0196 Section)				
			EOT	< 70 Deg C				
			Continuous Test Fail					

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			EOT Sensed - EOT Model **AND** EOT Sensed - EOT Model **OR** Absolute value of EOT Sensed - EOT Model	< 0 Deg C or > 40 Deg C >= 0 Deg C > 40 Deg C				
Engine Oil Temperature (EOT) Circuit Low	P0197	Detects a short to ground in the Engine Oil Temperature (EOT) Sensor signal	Engine Oil Temperature Sensor (EOT) Circuit Resistance	< 25 ohms	Diagnostic enabled/disabled Engine Run Time OR ECT Sensor Circuit Resistance	Enabled > 20.0 seconds <= 25 Ohms	25 failures out of 50 samples Sampled every 1 second	Type B 2 trips
Engine Oil Temperature (EOT) Circuit High	P0198	Detects an open circuit or continuous short to high in the Engine Oil Temperature (EOT) Sensor signal	Engine Oil Temperature Sensor (EOT) Circuit Resistance	> 1800000 ohms	Diagnostic enabled/disabled Engine Run Time OR ECT Sensor Circuit Resistance	Enabled > 20.0 seconds >= 450000 Ohms	25 failures out of 50 samples Sampled every 1 second	Type B 2 trips
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 circuit 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	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips
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 circuit 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	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
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 circuit 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	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips
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 circuit 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	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips
Knock Sensor (KS) Circuit Bank 2	P0330	This diagnostic checks for an open in the knock sensor circuit	Gated FFT Output	< OpenCircuitThresh See Supporting Tables for OpenCircuitThresh	Diagnostic Enabled (1 = Enabled) Engine Speed ECT Engine Run Time No Active DTC's Power Take-Off Disabled (= FALSE)	= 1 ≥ 1500 RPM ≥ -40 deg. C ≥ 1 seconds KS_Ckt_Perf_B1B2_FA GetPTOR_b_PTO_Active	50 Failures out of 63 Samples 100 msec rate	Type B 2 trips
Knock Sensor (KS) Circuit Low Bank 2	P0332	This diagnostic checks for an out of range low knock sensor signal	Sensor Input Signal Line **or** Sensor Return Signal Line	< ShortLowThresh * (5 / 65,535) Volts < 2 * [ShortLowThresh * (5 / 65,535) - 2.5] Volts See Supporting Tables for ShortLowThresh	ECT Engine Run Time Valid Oil Temp Required? (1= Yes, 0 = No) If Yes: Engine Oil Temp and ValidOilTempModel or No OilTempSensor DTC's	≥ -40 deg. C ≥ 1 seconds = 1 < 130 deg. C EngOilModeledTempValid EngOilTempSensorCircuitFA	50 Failures out of 63 Samples 100 msec rate	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					If No: No Eng Oil Temp enable criteria			
Knock Sensor (KS) Circuit High Bank 2	P0333	This diagnostic checks for an out of range high knock sensor signal	Sensor Input Signal Line **or** Sensor Return Signal Line	> ShortHiThresh * (5 / 65,535) Volts > 2 * [ShortLowThresh * (5 / 65,535) - 2.5] Volts See Supporting Tables for ShortHiThresh	ECT Engine Run Time Valid Oil Temp Required? (1= Yes, 0 = No) If Yes: Engine Oil Temp and ValidOilTempModel or No OilTempSensor DTC's If No: No Eng Oil Temp enable criteria	≥ -40 deg. C ≥ 1 seconds = 1 < 160 deg. C EngOilModeledTempValid EngOilTempSensorCircuitFA	50 Failures out of 63 Samples 100 msec rate	Type B 2 trips
Camshaft Position (CMP) Sensor Circuit Bank 2 Sensor A	P0345	Determines if a fault exists with the cam position bank 2sensor A signal	<u>Engine Cranking Camshaft Test:</u> Time since last camshaft position sensor pulse received OR Time that starter has been engaged without a camshaft sensor pulse	 >= 5.5 seconds >= 4.0 seconds	<u>Engine Cranking Camshaft Test:</u> Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103	 = FALSE = FALSE = FALSE	<u>Engine Cranking Camshaft Test:</u> Continuous 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.
					AND Engine Air Flow	> 3.0 grams/second))		
			Time-Based Camshaft Test: Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Time-Based Camshaft Test: Engine is Running Starter is not engaged No DTC Active:	5VoltReferenceA_FA	Time-Based Camshaft Test: 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 No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Fast Event-Based Camshaft Test: Continuous every MEDRES event	
			Slow Event-Based Camshaft Test: The number of camshaft pulses received during 100 engine cycles	= 0	Slow Event-Based Camshaft Test: Crankshaft is synchronized No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Slow Event-Based Camshaft Test: 8 failures out of 10 samples Continuous every engine cycle	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Camshaft Position (CMP) Sensor Performance Bank 2 Sensor A	P0346	Determines if a performance fault exists with the cam position bank 2 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 10 (There are 24 MEDRES events per engine cycle) Slow Event-Based Camshaft Test: The number of camshaft pulses received during 100 engine cycles AND	 < 397 > 403	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 No DTC Active:	 5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA 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 Continuous every engine cycle	Type B 2 trips
IGNITION CONTROL #4 CIRCUIT	P0354	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 4 (if applicable)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	 **> 6.00 Volts**	100 Failures out of 120 Samples 100 msec rate	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
IGNITION CONTROL #5 CIRCUIT	P0355	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 5 (if applicable)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	**> 6.00 Volts**	100 Failures out of 120 Samples 100 msec rate	Type B 2 trips
IGNITION CONTROL #6 CIRCUIT	P0356	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 6 (if applicable)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	**> 6.00 Volts**	100 Failures out of 120 Samples 100 msec rate	Type B 2 trips
IGNITION CONTROL #7 CIRCUIT	P0357	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 7 (if applicable)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	**> 6.00 Volts**	100 Failures out of 120 Samples 100 msec rate	Type B 2 trips
IGNITION CONTROL #8 CIRCUIT	P0358	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 8 (if applicable)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	**> 6.00 Volts**	100 Failures out of 120 Samples 100 msec rate	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Camshaft Position (CMP) Sensor Circuit Bank 2 Sensor B	P0390	Determines if a fault exists with the cam position bank 2sensor B 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: Fewer than 4 camshaft pulses received in a time Fast Event-Based Camshaft Test: No camshaft pulses received during first 24 MEDRES events (There are 24 MEDRES events per engine cycle)	>= 5.5 seconds >= 4.0 seconds > 3.0 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: Engine is Running Starter is not engaged No DTC Active: 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	= FALSE = FALSE = FALSE > 3.0 grams/second)) 5VoltReferenceA_FA	Engine Cranking Camshaft Test: Continuous every 100 msec Time-Based Camshaft Test: Continuous every 100 msec Fast Event-Based Camshaft Test: Continuous every MEDRES event	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA		
			Slow Event-Based Camshaft Test:		Slow Event-Based Camshaft Test:		Slow Event-Based Camshaft Test:	
			The number of camshaft pulses received during 100 engine cycles		Crankshaft is synchronized		8 failures out of 10 samples	
				= 0	No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Continuous every engine cycle	
Camshaft Position (CMP) Sensor Performance Bank 2 Sensor B	P0391	Determines if a performance fault exists with the cam position bank 2 sensor B signal	Fast Event-Based Camshaft Test:		Fast Event-Based Camshaft Test:		Fast Event-Based Camshaft Test:	Type B 2 trips
			The number of camshaft pulses received during first 24 MEDRES events is less than 4 or greater than 10		Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged		Continuous every MEDRES event	
			(There are 24 MEDRES events per engine cycle)		No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA		
			Slow Event-Based Camshaft Test:		Slow Event-Based Camshaft Test:		Slow Event-Based Camshaft Test:	
			The number of camshaft pulses received during 100 engine cycles		Crankshaft is synchronized		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.
			AND	< 397 > 403	No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Continuous every engine cycle	
Exhaust Gas Recirculation (EGR) Flow Insufficient	P0401	During a closed throttle decel condition, the EGR valve is normally closed. This diagnostic opens the valve to a pre-determined position, and the change in MAP is computed. This change in MAP correlates to the flow rate of the EGR system	With EGR valve open, the peak + MAP change is monitored over a period of time. This value is compared with a threshold from Engine Speed vs Baro table and the difference computed. The result is statistically filtered (EWMA) and compared to a decision limit.	DTC is set when the filtered pressure change (NeEGRD_p_EWMA) exceeds 0.75	Run multiple tests (KtEGRD_Cnt_StepSamplesPerTrip) IF the difference between the current EWMA and the current map diff > KtEGRD_p_StepDelta AND current map diff > KtEGRD_p_StepMAP_DIFF, until KtEGRD_Cnt_SamplesAfterStep tests have been completed. Initiate multiple tests upon code clear or a non-volatile memory failure: Several tests per trip will run until KtEGRD_Cnt_SamplesAfterReset tests have been completed. (see Supporting Tables)	***The following DTC's should NOT be active:*** Injector circuit DTC's P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208 No CKP DTCs set P0335, P0336 No TP sensor DTC's set P0068, P0121, P1516, P2101, P2135 No MAP DTC's P0106, P0107, P0108 No VSS DTC's set P0502, P0503, P0722, P0723 No 5 volt reference DTC's set P0641, P0651 No IAT DTC's P0111, P0112, P0113 No ECT DTC's P0117, P0118 No IAC DTC's P0506, P0507 No EGR DTC's P0403, P0404, P0405, P0406 No Misfire DTC's P0301, P0302, P0303, P0304, P0305, P0306, P0307, P0308 No MAF DTC's P0101, P0102, P0103 No PCM DTC's set P0604, P0606 No E85 Sensor DTC's P0178, P0179 GetEMOC_b_EngMetalOvertempActv = FALSE, Not in Power Take Off (PTO) Mode	Time to test = 0.5 + 0.3 sec. 6.25 ms operating loop Completes once per trip (typically)	Type A 1 trip

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						(GetPTOI_b_PTO_Active = FALSE), Traction control is NOT active, Not in device control, Not in Catalyst protection mode, BARO > 74 BARO data is NOT defaulted Inlet Air Temp (IAT) < 100 IAT > 5 Ignition Voltage < 18.0 Ignition Voltage > 11.0 Transmission gear is stable > 1.5 Decel fuel cut off state is unchanged for time > 1 Vehicle speed < 113 & Vehicle Speed > 45 Clutch Pedal is not depressed Throttle area cannot change more than 100.0 EGR Position < 1.0 1000 < Engine Speed < 1800 MAP fluctuations < 1.3 17.0 < Altitude-compensated MAP < 43.0 Difference between desired & actual airflow < 1.2 Intrusive Mode Enablements: MPH variation <= 3 +Delta RPM <= 100 -Delta RPM <= 200 Number of EGR On-time execution loops < 25 Throttle Area fluctuations < 100.0		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
EGR Solenoid Circuit	P0403	This DTC checks the Linear EGR 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 < 18 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type B 2 trips
EGR Valve - Open Position Performance	P0404	This diagnostic detects if the pintle position error is too large	Pintle position error [absolute value of (desired position - actual position)] > error threshold	Position error > 10 (Include KfEGRP_Pct_PosErrorMax1 cal if utilized)	Desired EGR position > 0%	*The following DTC's should NOT be active: No 5 volt reference DTC's set P0641, P0651.* *Engine is running* *Off-board device not active* *PTO not active* *P0401 not intrusive* *Ignition voltage >= 11.0* *EGR control is enabled* *Desired EGR position variation < 9.5 for 1.0 sec.* *Enable conditions met for 0.2 sec.*	420 failures out of 1200 samples 100ms loop Continuous	Type B 2 trips
EGR Valve - Position Sensor - Circuit Low	P0405	This diagnostic detects if the pintle position feedback circuit is open or shorted to ground by comparing the sensor feedback to normal operating ranges	Raw EGR feedback sensor signal is less than the expected low limit	Raw EGR feedback sensor signal < 4		*The following DTC's should NOT be active: No 5 volt reference DTC's set P0641, P0651.* *Engine is running* *Off-board device not active* *PTO not active* *P0401 not intrusive* *Ignition voltage >= 11.0* *EGR control is enabled* *Desired EGR position variation < 9.5 for 1.0 sec.* *Enable conditions met for 0.2 sec.*	50 failures out of 55 samples 100 ms Continuous	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
EGR Valve - Position Sensor - Circuit High	P0406	This diagnostic detects if the pintle position feedback circuit is shorted to high voltage or the 5V return is open.	Raw EGR feedback sensor signal is greater than the expected high limit	Raw EGR feedback sensor signal > 94.7		*The following DTC's should NOT be active: No 5 volt reference DTC's set P0641, P0651.* *Engine is running* *Off-board device not active* *PTO not active* *P0401 not intrusive* *Ignition voltage >= 11.0* *EGR control is enabled* *Desired EGR position variation < 9.5 for 1.0 sec.* *Enable conditions met for 0.2 sec.*	180 failures out of 200 samples 100 ms Continuous	Type B 2 trips
Secondary AIR Incorrect Airflow Duel Bank Systems	P0411	Detects an insufficient flow condition This test is run during Phase 1 (AIR pump commanded On, Valve commanded Open) Leaks downstream of the valve are detected via an evaluation of both pressure error and average pressure "String Length"(SL) – a term that represents the absolute pressure delta accumulated every 6.25ms, then averaged over the duration of the test. Low SL values are indicative of downstream leaks or blockages.	Predicted System Pressure versus Actual System Pressure Error OR or the following SL test System Pressure Error OR while the Average String Length	> 5.0 kPa Bank 1 or > 5.0 kPa Bank 2 < -3.0 kPa Bank 1 or < -3.0 kPa Bank 2 > 32.0 kPa Bank 1 or > 32.0 kPa Bank 2 < -32.0 kPa Bank 1 or < -32.0 kPa Bank 2 <**SL Threshold** **Bank 1** Table or <**SL Threshold** **Bank 2** Table **disable**	BARO Inlet Air Temp Coolant Temp Engine off time System Voltage SL Stability time SL Range **Conditional test weight is calculated by multiplying the following Factors** **Phase 1 Baro Test Weight Factor** **Phase 1 MAF Test Weight Factor** **Phase 1 System Volt Test Weight Factor** **Phase 1 Ambient Temp Test Weight Factor** MAP	> 60 kPa > 5.0 deg C. > 5.0 deg C. < 80.0 deg C. > 7200.0 seconds > 10.7 OR < 32.0 > 5.0 seconds Bank 1 > 5.0 seconds Bank 2 rpm < 3000 and > 3400 < 20 kPa for 2 seconds	Phase 1 Conditional test weight > 7.0 seconds Total 'String Length' accumulation time > 10 sec Bank1 > 10 sec Bank2	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
				conditions:	Engine Speed	> 5000 RPM		
					MAF	> 50 gm/s for 0 seconds	Frequency: Once per trip when AIR pump commanded On	
					No active DTCs:	AIRSystemPressureSensor FA AIRValveControlCircuit FA AIRPumpControlCircuit FA MAF_SensorFA MAP_SensorFA IAT_SensorFA ECT_Sensor_FA EngineMisfireDetected_FA CatalystSysEfficiencyLoB1_FA CatalystSysEfficiencyLoB2_FA ControllerProcessorPerf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA IgnitionOutputDriver_FA FuelInjectorCircuit_FA		
Secondary AIR Solenoid Control Circuit	P0412	This DTC checks the AIR solenoid circuit for electrical integrity	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		System Voltage	> 10.7 Volts < 32.0 Volts	20 failures out of 25 samples 250 ms loop Continuous	Type B 2 trips
Secondary AIR Pump Control Circuit	P0418	This DTC checks the AIR Pump circuit for electrical integrity	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		System Voltage	> 10.7 Volts < 32.0 Volts	20 failures out of 25 samples 250 ms loop Continuous	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
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*** Throttle Position	< 2.00 %	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

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		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.			Vehicle Speed	*< 1.00 Mph*		
					Engine speed	> 1100 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**		
					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		
					RunCrank Voltage	> 10.90 Volts		
					Ethanol Estimation	NOT in Progress		
					ECT	*40 < ° C < 123*		
					Barometric Pressure	> 70 KPA		
					Idle Time before going intrusive is	< 50 Seconds		
					Idle time is incremented if Vehicle speed	< 1 Mph and the throttle position < 2.00 % as identified in the Valid Idle Period Criteria section.		
					Short Term Fuel Trim	*0.90 < ST FT < 1.10*		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Predicted catalyst temp > MinCatTemp table (degC) (refer to "Supporting Tables" tab) 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 50 seconds with a closed throttle time < 180 seconds consecutively (closed throttle consideration involves having the TPS < the value as stated in the Valid Idle Period Criteria Section) . Also, in order to increment the WarmedUpEvents counter (counter must exceed 50 cal value), either the vehicle speed must exceed the vehicle speed cal or the TPS must exceed the TPS cal as stated in the Valid Idle Period Criteria section above. **Closed loop fueling Enabled** A Function of Coolant Temperature based on Start-up coolant temp. and a function of Time also based on Start-up coolant temp. **Please see "Supporting Tables" Tab** **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 *2.80 < g/s < 17.50*			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Predicted catalyst temperature	< 890 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	*0.900 < 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 > 0.570 and the current OSC Normalized Ratio value is < 0.260			
					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 > 590 ° C for 3600 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 AmbientAirDefault_SC IAT_SensorCircuitFA 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 FuelTrimSystemB2_FA EngineMisfireDetected_FA EvapPurgeSolenoidCircuit_FA IAC_SystemRPM_FA EGRValvePerformance_FA EGRValveCircuit_FA CamSensor_FA CrankSensorFaultActive 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.
EGR Valve - Closed-Valve Position Performance	P042E	This diagnostic detects if the valve is stuck open when commanded closed.	Actual pintle position is greater than an error threshold (% of reference voltage from learned closed position)	Raw EGR feedback sensor signal > CV_4.0		*The following DTC's should NOT be active: No 5 volt reference DTC's set P0641, P0651.* *Engine is running* *Off-board device not active* *PTO not active* *P0401 is not intrusive* *Ignition voltage >= 11.0* *EGR control is enabled* *Desired EGR position = 0, for at least 1.0 sec.* *Enable conditions met for 0.2 sec*	360 failures out of 400 samples for 4 failed attempts with valve movement (> 25.0 for 2.0 sec.) in-between attempts 100 ms Continuous	Type B 2 trips
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

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		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.			Throttle Position	< 2.00 %		
		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.			Vehicle Speed	*< 1.00 Mph*		
					Engine speed	> 1100 RPM for a minimum of 20 seconds since end of last idle period.		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Engine run time	≥ MinimumEngineRunTime, **This is a function of Coolant Temperature, please see Supporting Tables**		
					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		
					RunCrank Voltage	> 10.90 Volts		
					Ethanol Estimation	NOT in Progress		
					ECT	*40 < ° C < 123*		
					Barometric Pressure	> 70 KPA		
					Idle Time before going intrusive is	< 50 Seconds		
					Idle time is incremented if Vehicle speed	< 1 Mph and the throttle position < 2.00 % as identified in the Valid Idle Period Criteria section.		
					Short Term Fuel Trim	*0.90 < ST FT < 1.10*		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Predicted catalyst temp > MinCatTemp table (degC) (refer to "Supporting Tables" tab) 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 50 seconds with a closed throttle time < 180 seconds consecutively (closed throttle consideration involves having the TPS < the value as stated in the Valid Idle Period Criteria Section) . Also, in order to increment the WarmedUpEvents counter (counter must exceed 50 cal value), either the vehicle speed must exceed the vehicle speed cal or the TPS must exceed the TPS cal as stated in the Valid Idle Period Criteria section above.			
					Closed loop fueling Enabled A Function of Coolant Temperature based on Start-up coolant temp. and a function of Time also based on Start-up coolant temp. **Please see "Supporting Tables" Tab**			
					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	*2.80 < g/s < 17.50*		
					Predicted catalyst temperature	< 890 degC		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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	*0.90 < 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 > 0.410 and the current OSC Normalized Ratio value is < 0.380			
					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 > 590 ° C for 3600 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			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					DTC's Not Set			
					MAF_SensorFA			
					AmbientAirDefault_SC			
					IAT_SensorCircuitFA			
					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			
					FuelTrimSystemB2_FA			
					EngineMisfireDetected_FA			
					EvapPurgeSolenoidCircuit_FA			
					IAC_SystemRPM_FA			
					EGRValvePerformance_FA			
					EGRValveCircuit_FA			
					CamSensor_FA			
					CrankSensorFaultActive			
					TPS_Performance_FA			
					EnginePowerLimited			
					VehicleSpeedSensor_FA			
Fuel Level Sensor 1 Performance (For use on vehicles with mechanical transfer pump dual fuel tanks)	P0461	This DTC will detect a fuel sender stuck in range in the primary fuel tank.			Engine Running No active DTCs:	 VehicleSpeedSensor_FA	250 ms / sample Continuous	Type B 2 trips
			Fuel Level in Primary Tank 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	>= 21.0 liters < 5.0 liters 109 miles				
			After Refuel Event					

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			If the secondary fuel volume changes by 9.0 liters from engine "off" to engine "on" the primary volume should change by 3.0 liters. OR		The shutdown primary tank volume + 3.0 liters must be	< 21.0 liters		
			Distance Traveled without a Primary Fuel Level Change					
			Delta Fuel Volume change over an accumulated 50 miles.	< 3 liters				
Transmission Output Speed Sensor (TOSS)	P0502	No activity in the TOSS circuit	TOSS Raw Speed	<= 60 RPM			>= 4.5 sec	Type B 2 trips
					Maximum Engine Torque	<= 8191.8 N-M		
					Minimum Engine Torque	>= 90.0 N-M		
					Minimum Throttle opening	>= 8.0 %		
					Maximum Engine Speed	<= 6500 RPM		
					Minimum Engine Speed	>= 1500 RPM		
					Disable P0502 if PTO Active	0 Boolean		
					Maximum Engine Speed	<= 7500 RPM		
					Minimum Engine Speed	>= 200 RPM		
					Time at Engine Speed	>= 5.0 sec		
					Maximum Ignition Voltage	<= 18.0 volts		
					Minimum Ignition Voltage	>= 11.0 volts		
				Disable Conditions:	MIL not Illuminated for DTC's:	ECM: P0068, P006E, P0101, P0102, P0103, P0104, P0107, P0108, P0120, P0122, P0123, P012C, P012D, P0171, P0172, P0174, P0175, P0201, P0202, P0203, P0204, P0205, P0206, P0207, P0208, P0209, P020A, P020B, P020C, P020D, P020E, P020F, P0220, P0222, P0223, P0300, P0400, P0401, P0402, P0403, P0404, P0405, P0406, P042E, P042F, P0489, P0490, P049D, P1106, P1107, P1120, P1122, P1123, P1220, P1221, P1183,		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						P1184, P1185, P1186, P1400, P1404, P1407, P1512, P1514, P1515, P1516, P151A, P1523, P1524, P1681, P1791, P2100, P2101, P2119, P2135, P2176, P245A, P245B, P245C, P245D, U0101 TCM: None		
Transmission Output Speed Sensor (TOSS)	P0503	TOSS Signal Intermittent	Loop-to-Loop change in TOSS	>= 350 RPM	Raw Output Speed	>= 300 RPM	>= 3.3 sec	Type B 2 trips
					Output Speed change	<= 150 RPM		
					Time for Positive Output Speed Change	>= 2.0 sec		
					Time since transfer case range change	>= 6.0 sec		
					Time above raw Output Speed	>= 2.0 sec		
					Disable P0502 if PTO Active	0 Boolean		
					Maximum Ignition Voltage	<= 18.0 volts		
					Minimum Ignition Voltage	>= 11.0 volts		
					Maximum Engine Speed	<= 7500 RPM		
					Minimum Engine Speed	>= 200 RPM		
					Time at Engine Speed	>= 5.0 sec		
					Maximum Vehicle speed	<= 318 Mph		
					Time below Max Vehicle Speed	>= 5.0 sec		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
				Disable Conditions:	MIL not Illuminated for DTC's:	ECM: P0503		
Cold Start IAC System Performance Fault	P050A	Monitors the engine speed performance when the cold start emission reduction strategy is active by accumulating and averaging the difference between the desired engine speed and the actual engine speed.	Average difference between the actual and desired engine speed	< 1.00 RPM	Cold Start Emission Reduction Strategy Is Active. The strategy is considered active if either the Spark cat light off or Idle cat light off strategies are considered active. Spark CLO is considered active when the CatLightOffDesiredSparkRetard (function of idle RPM and air per cylinder and scaled based on coolant and engine run time) <= 0.00 degrees of Spark Idle CLO is considered active if the desired RPM exceeds a base RPM value (function of coolant) plus an RPM offset. The amount of RPM offset to be considered catalyst light off is also a function of coolant temperature and gear state. Refer to "Supporting Tables" for details. Vehicle Speed | < 1.24 MPH OBD Manufacturer Enable Counter | 0 Throttle Position | < 1.00 percent A change in throttle position (tip-in/tip-out) will initiate a delay in the calculation of the average qualified residual value. When the delay timer > 5.00 seconds the diagnostic will continue the calculation. For Manual Transmission vehicles, the clutch must be fully engaged. Clutch Pedal Position < 25.00 OR The clutch must be fully disengaged. Clutch Pedal Position > 88.00 ***General Enable*** **DTC's Not Set** MAF_SensorFA		Runs once per trip when the cold start emission reduction strategy is active Frequency: 100ms Loop Test completes after 65535 counts of accumulated engine speed difference between actual and desired.	Type B 2 Trip(s)

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					MAP_SensorFA IAT_SensorCircuitFA IAT2_SensorCircuitFA ECT_Sensor_FA CrankSensorFaultActive IAC_SystemRPM_FA TPS_FA VehicleSpeedSensor_FA EngineMisfireDetected_FA IgnitionOutputDriver_FA ControllerProcessorPerf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA FuelInjectorCircuit_FA TransmissionEngagedState_FA Clutch Sensor FA			
Cold Start Ignition Timing System Performance Fault	P050B	Monitors the ignition timing performance when the cold start emission reduction strategy is active by accumulating and averaging the difference between the desired ignition timing and the actual ignition timing.	Average difference between the actual and desired ignition timing	> 255.99 degrees of spark	Cold Start Emission Reduction Strategy Is Active. The strategy is considered active if either the Spark cat light off or Idle cat light off strategies are considered active. Spark CLO is considered active when the CatLightOffDesiredSparkRetard (function of idle RPM and air per cylinder and scaled based on coolant and engine run time) <= 0.00 degrees of Spark Idle CLO is considered active if the desired RPM exceeds a base RPM value (function of coolant) plus an RPM offset. The amount of RPM offset to be considered catalyst light off is also a function of coolant temperature and gear state. Refer to "Supporting Tables" for details.	Vehicle Speed < 1.24 MPH	Runs once per trip when the cold start emission reduction strategy is active Frequency: 100ms Loop Test completes after 65535 counts of accumulated ignition timing difference between actual and desired.	Type B 2 Trip(s)

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					OBD Manufacturer Enable Counter	0		
					Throttle Position	< 1.00 percent		
					A change in throttle position (tip-in/tip-out) will initiate a delay in the calculation of the average qualified residual value. When the delay timer > 5.00 seconds the diagnostic will continue the calculation.			
					For Manual Transmission vehicles, the clutch must be fully engaged. Clutch Pedal Position < 25.00 OR The clutch must be fully disengaged. Clutch Pedal Position > 88.00			
					General Enable			
					DTC's Not Set			
					MAF_SensorFA			
					MAP_SensorFA			
					IAT_SensorCircuitFA			
					IAT2_SensorCircuitFA			
					ECT_Sensor_FA			
					CrankSensorFaultActive			
					IAC_SystemRPM_FA			
					TPS_FA			
					VehicleSpeedSensor_FA			
					EngineMisfireDetected_FA			
					IgnitionOutputDriver_FA			
					ControllerProcessorPerf_FA			
					5VoltReferenceA_FA			
					5VoltReferenceB_FA			
					FuelInjectorCircuit_FA			
					TransmissionEngagedState_FA			
					Clutch Sensor FA			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Cruise Control Mutil-Functon Switch Circuit	P0564	Detect when cruise control multi-function switch circuit (analog) voltage is in an illegal range	Cruise Control analog circuit voltage must be in an "illegal range" for greater than a calibratable period of time for cruise switch states are received over serial data	Cruise switch data integrity is equal to "illegal range"		Switch architecture CeCRZG_e_CAN is CAN, CAN based switch diagnostic 1 is TRUE, general switch diagnostic enable 1 is TRUE	fail continuously for greater than 0.700 seconds	Special Type: C 1 Trip NO MIL
		Detect when cruise control multi-function switch circuit (analog) voltage is in an illegal range	Cruise Control analog circuit voltage must be in an "illegal range" for greater than a calibratable period of time for cruise switches hardwired to the ECM			Switch architecture CeCRZG_e_CAN is ANALOG, general switch diagnostic enable 1 is TRUE	fail continuously for greater than 0.700 seconds	
Cruise Control Resume Circuit	P0567	Detects a failure of the cruise resume switch in a continuously applied state	Cruise Control Resume switch remains applied for greater than a calibratable period of time for architecture where cruise switch states are received over serial data			Switch architecture CeCRZG_e_CAN is CAN, CAN based switch diagnostic 1 is TRUE, general switch diagnostic enable 1 is TRUE	fail continuously for greater than 90.000 seconds	Special Type: C 1 Trip NO MIL
			Cruise Control Resume switch remains applied for greater than a calibratable period of time for cruise switches hardwired to the ECM			Switch architecture CeCRZG_e_CAN is ANALOG or DISCRETE, general switch diagnostic enable 1 is TRUE	fail continuously for greater than 90.000 seconds	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Cruise Control Set Circuit	P0568	Detects a failure of the cruise set switch in a continuously applied state	Cruise Control Set switch remains applied for greater than a calibratable period of time for architecture where cruise switch states are received over serial data			Switch architecture CeCRZG_e_CAN is CAN, CAN based switch diagnostic 1 is TRUE, general switch diagnostic enable 1 is TRUE	fail continuously for greater than 90.000 seconds	Special Type: C 1 Trip NO MIL
			Cruise Control Set switch remains applied for greater than a calibratable period of time for cruise switches hardwired to the ECM			Switch architecture CeCRZG_e_CAN is ANALOG or DISCRETE, general switch diagnostic enable 1 is TRUE	fail continuously for greater than 90.000 seconds	
Cruise Control Input Circuit	P0575	Detects rolling count or protection value errors in Cruise Control Switch Status serial data signal	If x of y rolling count / protection value faults occur, disable cruise for duration of fault			Switch architecture CeCRZG_e_CAN is CAN, DTC enable cal 1 is TRUE	10/16 counts	Special Type: C 1 Trip NO MIL
Intake Manifold Tuning (IMT) Valve Control Circuit	P0660	Electrical Integrity of Intake Manifold Tuning (IMT) Valve Control Circuitry	ECM detects that commanded and actual states of output driver do not match		Ignition Voltage Ignition Voltage	>= 11.00 Volts <= 18.00 Volts	20 failures out of 25 samples 1 sample every 250 msec	Type B 2 trips
Powertrain Relay Feedback Circuit Low	P0689	This DTC is a check to determine if the Powertrain relay is functioning properly.	PT Relay feedback voltage is	≤ 5 volts	Powertrain relay commanded "ON" No active DTCs:	PowertrainRelayStateOn_Error	5 failures out of 6 samples 1second / sample	1 trip Special Type C
Fuel Pump Control Module (FPCM) Requested MIL Illumination	P069E	Monitors the FPCM MIL request line to determine when the FPCM has detected a MIL illuminating fault.	Fuel Pump Control Module Emissions-Related DTC set			Time since power-up > 3 seconds	Continuous	Type A 1 trip NO MIL

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Clutch Pedal Position Sensor Circuit Range / Performance	P0806	Detects if Clutch Pedal Position Sensor is Stuck in a range indicative of a vehicle NOT in gear, when the vehicle is determined to be in gear.	Filtered Clutch Pedal Position Error when the vehicle is determined to be in gear.	> 4 %	N/V Ratio must Match Actual Gear (i.e. vehicle in gear) Transfer Case not in 4WD Low range Engine Torque Clutch Pedal Position	 > **EngTorqueThreshold** Table < **ResidualErrEnableLow** Table > ***ResidualErrEnableHigh*** *Table*	25 ms loop Continuous	Type A 1 trip
				disable conditions:	No active DTCs:	ClutchPositionSensorCktLo FA ClutchPositionSensorCkitHi FA CrankSensorFA VehicleSpeedSensor_FA		
Clutch Pedal Position Sensor Circuit Low	P0807	Detects Continuous Circuit Short to Low or Open	Clutch Position Sensor Circuit	< 4 % of Vref disable conditions:	Engine Not Cranking System Voltage No active DTCs:	< 11.0 Volts 5VoltReferenceB_FA	200 failures out of 250 samples 25 ms loop Continuous	Type A 1 trip
Clutch Pedal Position Sensor Circuit High	P0808	Detects Continuous Circuit Short toHigh	Clutch Position Sensor Circuit	> 96 % of Vref disable conditions:	Engine Not Cranking System Voltage No active DTCs:	< 11.0 Volts 5VoltReferenceB_FA	200 failures out of 250 samples 25 ms loop Continuous	Type A 1 trip
Clutch Pedal Position Not Learned	P080A	Monitor for Valid Clutch Pedal Fully Applied Learn Position values	Fully Applied Learn Position OBD Manufacturer Enable Counter	= 0 = 0	Clutch Pedal Position Not Learned		250 ms loop Continuous	Type B 2 trip(s)

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 If Slope Time L/R or R/L Switches are below the threshold.	H/C L/R switches < Threshold, or H/C R/L switches < Threshold, (refer to table named "P1153 - O2S HC L to R Switches Limit Bank 2 Sensor 1" Pass/Fail Threshold table & "P1153 - O2S HC R to L Switches Limit Bank 2 Sensor 1" Pass/Fail Threshold table in Supporting tables tab) OR S/T L/R switches < 3, or S/T R/L switches < 3	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 Green Sensor Delay Criteria The diagnostic will not be enabled until the next ignition cycle after the following has been met: 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	Type B 2 trips
					Bank 2 Sensor 1 DTC's not active	= P0151, P0152 or P0154		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					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		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					O2 Heater on for	>= 40 seconds		
					Learned Htr resistance	= Valid		
					Engine Coolant	> 50 ºC		
					IAT	> -40 ºC		
					Engine Run Time	> 120 seconds		
					Time since any AFM status change	> 1.5 seconds		
					Time since Purge On to Off change	> 0.0 seconds		
					Time since Purge Off to On change	> 1.5 seconds		
					Purge duty cycle	>= 0 % duty cycle		
					Engine airflow	15 gps <= engine airflow <= 45 gps		
					Engine speed	1250 <= RPM <= 2550		
					Fuel	< 87 % Ethanol		
					Baro	> 70 kpa		
					Throttle Position	>= 5 %		
					Low Fuel Condition Diag	= False		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					LTM fuel cell	= Enabled		
					Transient Fuel Mass	<= 2.5 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			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Time	> 4.5 seconds		
Air Fuel Imbalance Bank 2	P1175	Determines if the air-fuel delivery system is imbalanced by monitoring the pre-catalyst O2 sensor voltage characteristics	The Bank 2 AFIM Filtered Length Ratio variable exceeds a value of	> 1.000	System Voltage	*10 < V < 32 for > 4 seconds*	Frequency: Continuous Monitoring of O2 voltage signal in 12.5ms loop AFIM Filtered Length Ratio variable is updated after every 3 seconds of valid data.	Type B 2 Trip(s)
					Engine Run Time	> 50 seconds		
					ECT	> 10 oC		
					Engine speed	*1250 < rpm < 3500*		
					Mass Airflow	*9 < g/s < 400*		
					PerCent Ethanol	< 87 %		
					Delta O2 voltage during previous 12.5ms	> 5 and -5		
					O2 sensor switches	> 0 times during current 3 second sample period		
					Quality Factor	> 0 in the current operating region		
					For DoD equipped vehicles only	No DoD state change during current 3 second sample period.		
					The AFIM Filtered Length Ratio is determined by calculating the difference between the measured O2 voltage length (accumulated O2 voltage over a 3 second period) and an emissions-correlated threshold value, divided by the threshold 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 resulting ratio is then filtered utilizing a first-order lag filter.			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					The first report is delayed for 100 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.			
					Closed Loop fueling enabled A Function of Coolant Temperature based on Start-up coolant temp. and a function of Time also based on Start-up coolant temp. **Please see "Supporting Tables" Tab**			
					Fuel System Status	***LONG FT Enabled***		
					Disable Conditions: **MIL not illuminated for DTC's**			
					EngineMisfireDetected_FA			
					MAP_SensorFA			
					MAF_SensorFA			
					ECT_Sensor_FA			
					Ethanol Composition Sensor FA			
					TPS_ThrottleAuthorityDefaulted			
					FuelInjectorCircuit_FA			
					AIR System FA			
					O2S_Bank_1_Sensor_1_FA			
					O2S_Bank_2_Sensor_1_FA			
					EvapPurgeSolenoidCircuit_FA			
					EvapFlowDuringNonPurge_FA			
					EvapVentSolenoidCircuit_FA			
					EvapSmallLeak_FA			
					EvapEmissionSystem_FA			
					FuelTankPressureSensorCircuit_FA			
					Device Control	**Not Active**		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Intrusive Diagnostics	**Not Active**		
					Engine OverSpeed Protection	**Not Active**		
					Reduced Power Mode (ETC DTC)	**Not Active**		
					PTO	**Not Active**		
					Traction Control	**Not Active**		
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	The ECM detects that the engine coolant has exceeded a threshold for certain amount of time.	Engine Coolant > 131 for 2 seconds	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.	KeEMOG_b_DisableOvertempProtect = 0 Feature is enabled only if KeEMOG_b_DisableOvertempProtect = 0 and Engine Run time > 2	Time that EMOP active must be true for P1258 to be set is 0 seconds	Type A 1 trips
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	VSS ≥ 5 mph	40 failures out of 80 samples	"Special" Type C 1 Trip
					Engine Speed	rpm < 8192		
					Engine Load	load < 200	250 ms /sample	
					RunCrankActive	= TRUE	Continuous	
					Active DTC	P0300, MIL Request		
ABS System Rough Road Detection Communication Fault	P1381	This diagnostic detects if the rough road information is no longer being received from the ABS controller, and misfire is present. When this occurs, misfire will continue to run.	Loss of GMLan Message: "Wheel Sensor Rough Road Magnitude"	= FALSE	Vehicle Speed	VSS ≥ 5 mph	40 failures out of 80 samples	"Special" Type C 1 trip
					Engine Speed	rpm < 8192		
					Engine Load	load < 200	250 ms /sample	
					RunCrankActive	= TRUE	Continuous	
					Active DTC	P0300, MIL Request		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Fuel Level Sensor 2 Performance	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	Type B 2 trips
			Fuel Level in Secondary Tank 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 < 1.0 liters 124 miles				
			Fuel Level is in a Readable Range for both Primary and Secondary Tanks too Long					
			Volume in Primary Tank AND Volume in Secondary Tank and remains in this condition for OR	< 1024 liters > 1 liters 2430 seconds				
			Distance Traveled without a Secondary Fuel Level Change					
			If the vehicle is driven a distance of 186 miles without the secondary fuel level changing by 3 liters, then the sender must be stuck.		Volume in Secondary Tank	>= 1.0 liters		
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	11 volts ≤ Voltage ≤ 18 volts	180 failures out of 225 samples 100 ms / sample Continuous	Type B 2 trips
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	11 volts ≤ Voltage ≤ 18 volts	180 failures out of 225 samples 100 ms / sample	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
							Continuous	
Intake Manifold Tuning (IMT) Valve Stuck Open	P2070	This DTC sets for valve stuck OPEN in normal operation range. This DTC is also set if the IMT position sensor is either outputting an incorrect frequency for its feedback position. This DTC is also set if the valve is having difficulty finding its home position after the ignition is turned on (Shaft Integrity Diagnostic).	Valve Stuck Open: Commanded Valve Position AND Actual Valve Position Valve Position Sensor Frequency Incorrect Test: Time since enable criteria met AND (Sensor Frequency OR Sensor Frequency Shaft Integrity Test: Time without initiating valve position learn sequence after learn request AND (Valve Position OR Valve Position OR	 = CLOSED = OPEN >= 0.3 seconds < 137 Hz > 157 Hz) >= 2.0 seconds > 11.5% < 8%)	Valve Stuck Open: Time since command for valve to CLOSE No Active DTCs: Valve Position Sensor Frequency Incorrect Test: Engine Run Time Powertrain Relay Voltage Powertrain Relay Voltage Shaft Integrity Test: Engine Run Time Powertrain Relay Voltage Powertrain Relay Voltage Sensor Frequency Sensor Frequency	 > 1.0 seconds P0660, P2077, P2078 >= 10.0 seconds >= 11.0 Volts <= 18.0 Volts >= 10.0 seconds >= 11.0 Volts <= 18.0 Volts >= 137 Hz <= 157 Hz	Valve Stuck Open: 400 failures out of 500 samples 1 sample every 12.5 msec Valve Position Sensor Frequency Incorrect Test: Executes every 12.5 msec after power-up until test has passed or failed Shaft Integrity Test: Executes every 12.5 msec after power-up or reset until test is complete or valve initiates another learning attempt by outputting a duty cycle between 11.5% and 8%	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Time that valve takes to learn home position AND (Valve Position OR Valve Position OR Number of learn tries during one key cycle	>= 2.0 seconds > 90% < 12.9%) >= 100				
Intake Manifold Tuning (IMT) Valve Stuck Closed	P2071	This DTC sets for valve stuck CLOSED in normal operation range.	Commanded Valve Position AND Actual Valve Position	= OPEN = CLOSED	Time since command for valve to OPEN No Active DTCs:	> 1.0 seconds P0660, P2077, P2078	400 failures out of 500 samples 1 sample every 12.5 msec	Type B 2 trips
Intake Manifold Tuning (IMT) Valve Position Sensor Circuit Low	P2077	This DTC detects a continuous short to low or open in either the signal circuit or the sensor.	Valve Position	>= 94.9%	Ignition Voltage Ignition Voltage	>= 18.0 Volts <= 9.0 Volts	400 failures out of 500 samples 1 sample every 12.5 msec	Type B 2 trips
Intake Manifold Tuning (IMT) Valve Position Sensor Circuit High	P2078	This DTC detects an open sensor ground or continuous short to high in either the signal circuit or the sensor.	Valve Position	<= 5%	Ignition Voltage Ignition Voltage	>= 18.0 Volts <= 9.0 Volts	400 failures out of 500 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.
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	[Bank 1 Filtered Length Ratio variable OR Bank 1 AFM Filtered Length Ratio variable (AFM applications only)] 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.	> 0.59 > 0.01 950 and 50 millivolts	System Voltage	*10 <= V <= 18 for >= 4 seconds*	Frequency: Continuous Monitoring of O2 voltage signal in 12.5ms loop	Type B 2 Trips
		Note: The AFIM Filtered Length Ratio is determined by calculating the difference between the measured O2 voltage length (accumulated O2 voltage over a 2.50 second period) and an emissions-correlated threshold value, divided by the threshold 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 resulting ratio is then filtered utilizing a first-order lag filter.			Engine Run Time	>= 50 seconds	AFIM Filtered Length Ratio variable is updated after every 2.50 seconds of valid data.	
					ECT	> -20 oC		
					Engine speed	*1100 <= rpm <= 6950*		
					Mass Airflow	*15.0 <= g/s <= 510.0*		
					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*		
					Air Per Cylinder	*0 <= mg/cylinder <= 2000*		
					PerCent Ethanol	<= 87 %		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Positive (rising) Delta O2 voltage during previous 12.5ms is OR Negative (falling) Delta O2 voltage during previous 12.5ms is	> 5.0 millivolts < -5.0 millivolts		
					O2 sensor switches	>= 1 times during current 2.50 second sample period		
					Quality Factor	>= 0.00 in the current operating region		
					For AFM (Cylinder Deactivation) equipped vehicles only	No AFM state change during current 2.50 second sample period.		
					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.			
					The first report is delayed for 100 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.			
					Data collection is suspended under the following circumstances: - for 1.0 seconds after AFM transitions - for 0.0 seconds after Closed Loop transitions from Off to On - for 0.0 seconds after purge transitions from Off to On or On to Off - for 0.0 seconds after the AFIM diagnostic transitions from Disabled to Enabled			
					Closed Loop fueling enabled			
					Fuel System Status	***LONG FT Enabled***		
					No EngineMisfireDetected_FA			
					No MAP_SensorFA			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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			
					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			
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 OR Bank 2 AFM Filtered Length Ratio variable (AFM applications only)] 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.	> 0.75 > 0.01 950 and 50 millivolts	System Voltage	*10 <= V <= 18 for >= 4 seconds*	Frequency: Continuous Monitoring of O2 voltage signal in 12.5ms loop	Type B 2 Trip(s)

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		Note: The AFIM Filtered Length Ratio is determined by calculating the difference between the measured O2 voltage length (accumulated O2 voltage over a 2.50 second period) and an emissions-correlated threshold value, divided by the threshold 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 resulting ratio is then filtered utilizing a first-order lag filter.			Engine Run Time	>= 50 seconds	AFIM Filtered Length Ratio variable is updated after every 2.50 seconds of valid data.	
					ECT	> -20 oC		
					Engine speed	*1100 <= rpm <= 6950*		
					Mass Airflow	*15.0 <= g/s <= 510.0*		
					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*		
					Air Per Cylinder	*0 <= mg/cylinder <= 2000*		
					PerCent 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		
					O2 sensor switches	>= 1 times during current 2.50 second sample period		
					Quality Factor	>= 0.00 in the current operating region		
					For AFM (Cylinder Deactivation) equipped vehicles only	No AFM state change during current 2.50 second sample period.		
					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.			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					The first report is delayed for 100 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.			
					Data collection is suspended under the following circumstances: - for 1.0 seconds after AFM transitions - for 0.0 seconds after Closed Loop transitions from Off to On - for 0.0 seconds after purge transitions from Off to On or On to Off - for 0.0 seconds after the AFIM diagnostic transitions from Disabled to Enabled			
					Closed Loop fueling enabled			
					Fuel System Status	***LONG FT Enabled***		
					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			
					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			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Barometric Pressure (BARO) Sensor Performance	P2227	Detects stability of barometric pressure input	Difference between the current Baro sensor reading and the previous Baro sensor reading	> 10.0 kPa	Ignition has been on Vehicle Speed No Active DTCs:	> 10.0 seconds < 62 MPH AmbientAirPressCktFA ECT_Sensor_FA IAT_SensorFA MAF_SensorFA AfterThrottlePressure_NA or AfterThrottlePressure_SC TPS_FA TPS_Performance_FA VehicleSpeedSensorError	20 failures out of 25 samples 1 sample every 250 msec	Type B 2 trips
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	< 21.0 % of 5 Volt Range (1.0 Volts = 50.0 kPa)	Continuous		20 failures out of 25 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	> 53.5 % of 5 Volt Range (2.7 Volts = 115.0 kPa)	Continuous		20 failures out of 25 samples 1 sample every 12.5 msec	Type B 2 trips
O2 Sensor Signal Stuck Lean Bank 1 Sensor 2 <NOTE: This is a POVD DTC description>	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 cannot achieve the rich threshold voltage. AND The Accumulated mass air flow monitored during the Stuck Lean Voltage Test is greater than the threshold before the above voltage threshold is met.	1) Post O2S signal >= 740 mvolts AND 2) Accumulated air flow during stuck lean test > 600 grams.	No Active DTC's	TPS_ThrottleAuthority Defaulted P0131, P0137, P0151, P0157 P0132, P0138, P0152, P0158 P0134, P0140, P0154, P0160	Frequency: Once per trip Green Sensor Delay Criteria	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						P0053, P0054, P0059, P0060		
						P0135, P0141, P0155, P0161	The diagnostic will not be enabled until the next ignition cycle after the following has been met: 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	
						P1133, P1153, P0133, P0153		
						EvapPurgeSolenoidCircuit_FA		
						EvapFlowDuringNonPurge_FA		
						EvapVentSolenoidCircuit_FA		
						EvapSmallLeak_FA		
						EvapEmissionSystem_FA		
						FuelTankPressureSensorCircuit_FA		
						MAF_SensorFA		
						MAP_SensorFA		
						AIR System FA		
						FuelInjectorCircuit_FA		
						FuelTrimSystemB1_FA		
						FuelTrimSystemB2_FA		
						EngineMisfireDetected_FA		
						EthanolCompositionSensor_FA		
					DTC passed	= P2271		
					System Voltage	10.0 volts < system voltage< 18.0 volts		
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid		
					Low Fuel Condition Diag	= False		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Engine Speed	400 <= RPM <= 1900		
					Engine Airflow	3 gps <= Airflow <= 12 gps		
					Vehicle Speed	24.9 mph <= Veh Speed <= 80.8 mph		
					Closed loop integral	0.95 <= C/L Int <= 1.05		
					Closed Loop Active	= TRUE		
					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		
					All above met and then fuel is commanded Rich			
					Fuel State	= Refer to **"P2270/P2272 - O2 Sensor Signal Stuck Lean Bank 1/2 Sensor 2"** Rich Equiv Ratio table in the Supporting Tables tab.		
					During Stuck Lean test the following can cause the test to abort			
					Fuel State	= DFCO		
					Fuel State	= PE		
					Purge duty cycle	> 0 %		
O2 Sensor Signal Stuck Rich Bank 1 Sensor 2 <NOTE: This is a POVD DTC description>	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	Post O2 sensor cannot achieve the lean threshold voltage. AND The Accumulated mass air flow	1) Post O2S signal <= 250 mvolts AND 2) Accumulated air flow during stuck rich test > 400 grams.	No Active DTC's	TPS_ThrottleAuthority Defaulted P0131, P0137, P0151, P0157 P0132, P0138, P0152, P0158	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.
		diagnostic is an intrusive test which reduces delivered fuel to achieve the required lean threshold.	monitored during the Stuck Rich Voltage Test is greater than the threshold before the above voltage threshold is met.			P0134, P0140, P0154, P0160 P0053, P0054, P0059, P0060 P0135, P0141, P0155, P0161 P1133, P1153, P0133, P0153 EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSensorCircuit_FA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA 10.0 volts < system voltage< 18.0 volts = Valid = Not Valid = Not Valid	Green Sensor Delay Criteria The diagnostic will not be enabled until the next ignition cycle after the following has been met: 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	
					System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Low Fuel Condition Diag	= False		
					Engine Speed	400 <= RPM <= 1900		
					Engine Airflow	3 gps <= Airflow <= 12 gps		
					Vehicle Speed	24.9 mph <= Veh Speed <= 80.8 mph		
					Closed loop integral	0.95 <= C/L Int <= 1.05		
					Closed Loop Active	= TRUE		
					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		
					All of the above met for at least 2.0 seconds, Purge is commanded off, and then wait 4.0 seconds before a commanding lean ratio.			
					Fuel State	= Refer to **"P2271/P2273 - O2 Sensor Signal Stuck Rich Bank 1/2 Sensor 2"** Lean Equiv Ratio table in the Supporting Tables tab.		
					During Stuck Lean test the following can cause the test to abort			
					Piston Protection	= Active		
					Converter Mode	= Over Temperature		
					Hot Coolant Enrichment	= Active		
					Fuel State	= PE		
					Purge duty cycle	> 0 %		

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 <NOTE: This is a POPD DTC description>	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 cannot achieve the rich threshold voltage. AND The Accumulated mass air flow monitored during the Stuck Lean Voltage Test is greater than the threshold before the above voltage threshold is met.	1) Post O2S signal < 800 mvolts AND 2) Accumulated air flow during stuck lean test > 62 grams.	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.	2 trips Type B
					B1S2 Failed this key cycle	P013A, P013B, P013E, P013F, P2270 or P2271		
					System Voltage	10.0 volts < system voltage< 18.0 volts		
					Learned heater resistance	= Valid	Green Sensor Delay Criteria The diagnostic will not be enabled until the next ignition cycle after the following has been met: 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	
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid		
					Low Fuel Condition Diag	= False		
					Engine Speed to enable test	1225 <= RPM <= 2100		
					Engine Speed to disable test	1100 <= RPM <= 2225		
					Engine Airflow	4 gps <= Airflow <= 13 gps		
					Vehicle Speed to enable test	40.4 mph <= Veh Speed <= 77.7 mph		
					Vehicle Speed to disable test	37.3 mph <= Veh Speed <= 81.4 mph		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Closed loop integral 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 All of the above met for at least 3.0 seconds, and then the Force Cat Rich intrusive stage is requested.	0.82 <= C/L Int <= 1.07 = TRUE not in control of purge not in estimate mode = enabled = not active = not active = not active >= 180.0 sec 615 ºC <= Cat Temp <= 980 ºC = DFCO possible	new and cannot be enabled in service	
O2 Sensor Signal Stuck Rich Bank 1 Sensor 2 <NOTE: This is a POPD DTC description>	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 cannot achieve the lean threshold voltage. AND The Accumulated mass air flow monitored during the Stuck Rich Voltage Test is greater than the threshold before the above voltage threshold is met.	1) Post O2S signal > XXX mvolts AND 2) Accumulated air flow during stuck rich test > XX grams.	No Active DTC's B1S2 Failed this key cycle	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	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.
					System Voltage	10.0 volts < system voltage< 18.0 volts		
					Learned heater resistance	= Valid	Green Sensor Delay Criteria	
					ICAT MAT Burnoff delay	= Not Valid	The diagnostic will not be enabled until the next ignition cycle after the following has been met: 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	
					Green O2S Condition	= Not Valid		
					Low Fuel Condition Diag	= False		
					Engine Speed	1225 <= RPM <= 2100		
					Engine Airflow	4 gps <= Airflow <= 13 gps		
					Vehicle Speed	40.4 mph <= Veh Speed <= 77.7 mph		
					Closed loop integral	0.82 <= C/L Int <= 1.07		
					Closed Loop Active	= TRUE		
					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	>= 180.0 sec		
					Predicted Catalyst temp	615 ºC <= Cat Temp <= 980 ºC		
					Fuel State	= DFCO possible		
					DTC's Passed	= P2270 (and P2272 (if applicable))		
					DTC's Passed	= P013E (and P014A (if applicable))		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					DTC's Passed	= P013A (and P013C (if applicable))		
					After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).			
O2 Sensor Signal Stuck Lean Bank 2 Sensor 2 <NOTE: This is a POPD DTC description>	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 cannot achieve the rich threshold voltage. AND The Accumulated mass air flow monitored during the Stuck Lean Voltage Test is greater than the threshold before the above voltage threshold is met.	1) Post O2S signal < 775 mvolts AND 2) Accumulated air flow during stuck lean test > 60 grams.	No Active DTC's		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
						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		
					B2S2 Failed this key cycle	P013C, P013D, P014A, P014B, P2272		
					System Voltage	10.0 volts < system voltage< 32.0 volts		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Learned heater resistance	= Valid	Green Sensor Delay Criteria The diagnostic will not be enabled until the next ignition cycle after the following has been met: 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	
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid		
					Low Fuel Condition Diag	= False		
					Engine Speed to initially enable test	1250 <= RPM <= 1850		
					Engine Speed range to keep test enabled (after initially enabled)	1100 <= RPM <= 1975		
					Engine Airflow	3 gps <= Airflow <= 12 gps		
					Vehicle Speed to initially enable test	46.6 mph <= Veh Speed <= 74.6 mph		
					Vehicle Speed range to keep test enabled (after initially enabled)	41.6 mph <= Veh Speed <= 77.7 mph		
					Closed loop integral	0.92 <= C/L Int <= 1.07		
					Closed Loop Active	= TRUE		
					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	>= 180.0 sec		
					Predicted Catalyst temp	580 ºC <= Cat Temp <= 875 ºC		
					Fuel State	= DFCO possible		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					All of the above met for at least 3.0 seconds, and then the Force Cat Rich intrusive stage is requested.			
O2 Sensor Signal Stuck Rich Bank 2 Sensor 2 <NOTE: This is a POPD DTC description>	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 cannot achieve the lean threshold voltage. AND The Accumulated mass air flow monitored during the Stuck Rich Voltage Test is greater than the threshold before the above voltage threshold is met.	1) Post O2S signal > 100 mvolts AND 2) Accumulated air flow during stuck rich test > 32 grams.	No Active DTC's B2S2 Failed this key cycle System Voltage	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 10.0 volts < system voltage< 32.0 volts	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.
					Learned heater resistance	= Valid	Green Sensor Delay Criteria The diagnostic will not be enabled until the next ignition cycle after the following has been met: 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	
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid		
					Low Fuel Condition Diag	= False		
					Engine Speed	1250 <= RPM <= 1850		
					Engine Airflow	3 gps <= Airflow <= 12 gps		
					Vehicle Speed	46.6 mph <= Veh Speed <= 74.6 mph		
					Closed loop integral	0.92 <= C/L Int <= 1.07		
					Closed Loop Active	= TRUE		
					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	>= 180.0 sec		
					Predicted Catalyst temp	580 ºC <= Cat Temp <= 875 ºC		
					Fuel State	= DFCO possible		
					DTC's Passed	= P2270 (and P2272 (if applicable))		

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))		
					DTC's Passed	= P013A (and P013C (if applicable))		
					After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).			
Secondary AIR System Pressure Sensor Circuit Bank 1	P2430	This DTC detects a stuck in range pressure sensor signal when the AIR pump is commanded on.	Average Error	< 0.50 kPa	BARO	> 60 kPa	Stuck in range cumulative time > 5.0 seconds	Type B 2 trip(s)
			and		Inlet Air Temp	> 5.0 deg C.		
			Signal Variation	< 1.00 kPa	Coolant Temp	> 5.0 deg C. < 80.0 deg C.		
					Engine off time	> 7200.0 seconds		
					System Voltage	> 10.7 OR < 32.0		
				disable conditions:	MAP	< 20 kPa for 2 seconds	Frequency: Once per trip when SAI pump commanded On	
					Engine Speed	> 5000 RPM		
					MAF	> 50 gm/s for 0 seconds		
					No active DTCs:	AIRValveControlCircuit FA AIRPumpControlCircuit FA AIRSysPressSnsrB1CktLoFA AIRSysPressSnsrB1CktHiFA ControllerProcessorPerf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Secondary AIR System Pressure Sensor Performance Bank 1	P2431	This DTC detects a skewed pressure sensor signal via a comparison of the AIR pressure sensor signal and estimated BARO, as well as an evaluation of the quality of the comparison.	Difference between AIR pressure sensor and BARO (Pump Commanded Off) OR Difference between AIR pressure sensor and BARO (Pump Commanded On)	> 20.0 kPa < -20.0 kPa > 50.0 kPa	BARO Inlet Air Temp Coolant Temp Engine off time System Voltage **Skewed sensor cumulatative test weight is based on distance from the last Baro update** **Baro Skewed Sensor Weight Factor**	> 60 kPa > 5.0 deg C. > 5.0 deg C. < 80.0 deg C. > 7200.0 seconds > 10.7 OR < 32.0	Skewed sensor cumulative test weight > 5.0 seconds Continuous 6.25ms loop	Type B 2 trip(s)
				disable conditions:	MAP Engine Speed MAF No active DTCs:	< 20 kPa for 2 seconds > 5000 RPM > 50 gm/s for 0 seconds Transfer Case not in 4WD Low AIRValveControlCircuit FA AIRPumpControlCircuit FA AIRSysPressSnsrB1CktLoFA AIRSysPressSnsrB1CktHiFA MAF_SensorFA ControllerProcessorPerf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA		
Secondary AIR System Pressure Sensor Circuit Low Voltage Bank 1	P2432	This DTC detects an out of range low AIR pressure sensor signal	AIR Pressure Sensor signal	< 5 % of 5Vref			800 failures out of 1000 samples	Type B 2 trip(s)
				disable conditions:	No active DTCs:	ControllerProcessorPerf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA	6.25 ms loop Continuous	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Secondary AIR System Pressure Sensor Circuit Hi Voltage Bank 1	P2433	This DTC detects an out of range high AIR pressure sensor signal	AIR Pressure Sensor signal	> 94 % of 5Vref			800 failures out of 1000 samples	Type B 2 trip(s)
				disable conditions:	No active DTCs:	ControllerProcessorPerf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA	6.25 ms loop Continuous	
Secondary AIR System Pressure Sensor Circuit Bank 2	P2435	This DTC detects a stuck in range pressure sensor signal when the AIR pump is commanded on.	Average Error and Signal Variation	< 0.50 kPa < 1.00 kPa	BARO Inlet Air Temp Coolant Temp Engine off time System Voltage	> 60 kPa > 5.0 deg C. > 5.0 deg C. < 80.0 deg C. > 7200.0 seconds > 10.7 OR < 32.0	Stuck in range cumulative time > 5.0 seconds	Type B 2 trip(s)
				disable conditions:	MAP Engine Speed MAF No active DTCs:	< 20 kPa for 2 seconds > 5000 RPM > 50 gm/s for 0 seconds AIRValveControlCircuit FA AIRPumpControlCircuit FA AIRSysPressSnsrB1CktLoFA AIRSysPressSnsrB1CktHiFA ControllerProcessorPerf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA	Frequency: Once per trip when SAI pump commanded On	
Secondary AIR System Pressure Sensor Performance Bank 2	P2436	This DTC detects a skewed pressure sensor signal via a comparison of the AIR pressure sensor signal and estimated BARO, as well as an evaluation of the quality of the comparison.	Difference between AIR pressure sensor and BARO (Pump Commanded Off) OR Difference between AIR pressure sensor and BARO (Pump Commanded On)	> 20.0 kPa < -20.0 kPa	BARO Inlet Air Temp Coolant Temp Engine off time System Voltage	> 60 kPa > 5.0 deg C. > 5.0 deg C. < 80.0 deg C. > 7200.0 seconds > 10.7 OR < 32.0	Skewed sensor cumulative test weight > 5.0 seconds Continuous 6.25ms loop	Type B 2 trip(s)

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
				> 50.0 kPa	**Skewed sensor cumulatative test weight is based on distance from the last Baro update** **Baro Skewed Sensor Weight Factor**			
				disable conditions:	MAP Engine Speed MAF No active DTCs:	< 20 kPa for 2 seconds > 5000 RPM > 50 gm/s for 0 seconds Transfer Case not in 4WD Low AIRValveControlCircuit FA AIRPumpControlCircuit FA AIRSysPressSnsrB1CktLoFA AIRSysPressSnsrB1CktHiFA MAF_SensorFA ControllerProcessorPerf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA		
Secondary AIR System Pressure Sensor Circuit Low Voltage Bank 2	P2437	This DTC detects an out of range low AIR pressure sensor signal	AIR Pressure Sensor signal	< 5 % of 5Vref disable conditions:	No active DTCs:	ControllerProcessorPerf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA	800 failures out of 1000 samples 6.25 ms loop Continuous	Type B 2 trip(s)
Secondary AIR System Pressure Sensor Circuit Hi Voltage Bank 2	P2438	This DTC detects an out of range high AIR pressure sensor signal	AIR Pressure Sensor signal	> 94 % of 5Vref disable conditions:	No active DTCs:	ControllerProcessorPerf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA	800 failures out of 1000 samples 6.25 ms loop Continuous	Type B 2 trip(s)
Secondary AIR System Shut-off Valve Stuck Open Duel Bank System	P2440	This DTC detects if one or both of the AIR system control valves is stuck open	AIR pressure error	< **Bank 1 Valve Pressure Error** table	BARO Inlet Air Temp Coolant Temp	> 60 kPa > 5.0 deg C. > 5.0 deg C.	Phase 2 Conditional test weight > 1.5 seconds	Type B 2 trip(s)

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		This test is run during Phase 2 (Pump commanded On, valve commanded closed)		or **< Bank 2 Valve Pressure Error** table		< 80.0 deg C.		
					Engine off time	> 7200.0 seconds		
					System Voltage	> 10.7 OR < 32.0		
				or > 32 kPa for either Bank	Stability Time	> 0.5 seconds		
						AIR diagnostic Phase 1 passed		
					Conditional test weight is calculated by <u>multiplying the following Factors</u> **Phase 2 Baro Test Weight Factor** **Phase 2 MAF Test Weight Factor** **Phase 2 System Volt Test Weight Factor** **Phase 2 Ambient Temp Test Weight Factor**		Frequency: Once per trip when AIR pump commanded On	
				disable conditions:	MAP	< 20 kPa for 2 seconds		
					Engine Speed	> 5000 RPM		
					MAF	> 50 gm/s for 0 seconds		
					No active DTCs:	AIRSystemPressureSensor FA		
						AIRValveControlCircuit FA		
						AIRPumpControlCircuit FA		
						MAF_SensorFA		
						MAP_SensorFA		
						IAT_SensorFA		
						ECT_Sensor_FA		
						EngineMisfireDetected_FA		
						CatalystSysEfficiencyLoB1_FA		
						CatalystSysEfficiencyLoB2_FA		
						ControllerProcessorPerf_FA		
						5VoltReferenceA_FA		
						5VoltReferenceB_FA		
						IgnitionOutputDriver_FA		
						FuelInjectorCircuit_FA		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Secondary AIR System Pump Stuck On Duel Bank System	P2444	This DTC detects if the SAI pump is stuck On	AIR pressure error	> **Bank 1 Pump Pressure Error** table	BARO	> 60 kPa	Phase 3 Cumlatative test weight > 3.0 seconds	Type A 1 trip(s)
					Inlet Air Temp	> 5.0 deg C.		
					Coolant Temp	> 5.0 deg C.		
				or > **Bank 2 Pump Pressure Error** table		< 80.0 deg C.		
					Engine off time	> 7200.0 seconds		
		This test is run during Phase 3 (Pump commanded Off, valve commanded closed)			System Voltage	> 10.7 OR < 32.0		
				or < -32 kPa	Stability Time	> 10.0 seconds		
				either Bank		AIR diagnostic Phase 1 passed AIR diagnostic Phase 2 passed	Frequency: Once per trip when AIR pump commanded On	
					Phase 3 cumulatative test weight is based on distance from the last Baro update **Baro Skewed Sensor Weight Factor**			
				disable conditions:	MAP	< 20 kPa for 2 seconds		
					Engine Speed	> 5000 RPM		
					MAF	> 50 gm/s for 0 seconds		
					No active DTCs:	AIRSystemPressureSensor FA AIRValveControlCircuit FA AIRPumpControlCircuit FA MAF_SensorFA MAP_SensorFA IAT_SensorFA ECT_Sensor_FA EngineMisfireDetected_FA CatalystSysEfficiencyLoB1_FA CatalystSysEfficiencyLoB2_FA ControllerProcessorPerf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						IgnitionOutputDriver_FA FuelInjectorCircuit_FA		
O2 Sensor Circuit Range/Performance Bank 1 Sensor 2	P2A01	This DTC determines if the post catalyst O2 sensor is stuck in a normal 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 increases or reduces delivered fuel to achieve the required rich or lean threshold.	Post O2 sensor cannot achieve the rich threshold voltage. AND The Accumulated mass air flow monitored during the Stuck Lean Voltage Test is greater than the threshold before the above voltage threshold is met. OR Post O2 sensor cannot achieve the lean threshold voltage. AND The Accumulated mass air flow monitored during the Stuck Rich Voltage Test is greater than the threshold before the above voltage threshold is met.	1) Post O2S signal >= 730 mvolts AND Accumulated air flow > 500 grams for the stuck lean test. OR 2) Post O2S signal <= 250 mvolts AND Accumulated air flow during > 300 grams for the stuck rich test.	No Active DTC's System Voltage	TPS_ThrottleAuthority Defaulted P0131, P0137, P0151, P0157 P0132, P0138, P0152, P0158 P0134, P0140, P0154, P0160 P0053, P0054, P0059, P0060 P0135, P0141, P0155, P0161 P1133, P1153, P0133, P0153 EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSensorCircuit_FA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA 10.0 volts < system voltage< 18.0 volts	Frequency: Once per trip Green Sensor Delay Criteria The diagnostic will not be enabled until the next ignition cycle after the following has been met: 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	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid		
					Low Fuel Condition Diag	= False		
					Engine Speed	1000 <= RPM <= 3500		
					Engine Airflow	5 gps <= Airflow <= 50 gps		
					Vehicle Speed	40 mph <= Veh Speed <= 132 mph		
					Closed loop integral	0.929 <= C/L Int <= 1.07		
					Closed Loop Active	= TRUE		
					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		
					All above met and then fuel is commanded Rich			
					Fuel State	= Refer to **"P2A01 - O2 Sensor Signal Stuck Lean Bank 1 Sensor 2"** Rich Equiv Ratio table in the Supporting Tables tab.		
					During Stuck Lean test the following can cause the test to abort			
					Fuel State	= DFCO		
					Fuel State	= PE		
					Purge duty cycle	> 0 %		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					All of the above met for at least 1.0 seconds, Purge is commanded off, and then wait 3.0 seconds before a commanding lean ratio.			
					Fuel State	= Refer to **"P2A01 - O2 Sensor Signal Stuck Rich Bank 1 Sensor 2"** Lean Equiv Ratio table in the Supporting Tables tab.		
					During Stuck Lean test the following can cause the test to abort			
					Piston Protection	= Active		
					Converter Mode	= Over Temperature		
					Hot Coolant Enrichment	= Active		
					Fuel State	= PE		
					Purge duty cycle	> 0 %		
O2Sensor Circuit Range/ Performance Bank 2 Sensor 1	P2A03	This DTC determines if the O2 sensor voltage is not meeting the voltage criteria to enable closed loop fueling.	Closed Loop O2S ready flag	= False	No Active DTC's	TPS_ThrottleAuthority Defaulted MAP_SensorFA ECT_Sensor_FA FuelInjectorCircuit_FA P0131, P0151 P0132, P0152	200 failures out of 250 samples. Frequency: Continuous 100msec loop	Type B 2 trips
			A) O2S signal must be					
			1) O2S signal	> 550 mvolts				
			OR 2) O2S signal	< 350 mvolts				
			To set Closed Loop ready flag	= True	System Voltage	10.0 volts < system voltage< 32.0 volts		
			Closed Loop O2S ready flag	= True	Engine Speed	500 RPM <= Engine speed <= 3000 RPM		
			B) Once set to ready O2S cannot be		Engine Airflow	3.2 gps <= Engine Airflow<= 30.0 gps		
			1) O2S signal	> 350 mvolts	Engine Coolant	>= 65.0 ºC		
			AND 2) O2S signal	< 550 mvolts	Engine Metal Overtemp Active	= False		
			for time	> 10.0 seconds	Converter Overtemp Active	= False		
			Then set Closed Loop ready flag	= False	Fuel State	DFCO not active		
					AFM Status	= All Cylinders active		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Predicted Exhaust Temp (B1S1)	>= 0.0 ºC		
					Engine run time	> 100 seconds		
					Fuel Enrichment	= Not Active		
					All of the above met for Time	> 5 seconds		
Lost Communication With Fuel Pump Control Module	U0109	This DTC monitors for a loss of communication with the fuel pump control module	Message is not received from controller for this many counts out of these samples	12 counts 12 counts	Run/Crank Voltage	11 volts ≤ Voltage ≤ 18 volts	The diagnostic runs in the 1000 ms loop	Type B 2 trips
					Power mode is RUN			
					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.			

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

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	0.025	0.040	0.055	0.070	0.085	0.100	0.115	0.130	0.145	0.160	0.175	0.190	0.205	0.220	0.235	1.000
0.000	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
0.025	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
0.040	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
0.055	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
0.070	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
0.085	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
0.100	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
0.115	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
0.130	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
0.145	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.175	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.190	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.205	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.220	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.000	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 tabl

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	0.024	0.036	0.048	0.060	0.072	0.084	0.096	0.108	0.120	0.132	0.144	0.156	0.168	0.180	0.192	1.000
0.000	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
0.036	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
0.048	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
0.060	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
0.072	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.084	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
0.096	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
0.108	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	1	0
0.132	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.144	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.156	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.168	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0
0.180	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
0.192	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0
0.204	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0
1.000	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 tabl

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 minimum switches

	0.0	16383.8	32767.5	49151.3	65535.0
0.0	33	33	33	33	33
6.3	33	33	33	33	33
12.5	33	33	33	33	33
18.8	35	35	35	35	35
25.0	37	37	37	37	37
31.3	39	39	39	39	39
37.5	41	41	41	41	41
43.8	43	43	43	43	43
50.0	43	43	43	43	43
56.3	43	43	43	43	43
62.5	43	43	43	43	43
68.8	43	43	43	43	43
75.0	43	43	43	43	43
81.3	43	43	43	43	43
87.5	43	43	43	43	43
93.8	43	43	43	43	43
100.0	43	43	43	43	43

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

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 minimum switches

	0.0	16383.8	32767.5	49151.3	65535.0
0.0	33	33	33	33	33
6.3	33	33	33	33	33
12.5	33	33	33	33	33
18.8	35	35	35	35	35
25.0	37	37	37	37	37
31.3	39	39	39	39	39
37.5	41	41	41	41	41
43.8	43	43	43	43	43
50.0	43	43	43	43	43
56.3	43	43	43	43	43
62.5	43	43	43	43	43
68.8	43	43	43	43	43
75.0	43	43	43	43	43
81.3	43	43	43	43	43
87.5	43	43	43	43	43
93.8	43	43	43	43	43
100.0	43	43	43	43	43

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

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 minimum switches

	0.0	10.0	20.0	50.0	80.0
0.0	22	22	22	22	22
6.3	22	22	22	22	22
12.5	22	22	22	22	22
18.8	24	24	24	24	24
25.0	26	26	26	26	26
31.3	28	28	28	28	28
37.5	28	28	28	28	28
43.8	28	28	28	28	28
50.0	28	28	28	28	28
56.3	28	28	28	28	28
62.5	28	28	28	28	28
68.8	28	28	28	28	28
75.0	28	28	28	28	28
81.3	28	28	28	28	28
87.5	28	28	28	28	28
93.8	28	28	28	28	28
100.0	28	28	28	28	28

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

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 minimum switches

	0.0	10.0	20.0	50.0	80.0
0.0	22	22	22	22	22
6.3	22	22	22	22	22
12.5	22	22	22	22	22
18.8	24	24	24	24	24
25.0	26	26	26	26	26
31.3	28	28	28	28	28
37.5	28	28	28	28	28
43.8	28	28	28	28	28
50.0	28	28	28	28	28
56.3	28	28	28	28	28
62.5	28	28	28	28	28
68.8	28	28	28	28	28
75.0	28	28	28	28	28
81.3	28	28	28	28	28
87.5	28	28	28	28	28
93.8	28	28	28	28	28
100.0	28	28	28	28	28

P2270/P2272 - O2 Sensor Signal Stuck Lean Bank 1/2 Sensor 2 Rich Equiv Ratio

	0.0	500.0	1000.0	1500.0	2000.0
0.0	1.110352	1.110352	1.110352	1.120117	1.150391
25.0	1.110352	1.110352	1.110352	1.120117	1.150391
50.0	1.110352	1.110352	1.110352	1.120117	1.150391
75.0	1.110352	1.110352	1.110352	1.120117	1.150391
100.0	1.110352	1.110352	1.110352	1.120117	1.150391

Z axis is Equiv ratio during the test
Y axis is MAP (kpa)
X axis RPM

P2271/P2273 - O2 Sensor Signal Stuck Rich Bank 1/2 Sensor 2 Lean Equiv Ratio

	0.0	500.0	1000.0	1500.0	2000.0
0.0	0.919922	0.919922	0.919922	0.919922	0.919922
25.0	0.919922	0.919922	0.919922	0.919922	0.919922
50.0	0.919922	0.919922	0.919922	0.919922	0.919922
75.0	0.919922	0.919922	0.919922	0.919922	0.919922
100.0	0.919922	0.919922	0.919922	0.919922	0.919922

Z axis is Equiv ratio during the test
Y axis is MAP (kpa)
X axis RPM

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

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 Accumulated Airflow for IAT and Start-up ECT condition

Z axis is the accumulated airflow failure threshold (grams)
X axis is ECTTemperature at Power up (°C)
Y axis is IAT min during test (°C)

	IAT Range Low	Hi	-40	-28	-16	-4	8	20	32	44	56	68	80
Primary	10.0 ° C	54.5 ° C	6299	6299	6299	6299	6299	5363	4427	3491	2555	1619	683
Alternate	-7.0 ° C	10.0 ° C	8668	8668	8668	7708	6748	5788	4828	3868	2908	1948	988

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

TPS 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	0.000	0.000

MAF 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	0.946	1.000	0.858	0.943	0.000	0.000

MAF Residual Weight Factor Based on MAF Estimate

gm/sec	0.0	15.0	30.0	45.0	60.0	75.0	90.0	105.0	120.0	135.0	150.0	175.0	190.0	205.0	220.0	280.0	350.0
	1.000	1.000	1.000	1.000	1.000	0.600	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200

MAP1 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	0.943	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.000

MAP2 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	0.000	0.000

P0108: MAP Cold Run Time Threshold

X axis is Engine Coolant Temperature in Deg C

Temp	-30	-15	0	15	30
	242.0	188.0	134.0	80.0	0.0

P0068: MAP / MAF / TPS Correlation

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

X-axis	10.0006	14.9994	19.9997	25.0000	30.0003	35.0006	39.9994	44.9997	99.9985
Data	47.2188	43.7969	37.4063	36.0547	25.6875	27.8047	37.0781	100.0000	100.0000

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

X-axis	10.0006	14.9994	19.9997	25.0000	30.0003	35.0006	39.9994	44.9997	99.9985
Data	16.7422	16.6875	18.3750	20.8203	21.0859	34.4063	50.8828	255.0000	255.0000

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

X-axis	600.0000	1400.0000	2200.0000	3000.0000	3800.0000	4600.0000	5400.0000	6200.0000	7000.0000
Data	17.8984	39.1875	63.4297	80.9141	112.9219	138.3125	168.7031	174.2031	176.7031

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

X-axis	6.0000	7.0000	8.0000	9.0000	10.0000	11.0000	12.0000	13.0000	14.0000
Data	1.4844	1.9531	13.7422	42.6719	102.6719	205.2422	300.7031	300.7031	300.7031

P1682: Ignition Voltage Correlation

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

X-axis	23.0000	85.0000	95.0000	105.0000	125.0000
Data	7.0000	8.6992	9.0000	9.1992	10.0000

FASD Section_Ian MacEwer

P0171 & P0174 (LONG TERM ONLY) **Long Term Trim Lean**

% Ethanol	0.00	6.25	12.50	18.75	24.99	31.24	37.49	43.74	49.99	56.24	62.48	68.73	74.98	81.23	87.48	93.73	99.98
Long Term Fuel Trim Lean Threshold	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29

P0172 & P0175 (LONG TERM ONLY) **Non Purge Rich Limit**

% Ethanol	0.00	6.25	12.50	18.75	24.99	31.24	37.49	43.74	49.99	56.24	62.48	68.73	74.98	81.23	87.48	93.73	99.98
Long Term Fuel Non-Purge Rich Threshold	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79

P0172 & P0175 (LONG TERM ONLY) **Purge Rich Limit**

% Ethanol	0.00	6.25	12.50	18.75	24.99	31.24	37.49	43.74	49.99	56.24	62.48	68.73	74.98	81.23	87.48	93.73	99.98
Long Term Fuel Purge Rich Threshold	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80

The following tables define when the engine goes closed loop

P0171, P0172, P0174 & P0175 **Closed Loop Enable Temp vrs Coolant Temp**

Start-Up Coolant	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Close Loop Enable Temp	50	45	30	-40	-40	-40	-40	-40	-40	-40	-40	-40	-40	-40	-40	-40	-40

P0171, P0172, P0174 & P0175 **Closed Loop Enable Time vrs Coolant Temp**

Start-Up Coolant	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Close Loop Enable Time	230	200	145	75	24	18	18	17	15	11	2	2	2	2	2	2	2

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_NonSelectedCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_NonSelectedCell
FASD Enabled In Cell?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NO	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NO

P0326 Knock Detection Enabled Factors

FastRtdMax:

X - axis = Engine Speed (RPM
Y - axis = Manifold Pressure (kPa

	0	512	1024	1536	2048	2560	3072	3584	4096	4608	5120	5632	6144	6656	7168	7680	8192
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	0.0	2.0	3.0	2.0	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60	0.0	2.0	2.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
70	0.0	2.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
80	0.0	4.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
90	0.0	6.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0

100	0.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
110	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
120	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
130	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
140	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
150	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
160	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
170	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
180	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0

Knock Detection Enabled Factors

Knock Detection Enabled = FastAttackRate * FastAttackCoolGain * FastAttackBaroGair

RPM:	**0**	**512**	**1024**	**1536**	**2048**	**2560**	**3072**	**3584**	**4096**	**4608**	**5120**	**5632**	**6144**	**6656**	**7168**	**7680**	**8192**
FastAttackRate:	0.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00

ECT (deg. C):	**-40**	**-30**	**-20**	**-10**	**0**	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**	**110**	**120**
FastAttackCoolGain:	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.65	0.83	1.00	1.00	1.00	1.00	1.23	1.50

Baro:	**55.00**	**61.25**	**67.50**	**73.75**	**80.00**	**86.25**	**92.50**	**98.75**	**105.00**
FastAttackBaroGain:	0.55	0.60	0.67	0.74	0.80	0.86	1.00	1.00	1.00

KtPHSD_phi_CamPosErrorLimlc1

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	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
800	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
1200	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
1600	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
2000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
2400	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
2800	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
3200	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
3600	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
4000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
4400	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
4800	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
5200	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
5600	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
6000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
6400	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
6800	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000

KtPHSD_phi_CamPosErrorLimEc1

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	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
800	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
1200	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
1600	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
2000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
2400	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
2800	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
3200	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
3600	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
4000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
4400	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
4800	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
5200	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
5600	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
6000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
6400	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
6800	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000

KtPHSD_phi_CamPosErrorLimlc2

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	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
800	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
1200	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
1600	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
2000	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
2400	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

2800	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
3200	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
3600	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
4000	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
4400	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
4800	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
5200	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
5600	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
6000	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
6400	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
6800	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

KtPHSD_phi_CamPosErrorLimEc2

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

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	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
800	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
1200	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
1600	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
2000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
2400	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
2800	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
3200	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
3600	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
4000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
4400	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
4800	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
5200	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
5600	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
6000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
6400	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
6800	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000

KtPHSD_t_StablePositionTimeEc1

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	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
800	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
1200	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
1600	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
2000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
2400	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
2800	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
3200	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
3600	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
4000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
4400	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
4800	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
5200	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
5600	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
6000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
6400	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
6800	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000

KtPHSD_t_StablePositionTimeIc2

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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

KtPHSD_t_StablePositionTimeEc2

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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

CSED Section

KtlDLC_n_CLO_ThrshOfs

Coolant Temperature	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
RPM Offset to be considered Cat Light Off	1000	1000	250	125	125	125	125	125	125	500	1000	1000	1000	1000	1000	1000	1000

KalDLC_n_EngDsrdBase[CilDLR_PN]

Coolant Temperature	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Base RPM	950	950	950	950	950	950	950	875	750	675	675	675	675	675	675	675	675

KalDLC_n_EngDsrdBase[CilDLR_DR]

Coolant Temperature	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Base RPM	950	950	950	950	850	800	750	725	700	675	675	675	675	675	675	675	675

AFIM Section _ Ian MacEwen

KtOXYD_cmp_AFIM_LngthThrsh1

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	35008	35008	35008	35008	35008	35008	35008	35008	35008	35008	35008	35008	35008	35008	35008	35008	35008
80	35008	7520	7520	9024	16416	13312	17648	14944	16768	13472	12576	13968	14016	14016	35008	35008	35008
120	35008	7520	7520	9024	16416	13312	14224	14944	13840	14032	13296	13616	14016	16608	14400	35008	35008
160	35008	10464	8896	16224	14192	15968	14768	15648	14000	15424	14032	13632	13888	14400	14400	35008	35008
200	35008	11328	10816	13776	15632	15632	15216	17856	14928	18592	17936	16912	14000	16736	16736	35008	35008
240	35008	11328	7200	13600	17184	15632	17872	16480	16432	18720	17728	14416	12608	16960	16960	35008	35008
280	35008	11328	11328	15888	15888	18448	17728	16016	14608	17728	18464	14736	13424	19744	19744	35008	35008
320	35008	35008	35008	18528	18528	17216	16160	14448	15520	18480	18112	17232	14112	13616	13616	35008	35008
360	35008	35008	35008	18528	18528	15408	16880	14608	16432	20160	18128	17888	17184	14656	14656	35008	35008
400	35008	35008	35008	35008	16064	16064	19632	14864	17664	17248	18560	18384	15856	14912	14912	35008	35008
440	35008	35008	35008	35008	14176	14176	16240	15728	18976	18240	18112	16976	19376	15856	14912	35008	35008
480	35008	35008	35008	35008	14176	14176	16240	15808	17792	17360	19472	17152	19376	19376	35008	35008	35008
520	35008	35008	35008	35008	35008	35008	15808	15808	15712	16560	16544	19232	13568	16384	35008	35008	35008
560	35008	35008	35008	35008	35008	35008	35008	15712	15712	16560	16624	20624	16384	16384	35008	35008	35008
640	35008	35008	35008	35008	35008	35008	35008	35008	35008	35008	20624	20624	20624	35008	35008	35008	35008
720	35008	35008	35008	35008	35008	35008	35008	35008	35008	35008	35008	35008	35008	35008	35008	35008	35008
800	35008	35008	35008	35008	35008	35008	35008	35008	35008	35008	35008	35008	35008	35008	35008	35008	35008

KtOXYD_cmp_AFIM_LngthThrsh1_DoD

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
80	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
120	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
160	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
200	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
240	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
280	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
320	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
360	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
400	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
440	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
480	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
520	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
560	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
640	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
720	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
800	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000

KtOXYD_cmp_AFIM_LngthThrsh2

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
80	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
120	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
160	50000	50000	50000	50000	7040	9104	10320	10672	10656	11648	12064	11952	50000	50000	50000	50000	50000
200	50000	50000	50000	50000	8928	11696	14720	15168	13232	12768	12016	12576	50000	50000	50000	50000	50000
240	50000	50000	50000	50000	10928	12736	15008	14048	12064	12000	13888	14768	50000	50000	50000	50000	50000
280	50000	50000	50000	50000	11008	13776	14672	12896	12000	12160	14224	14480	50000	50000	50000	50000	50000
320	50000	50000	50000	50000	12720	15328	15232	13856	13472	12128	14064	15344	50000	50000	50000	50000	50000
360	50000	50000	50000	50000	13184	14816	13552	13024	13152	12720	13152	14256	50000	50000	50000	50000	50000
400	50000	50000	50000	50000	18912	17008	14848	13696	12960	12896	12864	14480	50000	50000	50000	50000	50000
440	50000	50000	50000	50000	18448	19088	15280	14448	15440	50000	50000	50000	50000	50000	50000	50000	50000
480	50000	50000	50000	50000	50000	21408	17456	17152	50000	50000	50000	50000	50000	50000	50000	50000	50000
520	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
560	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
640	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
720	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
800	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000

KtOXYD_cmp_AFIM_LngthThrsh2_DoD

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
80	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
120	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
160	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000

200	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
240	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
280	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
320	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
360	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
400	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
440	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
480	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
520	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
560	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
640	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
720	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
800	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000

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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	0	0	1	0	0	0	0	1	1	1	1	1	0	0	0	0	0
160	0	0	1	0	1	1	1	1	1	1	1	1	1	1	0	0	0
200	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
240	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
280	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0
320	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0
360	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0
400	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0
440	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0
480	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0
520	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0
560	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
640	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
720	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

KtOXYD_K_AFIM_QualFactor1_DoD

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
240	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
280	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
320	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
360	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
440	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
480	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
520	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
560	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
640	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
720	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0
200	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0
240	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0
280	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0
320	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0
360	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0
400	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0
440	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0
480	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0
520	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
560	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
640	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
720	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

KtOXYD_K_AFIM_QualFactor2_DoD

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
240	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
280	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
320	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
360	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
440	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
480	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
520	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
560	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
640	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
720	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Define Close Loop

KtFSTA_T_ClosedLoopTemp

Start-Up Coolant	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Close Loop Enable Temp	50	45	30	-40	-40	-40	-40	-40	-40	-40	-40	-40	-40	-40	-40	-40	-40

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	230	200	145	75	24	18	18	17	15	11	2	2	2	2	2	2	2

P0442: EONV Pressure Threshold Table (in Pascals)

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

	0.0000	**6.2485**	**12.4969**	**18.7454**	**24.9939**	**31.2424**	**37.4908**	**43.7393**	**49.9878**	**56.2363**	**62.4847**	**68.7332**	**74.9817**	**81.2302**	**87.4786**	**93.7271**	**99.9756**
-10.0000	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
-4.3750	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
1.2500	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
6.8750	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
12.5000	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
18.1250	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
23.7500	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
29.3750	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
35.0000	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
40.6250	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
46.2500	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
51.8750	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
57.5000	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
63.1250	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
68.7500	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
74.3750	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
80.0000	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-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	400
600	400
1200	450
1800	500
2400	600
3000	550
3600	500
4200	400
4800	380
5400	350
6000	340
6600	320
7200	300
7800	200
8400	200
9000	200
9600	200
10200	200
10800	200
11700	200
12600	200

13500	100
14400	100
15300	100
16200	100
17100	100
18000	100
19200	100
20400	100
21600	100
22800	100
24000	100
25200	100

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

P0300-P0308: Idle SCD

load
Load

(decel index (> Idle SCD AND > Idle SCD ddt Tables)

	400	500	600	700	800	900	1000	1100	1200
0	32767	32767	32767	32767	32767	32767	32767	32767	32767
6	32767	32767	32767	32767	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767
31	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767
44	32767	32767	32767	32767	32767	32767	32767	32767	32767
50	32767	32767	32767	32767	32767	32767	32767	32767	32767
56	32767	32767	32767	32767	32767	32767	32767	32767	32767
63	32767	32767	32767	32767	32767	32767	32767	32767	32767
69	32767	32767	32767	32767	32767	32767	32767	32767	32767
75	32767	32767	32767	32767	32767	32767	32767	32767	32767
81	32767	32767	32767	32767	32767	32767	32767	32767	32767
88	32767	32767	32767	32767	32767	32767	32767	32767	32767
94	32767	32767	32767	32767	32767	32767	32767	32767	32767
100	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: Idle SCD ddt

load

	400	500	600	700	800	900	1000	1100	1200
0	32767	32767	32767	32767	32767	32767	32767	32767	32767
6	32767	32767	32767	32767	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767
31	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767
44	32767	32767	32767	32767	32767	32767	32767	32767	32767
50	32767	32767	32767	32767	32767	32767	32767	32767	32767
56	32767	32767	32767	32767	32767	32767	32767	32767	32767
63	32767	32767	32767	32767	32767	32767	32767	32767	32767
69	32767	32767	32767	32767	32767	32767	32767	32767	32767
75	32767	32767	32767	32767	32767	32767	32767	32767	32767
81	32767	32767	32767	32767	32767	32767	32767	32767	32767
88	32767	32767	32767	32767	32767	32767	32767	32767	32767
94	32767	32767	32767	32767	32767	32767	32767	32767	32767
100	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
0	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
6	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
31	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
44	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
50	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
56	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
63	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
69	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
75	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
81	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
88	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
94	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
100	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
0	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
6	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
31	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
44	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
50	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
56	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
63	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
69	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
75	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
81	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
88	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
94	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
100	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
0	4000	4000	4000	4000	1600	1200	900	775	700
6	4000	4000	4000	4000	1600	1200	900	775	700
13	4000	4000	4000	4000	1800	1200	900	775	700
19	4000	4000	4000	4000	2000	1900	1500	1000	750
25	4000	4000	4000	4000	2400	1900	1500	1000	900
31	4000	4000	4000	4000	2500	1800	1500	1200	1000
38	4000	4000	4000	4000	3300	2600	1700	1300	1100
44	4000	4000	4000	4000	3700	3400	2000	2000	1400
50	4500	4500	4500	4500	4400	3500	2800	2400	1600
56	4800	4800	4800	4800	4400	4000	3300	2400	2000
63	5800	5800	5800	5800	4800	4500	4000	2450	2000
69	5900	5900	5900	5900	4850	4850	4000	2650	2200
75	5950	5950	5950	5950	4900	4850	4000	2650	2400
81	6000	6000	6000	6000	4950	4850	4400	2650	2400
88	6050	6050	6050	6050	5000	4975	4400	2900	2675

94	6100	6100	6100	6100	5050	4900	4400	2900	2675
100	6150	6150	6150	6150	5100	4950	4400	3000	2675

P0300-P0308: Idle Cyl Mode ddt

load

	400	**500**	**600**	**700**	**800**	**900**	**1000**	**1100**	**1200**
0	32767	32767	32767	32767	32767	32767	32767	32767	32767
6	32767	32767	32767	32767	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767
31	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767
44	32767	32767	32767	32767	32767	32767	32767	32767	32767
50	32767	32767	32767	32767	32767	32767	32767	32767	32767
56	32767	32767	32767	32767	32767	32767	32767	32767	32767
63	32767	32767	32767	32767	32767	32767	32767	32767	32767
69	32767	32767	32767	32767	32767	32767	32767	32767	32767
75	32767	32767	32767	32767	32767	32767	32767	32767	32767
81	32767	32767	32767	32767	32767	32767	32767	32767	32767
88	32767	32767	32767	32767	32767	32767	32767	32767	32767
94	32767	32767	32767	32767	32767	32767	32767	32767	32767
100	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: Cyl Mode

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

load
Load

	400	**500**	**600**	**700**	**800**	**900**	**1000**	**1100**	**1200**	**1400**	**1600**	**1800**	**2000**	**2200**	**2400**	**2600**	**2800**	**3000**	**3500**	**4000**	**4500**	**5000**	**5500**	**6000**	**6500**	**7000**
0	4000	4000	4000	4000	1600	1200	900	775	700	475	250	210	200	170	130	100	100	80	55	27	24	32767	32767	32767	32767	32767
6	4000	4000	4000	4000	1600	1200	900	775	700	475	250	210	200	170	130	100	100	80	55	27	24	32767	32767	32767	32767	32767
13	4000	4000	4000	4000	1800	1200	900	775	700	475	300	250	200	170	130	100	100	80	55	35	24	32767	32767	32767	32767	32767
19	4000	4000	4000	4000	2000	1900	1500	1000	750	500	300	210	160	170	130	105	80	75	50	35	25	32767	32767	32767	32767	32767
25	4000	4000	4000	4000	2400	1900	1500	1000	900	600	300	250	220	150	140	130	100	90	60	40	35	32767	32767	32767	32767	32767
31	4000	4000	4000	4000	2500	1800	1500	1200	1000	700	400	350	250	210	175	150	120	100	70	45	40	32767	32767	32767	32767	32767
38	4000	4000	4000	4000	3300	2600	1700	1300	1100	800	500	400	350	250	200	175	140	125	80	55	40	32767	32767	32767	32767	32767
44	4000	4000	4000	4000	3700	3400	2000	2000	1400	900	600	400	400	300	250	200	150	150	80	60	40	32767	32767	32767	32767	32767
50	4500	4500	4500	4500	4400	3500	2800	2400	1600	1000	700	500	400	350	250	225	200	150	90	70	45	50	50	50	30	25
56	4800	4800	4800	4800	4400	4000	3300	2400	2000	1300	800	600	450	350	300	250	225	175	100	75	55	60	50	35	30	25
63	5800	5800	5800	5800	4800	4500	4000	2450	2000	1400	1000	600	550	400	300	300	230	200	120	80	70	65	50	40	30	30
69	5900	5900	5900	5900	4850	4850	4000	2650	2200	1500	1200	750	600	400	350	300	250	200	120	100	75	70	55	45	35	35
75	5950	5950	5950	5950	4900	4850	4000	2650	2400	1700	1300	800	700	450	400	350	300	200	150	100	75	70	65	45	35	35
81	6000	6000	6000	6000	4950	4850	4400	2650	2400	1700	1350	900	700	500	400	400	325	250	160	110	80	75	65	50	40	35
88	6050	6050	6050	6050	5000	4975	4400	2900	2675	1950	1450	950	700	600	500	400	350	300	175	125	90	85	70	55	45	40
94	6100	6100	6100	6100	5050	4900	4400	2900	2675	1950	1550	1050	750	600	500	400	375	300	195	125	100	100	75	60	50	45
100	6150	6150	6150	6150	5100	4950	4400	3000	2675	2000	1650	1100	750	600	550	450	400	350	215	135	100	100	80	65	55	50

P0300-P0308: Cyl Mode ddt

load

	400	**500**	**600**	**700**	**800**	**900**	**1000**	**1100**	**1200**	**1400**	**1600**	**1800**	**2000**	**2200**	**2400**	**2600**	**2800**	**3000**	**3500**	**4000**	**4500**	**5000**	**5500**	**6000**	**6500**	**7000**
0	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
6	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
31	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	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	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
44	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
50	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
56	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
63	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
69	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
75	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
81	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
88	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
94	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
100	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: Rev Mode Table

OR (decel index > Rev Mode Table)

load

	400	**500**	**600**	**700**	**800**	**900**	**1000**	**1100**	**1200**	**1400**	**1600**	**1800**	**2000**	**2200**	**2400**	**2600**	**2800**	**3000**	**3500**	**4000**	**4500**	**5000**	**5500**	**6000**	**6500**	**7000**
0	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	50	45	37	30	15	13
6	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	50	45	37	30	15	13
13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	50	45	37	30	15	13
19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	50	45	37	30	15	13
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	50	45	37	30	15	15
31	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	50	45	37	30	16	15
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	55	45	37	30	17	16
44	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	65	45	37	30	20	17
50	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	75	50	40	30	20	17
56	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	80	55	45	33	26	23
63	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	90	60	55	37	30	26
69	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	90	65	55	45	35	30
75	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	100	75	60	45	35	33

81	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	100	85	65	50	40	33
88	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	115	90	70	55	45	40
94	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	115	100	75	60	50	43
100	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	125	110	80	70	50	47

P0300-P0308: AFM Mode Table

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

load
Load

	400	**500**	**600**	**700**	**800**	**900**	**1000**	**1100**	**1200**	**1400**	**1600**	**1800**	**2000**	**2200**	**2400**	**2600**	**2800**	**3000**	**3500**	**4000**	**4500**	**5000**	**5500**	**6000**	**6500**	**7000**
0	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
6	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
31	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	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	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
44	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
50	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
56	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
63	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
69	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
75	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
81	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
88	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
94	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
100	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: Zero torque engine load

RPM	Pct load
400	17.00
500	17.00
600	15.00
700	14.50
800	14.50
900	14.00
1000	14.00
1100	14.00
1200	14.00
1400	14.00
1600	14.00
1800	13.50
2000	13.50
2200	14.00
2400	14.00
2600	14.00
2800	14.00
3000	14.00
3500	17.25
4000	20.50
4500	23.75
5000	27.00
5500	30.25
6000	33.50
6500	36.75
7000	40.00

KcMISF_OneCylNoCatDamLvl

Catalyst Damaging Misfire Percentage

load
Load

	0	**1000**	**2000**	**3000**	**4000**	**5000**	**6000**	**7000**
0	23	23	23	21	5	5	5	5
10	23	23	23	21	5	5	5	5
20	23	23	23	21	5	5	5	5
30	23	23	23	21	5	5	5	5
40	23	23	23	20	5	5	5	5
50	21	21	20	16	5	5	5	5
60	20	20	19	14	5	5	5	5
70	19	19	18	5	5	5	5	5
80	16	16	5	5	5	5	5	5
90	15	15	5	5	5	5	5	5
100	15	15	5	5	5	5	5	5

Tables supporting AIR Diagnostics

P0411

SL Threshold Bank 1 Table — axis is average engine airflow during test in gm/se

Axis	0.0	3.0	6.0	9.0	12.0	15.0	18.0	21.0	24.0	27.0	30.0	33.0	36.0	39.0	42.0	45.0	48.0
Curve	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SL Threshold Bank 2 Table (duel Bank systems only — axis is average engine airflow during test in gm/se

Axis	0.0	3.0	6.0	9.0	12.0	15.0	18.0	21.0	24.0	27.0	30.0	33.0	36.0	39.0	42.0	45.0	48.0
Curve	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

P0411

Phase 1 Baro Test Weight Factor — axis is Baro in Kpa

Axis	40	50	60	70	80	90	100	110	120
Curve	0.0	0.0	0.5	1.0	1.0	1.0	1.0	0.5	0.0

P0411

Phase 1 MAF Test Weight Factor — axis is engine airflow in gm/sec

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

P0411

Phase 1 System Volt Test Weight Factor — axis is engine airflow in gm/sec

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

P0411

Phase 1 Amb Temp Test Weight Factor — axis is Deg C

Axis	-30	-20	-10	0	10	20	30	40	50
Curve	0.0	0.0	0.0	0.5	1.0	1.0	1.0	1.0	1.0

P02431/P2436

Baro Skewed Sensor Weight Factor — axis is distance traveled from last Baro update in Kn

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

P02440

Bank 1 Valve Pressure Error — axis weighted time in seconds

Axis	0	1	2	3	4	5	6	7	8
Curve	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0

Bank 2 Valve Pressure Error — axis weighted time in seconds

Axis	0	1	2	3	4	5	6	7	8
Curve	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0

P02440

Phase 2 Baro Test Weight Factor — axis is Baro in Kpa

Axis	40	50	60	70	80	90	100	110	120
Curve	0.0	0.0	0.5	1.0	1.0	1.0	1.0	0.5	0.0

P02440

Phase 2 MAF Test Weight Factor — axis is engine airflow in gm/sec

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

P02440

Phase 2 System Volt Test Weight Factor — axis is engine airflow in gm/sec

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

P02440

Phase 2 Amb Temp Test Weight Factor — axis is Deg C

Axis	-30	-20	-10	0	10	20	30	40	50
Curve	0.0	0.0	0.0	0.5	1.0	1.0	1.0	1.0	1.0

P02444

Bank 1 Pump Pressure Error — axis weighted time in seconds

Axis	0	1	2	3	4	5	6	7	8
Curve	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5

Bank 2 Pump Pressure Error — axis weighted time in seconds

Axis	0	1	2	3	4	5	6	7	8
Curve	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5

P0325/P0330 OpenCircuitThresh

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

OpenCircuitThresh:	10	18	25	50	54	60	65	70	75	80	85	90	95	100	105	110

P0327/P0332 ShortLowThresh

Engine Oil Temperature (deg C):	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
ShortLowThresh:	34000	34000	34000	34000	34000	34000	34000	34000	34000	32000	30000	28000	26000	24000	22000

P0328P0333 ShortHiThresh

Engine Oil Temperature (deg C):	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
ShortHiThresh:	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000

CATD Section

MinimumEngineRunTime

Coolant Temp	40	50	60	70	80
Engine Run Time	100	60	30	15	0

MinCatTemp

	X_AXIS_PTS
CATD_ExhaustWarmMin_Loc_0	300	0
CATD_ExhaustWarmMin_Loc_1	300	1
CATD_ExhaustWarmMin_Loc_2	300	2
CATD_ExhaustWarmMin_Loc_3	300	3
CATD_ExhaustWarmMin_Loc_4	300	4
CATD_ExhaustWarmMin_Loc_5	300	5
CATD_ExhaustWarmMin_Loc_6	300	6
CATD_ExhaustWarmMin_Loc_7	300	7

MinAirflowToWarmCatalyst

Engine Coolant	0	45	90
MinAirFlowToWrmCat	10	8	6

CSED Section

KtIDLC_n_CLO_ThrshOfst

Coolant Temperature	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
RPM Offset to be considered Cat Light Off	1000	1000	250	125	125	125	125	125	125	500	1000	1000	1000	1000	1000	1000	1000

KaIDLC_n_EngDsrdBase[CilDLR_PN]

Coolant Temperature	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Base RPM	950	950	950	950	950	950	950	875	750	675	675	675	675	675	675	675	675

KaIDLC_n_EngDsrdBase[CilDLR_DR]

Coolant Temperature	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Base RPM	950	950	950	950	850	800	750	725	700	675	675	675	675	675	675	675	675

P0171 & P0174 (COMB TERM ONLY) **Combined Fuel Trim Lean Threshold**

% Ethanol	0.00	6.25	12.50	18.75	24.99	31.24	37.49	43.74	49.99	56.24	62.48	68.73	74.98	81.23	87.48	93.73	99.98
Comb Fuel Trim Lean Threshold	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22

P0172 & P0175 (COMB TERM ONLY) **Combined Non Purge Rich Limit**

% Ethanol	0.00	6.25	12.50	18.75	24.99	31.24	37.49	43.74	49.99	56.24	62.48	68.73	74.98	81.23	87.48	93.73	99.98
Comb Fuel Trim Non-Purge RichThreshold	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82

P0172 & P0175 (COMB TERM ONLY) **Combined Purge Rich Limit**

% Ethanol	0.00	6.25	12.50	18.75	24.99	31.24	37.49	43.74	49.99	56.24	62.48	68.73	74.98	81.23	87.48	93.73	99.98
Comb Fuel Trim Purge Rich Threshold	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83

The following tables define when the engine goes closed loop

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

TPS Residual Weight Factor based on RPM

RPM	0	1500	2200	2500	2700	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

MAF 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

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	120.0	150.0	200.0	280.0	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	0.900	0.900	0.900

MAP1 Residual Weight Factor based on RPM

RPM	0	1500	2200	2500	2700	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

MAP2 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

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 Boos

% 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

Supercharger Intake Flow Rationality Diagnostic Failure Matrix

DTC Set	TPS Model Failure	MAF Model Failure	MAP 1 Model Failure	MAP 2 Model Failure	SCIAP 1 Model Failure	SCIAP 2 Model Failure
No DTC	F	F	F	F	F	F
No DTC	F	F	F	F	F	T
No DTC	F	F	F	F	T	F
P012B	F	F	F	F	T	T
No DTC	F	F	F	T	F	F
P1101	F	F	F	T	F	T
P1101	F	F	F	T	T	F
P1101	F	F	F	T	T	T
No DTC	F	F	T	F	F	F
P1101	F	F	T	F	F	T
P1101	F	F	T	F	T	F
P1101	F	F	T	F	T	T
P0106	F	F	T	T	F	F
P1101	F	F	T	T	F	T
P1101	F	F	T	T	T	F
P1101	F	F	T	T	T	T
No DTC	F	T	F	F	F	F
P0101	F	T	F	F	F	T
No DTC	F	T	F	F	T	F
P0101, P012B	F	T	F	F	T	T
P1101	F	T	F	T	F	F
P0101	F	T	F	T	F	T
P1101	F	T	F	T	T	F
P0101, P012B	F	T	F	T	T	T
P1101	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
P0121	T	F	F	F	F	F
No DTC	T	F	F	F	F	T
P0121	T	F	F	F	T	F
P1101	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
P0121	T	F	T	F	F	F
P1101	T	F	T	F	F	T
P0121	T	F	T	F	T	F
P1101	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
P0121	T	T	F	F	F	F
P1101	T	T	F	F	F	T
P0121	T	T	F	F	T	F
P1101	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
P0121	T	T	T	F	F	F
P1101	T	T	T	F	F	T
P0121	T	T	T	F	T	F
P1101	T	T	T	F	T	T

P0108, P012D: MAP/SCIAP Cold Run Time Threshold

X axis is Engine Coolant Temperature in Deg C

Temp	-30	-15	0	15	30
	242.0	188.0	134.0	80.0	0.0

Tables supporting Engine Oil Temperature Senso

P0196

FastFailTempDiff — **AXIS is Engine Coolant Temperature at ECM Power-up, Degrees C**

Axis	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0

TotalAccumulatedFlow — **Axis is Power up Engine Oil temperature, Curve is accumulated engine grams airflo**

Axis	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve	15000	14000	13000	12000	11000	10000	9000	8000	7000	6000	5000	4000	5000	4000	3000	3000	3000

Phaser Section

KtPHSD_phi_CamPosErrorLimlc1

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	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
800	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
1200	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
1600	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
2000	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
2400	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
2800	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
3200	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
3600	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
4000	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
4400	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
4800	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
5200	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
5600	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
6000	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
6400	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
6800	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000

KtPHSD_phi_CamPosErrorLimEc1

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	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
800	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
1200	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
1600	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
2000	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
2400	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
2800	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
3200	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
3600	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
4000	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
4400	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
4800	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
5200	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
5600	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
6000	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
6400	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
6800	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000

KtPHSD_phi_CamPosErrorLimlc2

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	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
800	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
1200	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
1600	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
2000	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
2400	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
2800	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
3200	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
3600	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
4000	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
4400	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
4800	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
5200	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
5600	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
6000	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
6400	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
6800	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000

KtPHSD_phi_CamPosErrorLimEc2

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	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
800	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
1200	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
1600	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
2000	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
2400	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
2800	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
3200	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
3600	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
4000	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
4400	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
4800	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
5200	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
5600	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
6000	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
6400	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000
6800	20.0000	20.0000	20.0000	10.0000	7.0000	5.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	6.0000

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	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
800	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
1200	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
1600	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
2000	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
2400	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
2800	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
3200	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
3600	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
4000	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
4400	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
4800	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
5200	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
5600	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
6000	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
6400	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
6800	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000

KtPHSD_t_StablePositionTimeEc1

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	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
800	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
1200	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
1600	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
2000	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
2400	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
2800	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
3200	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
3600	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
4000	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
4400	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
4800	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
5200	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
5600	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
6000	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
6400	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
6800	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000

KtPHSD_t_StablePositionTimeIc2

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	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
800	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
1200	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
1600	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
2000	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
2400	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
2800	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
3200	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
3600	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
4000	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
4400	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
4800	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
5200	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
5600	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
6000	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
6400	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
6800	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000

KtPHSD_t_StablePositionTimeEc2

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	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
800	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
1200	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
1600	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
2000	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
2400	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
2800	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
3200	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
3600	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
4000	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
4400	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
4800	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
5200	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
5600	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
6000	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
6400	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000
6800	16.000	16.000	12.000	10.000	8.500	7.000	5.000	4.000	4.000	3.000	3.000	3.000	3.000	4.000	4.000	4.000	5.000

EGR Section

KtEGRD_p_StepDelta

X axis is Kpa BARO

65	70	75	80	85	90	95	100	105
2.2266	2.2500	2.3125	2.3828	2.4844	2.6250	2.7813	2.9375	3.1406

KtEGRD_p_StepMAP_DIFF

X axis is Kpa BARO

65	70	75	80	85	90	95	100	105
0.1484	0.2422	0.3359	0.4297	0.5234	0.6172	0.7109	0.7969	0.8906

KtEGRD_Cnt_StepSamplesPerTrip

X axis is Kpa BARO

65	70	75	80	85	90	95	100	105
7.0000	6.0000	6.0000	6.0000	5.0000	5.0000	5.0000	5.0000	5.0000

KtEGRD_Cnt_SamplesAfterStep

X axis is Kpa BARO

65	70	75	80	85	90	95	100	105
39.0000	36.0000	34.0000	32.0000	30.0000	29.0000	28.0000	27.0000	27.0000

KtEGRD_Cnt_SamplesAfterReset

X axis is Kpa BARO

65	70	75	80	85	90	95	100	105
25.0000	22.0000	19.0000	17.0000	15.0000	15.0000	15.0000	14.0000	14.0000

Tables supporting Clutch Diagnostics

P0806

EngTorqueThreshold Table — AXIS is Percent Clutch Petal Position, 0 = bottom of trave

Axis	0	6.2485	12.497	18.7455	24.994	31.2425	37.491	43.7395	49.988	56.2365	62.485	68.7335	74.982	81.2305	87.479	93.7275	99.976
Curve	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

P0806

ResidualErrorEnableLow Table — AXIS is Gear

Axis	1st	2nd	3rd	4th	5th	6th	rev	neutral
Curve	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

P0806

ResidualErrorEnableHigh Table — AXIS is Gear

Axis	1st	2nd	3rd	4th	5th	6th	rev	neutral
Curve	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Cert Doc Bundle Name	**Pcodes**											
CatalystSysEfficiencyLoB1_FA	P0420											
CatalystSysEfficiencyLoB2_FA	P0430											
EvapPurgeSolenoidCircuit_FA	P0443											
EvapFlowDuringNonPurge_FA	P0496											
EvapVentSolenoidCircuit_FA	P0449											
EvapSmallLeak_FA	P0442											
EvapEmissionSystem_FA	P0455	P0446										
FuelTankPressureSnsrCkt_FA	P0452	P0453										
CoolingFanSpeedTooHigh_FA	P0495											
FuelLevelDataFault	P0461	P0462	P0463	P2066	P2067	P2068						
PowertrainRelayFault	P1682											
PowertrainRelayStateOn_FA	P0685											
PowertrainRelayStateOn_Error	P0685											
IgnitionOffTimer_FA	P2610											
IgnitionOffTimeValid	P2610											
TimeSinceEngineRunningValid	P2610											
VehicleSpeedSensor_FA	P0502	P0503	P0722	P0723								
VehicleSpeedSensorError	P0502	P0503	P0722	P0723								
FuelTrimSystemB1_FA	P0171	P0172										
FuelTrimSystemB2_FA	P0174	P0175										
A/F Imbalance Bank1	P1174											
A/F Imbalance Bank2	P1175											
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									

ClutchPositionSensorCktLo FA	P0807											
ClutchPositionSensorCktHi FA	P0808											
EthanolCompositionSensor_FA	P0178	P0179										
EngineMisfireDetected_TFTKO	P0300	P0301	P0302	P0303	P0304	P0305	P0306	P0307	P0308			
EngineMisfireDetected_FA	P0300	P0301	P0302	P0303	P0304	P0305	P0306	P0307	P0308			
KS_Ckt_Perf_B1B2_FA	P0324	P0325	P0326	P0327	P0328	P0330	P0332	P0333				
IgnitionOutputDriver_FA	P0351	P0352	P0353	P0354	P0355	P0356	P0357	P0358				
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				
O2S_Bank_1_Sensor_2_FA	P013A	P013B	P013E	P013F	P2270	P2271	P0137	P0138	P0140	P0141	P0054	
O2S_Bank_2_Sensor_1_FA	P2A03	P0151	P0152	P0153	P0154	P0155	P0059	P1153				
O2S_Bank_2_Sensor_2_FA	P013C	P013D	P014A	P014B	P2272	P2273	P0157	P0158	P0160	P0161	P0060	
ECT_Sensor_Ckt_FA	P0117	P0118										
ECT_Sensor_Ckt_TPTKO	P0117	P0118										
ECT_Sensor_Ckt_TFTKO	P0117	P0118										
ECT_Sensor_DefaultDetected	P0117	P0118	P0116	P0125								
ECT_Sensor_FA	P0117	P0118	P0116	P0125	P0128							
ECT_Sensor_TFTKO	P0117	P0118	P0116	P0125								
ECT_Sensor_Perf_FA	P0116											
ECT_Sensor_Ckt_FP	P0117	P0118										
ECT_Sensor_Ckt_High_FP	P0118											
ECT_Sensor_Ckt_Low_FP	P0117											
AmbientAirPressCktFA	P2228	P2229										
AmbientAirPressCktFA_NoSnsr	P0106	P0107	P0108									
AmbientAirDefault_NA	P0106	P0107	P0108	P2227	P2228	P2229						
AmbientAirDefault_SC	P012B	P012C	P012D	P2227	P2228	P2229						
AmbientAirDefault_NoSnsr	P0106	P0107	P0108									
AmbientAirDefault	NA is has Baro Sensor and Normally Aspirated, SC if suprecharged, NoSnsr is Normally Aspirated with no Baro Sensor											
IAT_SensorCircuitTFTKO	P0112	P0113										
IAT_SensorCircuitFA	P0112	P0113										
IAT_SensorCircuitFP	P0112	P0113										
IAT_SensorTFTKO	P0111	P0112	P0113									
IAT_SensorFA	P0111	P0112	P0113									

IAT2_SensorCktTFTKO	P0097	P0098										
IAT2_SensorCktTFTKO_NoSnsr	P0112	P0113										
IAT2_SensorCircuitFA	P0097	P0098										
IAT2_SensorCircuitFA_NoSnsr	P0112	P0113										
IAT2_SensorcircuitFP	P0097	P0098										
IAT2_SensorcircuitFP_NoSnsr	P0112	P0113										
IAT2_SensorTFTKO	P0096	P0097	P0098									
IAT2_SensorTFTKO_NoSnsr	P0111	P0112	P0113									
IAT2_SensorFA	P0096	P0097	P0098									
IAT2_SensorFA_NoSnsr	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											
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									
SCIAP_SensorFA	P012B	P012C	P012D									
SCIAP_SensorTFTKO	P012B	P012C	P012D									
SCIAP_SensorCircuitFP	P012C	P012D										
AfterThrottlePressureFA_NA	P0106	P0107	P0108									
AfterThrottlePressureFA_SC	P012B	P012C	P012D									
AfterThrottleVacuumTFTKO_NA	P0106	P0107	P0108									
AfterThrottleVacuumTFTKO_SC	P012B	P012C	P012D									
SCIAP_SensorCircuitFA	P012C	P012D										
AfterThrottlePressTFTKO_NA	P0106	P0107	P0108									
AfterThrottlePressTFTKO_SC	P012B	P012C	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
AnyCamPhaser_FA	P0010	P0011	P0013	P0014	P0020	P0021	P0023	P0024				
AnyCamPhaser_TFTKO	P0010	P0011	P0013	P0014	P0020	P0021	P0023	P0024				
IntkCamPhaser_FA	P0010	P0011	P0020	P0021								
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										
EngineMetalOvertempActive	P1258											
A/C_FailedOn	P0645											

EngOilTempSensorCircuitFA	P0197	P0198										
EngOilModeledTempValid	ECT_Sensor_FA or 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	VehicleSpeedSensorError or MAP_SensorFA											
FuelInjectorCircuit_FA	P0201	P0202	P0203	P0204	P0205	P0206	P0207	P0208				
FuelInjectorCircuit_TFTKO	P0201	P0202	P0203	P0204	P0205	P0206	P0207	P0208				
ControllerProcessorPerf_FA	P0606											
ControllerRAM_Error_FA	P0604											
TPS_Performance_FA	P0068	P0121	P1516	P2101								
EnginePowerLimited	P0068	P0606	P0120	P0122	P0123	P0220	P0222	P0223	P0641	P0651		
	P1516	P2101	P2120	P2122	P2123	P2125	P2127	P2128	P2135	P2138	P2176	
TPS1_OutOfRange_Composite	P0120	P0122	P0123									
TPS2_OutOfRange_Composite	P0220	P0222	P0223									
TPS_FA	P2135	(TPS1_OutOfRange_Composite and TPS2_OutOfRange_Composite)										
TPS_FaultPending	Always set to FALSE, As ETC diagnostics are set within 200 msec there is no real need for a pending flag											
TPS_ThrottleAuthorityDefaulted	P0068	P0606	P1516	P2101	P2135	P2176	V5B_OutOfRange_Composite					
	(TPS1_OutOfRange_Composite and TPS2_OutOfRange_Composite)											
	(MAP_OutOfRange_Composite and MAF_OutOfRange_Composite)											
AcceleratorEffectivePstnValid	Always set to TRUE, no P codes will set to FALSE											
5VoltReferenceA_FA	P0641											
5VoltReferenceB_FA	P0651											

IAC_SystemRPM_FA	P0506	P0507										
TCM_EngSpdReqCkt	P150C											
TransmissionGearDefaulted	P182E	P1915										
TransmissionEngagedState_FA	P182E	P1915										
FourWheelDriveLowStateValid	P2771											
EngineTorqureInaccurate	EngineMisfireDetected_FA or											
	FuelInjectorCircuit_FA or											
	FuelInjectorCircuit_TFTKO or											
	FuelTrimSystemB1_FA or											
	FuelTrimSystemB2_FA or											
	MAF_SensorTFTKO or											
	MAP_SensorTFTKO or											
	EGRValvePerformance_FA											
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											
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 ≥ 0.0 liters											
	AND											
	Transfer Pump on Time < refer to **"P0461, P2066, P2636: Transfer Pump Enable"** in the Supporting Tables tab											
	AND											
	Transfer Pump had been Off for at least 0.0 seconds											
	AND											
	Evap Diagnostic (Purge Valve Leak Test, Large Leak											
	AND											
	Engine Running											

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Wheel Speed Sensors								
Left Front Wheel Speed Sensor Circuit Low	C1221	The left front wheel speed sensor (WSS) is open.	WSS feedback voltage Pass Threshold	< 0.20v > 0.20v	Sys Voltage Sys Voltage No Active DTCs:	> 9.0v < 19.5v C1221 C1FFF	> 100ms	two trips
Right Front Wheel Speed Sensor Circuit Low	C1222	The right front wheel speed sensor is open.	WSS feedback voltage Pass Threshold	< 0.20v > 0.20v	Sys Voltage Sys Voltage No Active DTCs:	> 9.0v < 19.5v C1222 C1FFF	> 100ms	two trips
Left Rear Wheel Speed Sensor Circuit Low	C1223	The left rear wheel speed sensor is open.	WSS feedback voltage Pass Threshold	< 0.20v > 0.20v	Sys Voltage Sys Voltage No Active DTCs:	> 9.0v < 19.5v C1223 C1FFF	> 100ms	two trips
Right Rear Wheel Speed Sensor Circuit Low	C1224	The right rear wheel speed sensor is open.	WSS feedback voltage Pass Threshold	< 0.20v > 0.20v	Sys Voltage Sys Voltage No Active DTCs:	> 9.0v < 19.5v C1224 C1FFF	> 100ms	two trips
Left Front Wheel Speed Sensor Circuit High	C1221	The left front wheel speed sensor is shorted.	WSS feedback voltage OR ORION ASIC detects current Pass Threshold	> 2.20v > 35ma < 2.2v	Sys Voltage Sys Voltage No Active DTCs:	> 9.0v < 19.5v C1FFF	> 100ms	two trips
Right Front Wheel Speed Sensor Circuit High	C1222	The right front wheel speed sensor is shorted.	WSS feedback voltage OR ORION ASIC detects current Pass Threshold	> 2.20v > 35ma < 2.2v	Sys Voltage Sys Voltage No Active DTCs:	> 9.0v < 19.5v C1FFF	> 100ms	two trips
Left Rear Wheel Speed Sensor Circuit High	C1223	The left rear wheel speed sensor is shorted.	WSS feedback voltage OR ORION ASIC detects current Pass Threshold	> 2.20v > 35ma < 2.2v	Sys Voltage Sys Voltage No Active DTCs:	> 9.0v < 19.5v C1FFF	> 100ms	two trips
Right Rear Wheel Speed Sensor Circuit High	C1224	The right rear wheel speed sensor is shorted.	WSS feedback voltage OR ORION ASIC detects current Pass Threshold	> 2.20v > 35ma < 2.2v	Sys Voltage Sys Voltage No Active DTCs:	> 9.0v < 19.5v C1FFF	> 100ms	two trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Left Front Wheel Speed Sensor Circuit	C1225	The left front WSS signal has dropped out. It has stopped producing edges.	Number of detected edges	= 0 edges	Veh Vel System Voltage No Active DTCs:	> 8.0 mph < 19.5v C1221 C1FFF	20ms	two trips
		Missing signal. The left front wheel speed sensor is no longer being detected.	For Single Missing, TC Active, and Multiple Missing WSS's: Wheel Speed	< Larger of: (0.2 x MAX) or 1.1 mph Note: MAX is the maximum filtered velocity from the other 3 wheels	Accel (on all wheels) Veh Vel (largest from all 4 wheels) No Active DTCs:	< 17.16m/s/s > 8.0 mph C1221 C1FFF	Single: Time > 5s Single TC Active: Time > 60s Multiple: Time > 2minutes Pass: > 15 ms	two trips
Right Front Wheel Speed Sensor Circuit	C1226	The right front WSS signal has dropped out. It has stopped producing edges.	Number of detected edges	= 0 edges	Veh Vel System Voltage No Active DTCs:	> 8.0 mph < 19.5v C1222 C1FFF	20ms	two trips
		Missing signal. The right front wheel speed sensor is no longer being detected.	For Single Missing, TC Active, and Multiple Missing WSS's: Wheel Speed	< Larger of: (0.2 x MAX) or 1.1 mph Note: MAX is the maximum filtered velocity from the other 3 wheels	Accel (on all wheels) Veh Vel (largest from all 4 wheels) No Active DTCs:	< 17.16m/s/s > 8.0 mph C1222 C1FFF	Single: Time > 5s Single TC Active: Time > 60s Multiple: Time > 2minutes Pass: > 15 ms	two trips
Left Rear Wheel Speed Sensor Circuit	C1227	The left rear WSS signal has dropped out. It has stopped producing edges.	Number of detected edges	= 0 edges	Veh Vel System Voltage No Active DTCs:	> 8.0 mph < 19.5 C1223 C1FFF	20ms	two trips
		Missing signal. The left rear wheel speed sensor is no longer being detected.	For Single Missing, TC Active, and Multiple Missing WSS's: Wheel Speed	< Larger of: (0.2 x MAX) or 1.1 mph Note: MAX is the maximum filtered velocity from the other 3 wheels	Accel (on all wheels) Veh Vel (largest from all 4 wheels) No Active DTCs:	< 17.16m/s/s > 8.0 mph C1223 C1FFF	Single: Time > 5s Single TC Active: Time > 60s Multiple: Time > 2minutes Pass: > 15 ms	two trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Right Rear Wheel Speed Sensor Circuit	C1228	The right rear WSS signal has dropped out. It has stopped producing edges.	Number of detected edges	= 0 edges	Veh Vel System Voltage No Active DTCs:	> 8.0 mph < 19.5 C1224 C1FFF	20ms	two trips
		Missing signal. The right rear wheel speed sensor is no longer being detected.	For Single Missing, TC Active, and Multiple Missing WSS's: Wheel Speed	< Larger of: (0.2 x MAX) or 1.1 mph Note: MAX is the maximum filtered velocity from the other 3 wheels	Accel (on all wheels) Veh Vel (largest from all 4 wheels) No Active DTCs:	< 17.16m/s/s > 8.0 mph C1224 C1FFF	Single: Time > 5s Single TC Active: Time > 60s Multiple: Time > 2minutes Pass: > 15 ms	two trips
Left Front Wheel Speed Sensor Circuit Range/Performance	C1225	Erratic signal. The left front WSS is exhibiting erratic behavior with a large acceleration.	|WSS Accel| Pass Threshold	> 491 m/s/s < 491m/s/s	Veh Vel No Active DTCs:	> 8.0 mph C1221 C1FFF	280ms Pass >30s	two trips
Right Front Wheel Speed Sensor Circuit Range/Performance	C1226	Erratic signal. The right front WSS is exhibiting erratic behavior with a large acceleration.	|WSS Accel| Pass Threshold:	> 491 m/s/s < 491m/s/s	Veh Vel No Active DTCs:	> 8.0 mph C1222 C1FFF	280ms Pass >30s	two trips
Left Rear Wheel Speed Sensor Circuit Range/Performance	C1227	Erratic signal. The left rear WSS is exhibiting erratic behavior with a large acceleration.	|WSS Accel| Pass Threshold	> 491 m/s/s < 491m/s/s	Veh Vel No Active DTCs:	> 8.0 mph C1223 C1FFF	280ms Pass >30s	two trips
Right Rear Wheel Speed Sensor Circuit Range/Performance	C1228	Erratic signal. The right rear WSS is exhibiting erratic behavior with a large acceleration.	|WSS Accel| Pass Threshold	> 491 m/s/s < 491m/s/s	Veh Vel No Active DTCs:	> 8.0 mph C1224 C1FFF	280ms Pass >30s	two trips
Controller								
EBCM Device Voltage Excessive High	C12E2	System voltage is too high for certain operations.	System voltage Pass Threshold	> 19.5 Volts <19 volts	Ignition	Motor not being Cranked	100ms	two trips
Controller								
EBCM SPI	C1FFF	Comparison of loopback data to command sent	Count of Consecutive Comparison Failures	> 2 failures		Upon Starting Scheduler in the Application	15 msec	two trips
EBCM SPI Queue Overrun	C1FFF	Monitor queue usage	SPI message queue overflows	N/A		Upon Starting Scheduler in the Application	15 msec	two trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
EBCM BIST Failure	C1FFF	The Built In Self Test (BIST) is responsible for testing the internal functionality of the core within the main microprocessor	Count of Consecutive Failures	= 2		Upon Starting Scheduler in the Application	15ms	two trips
EBCM Random Access Memory (RAM)	C1FFF	The following tests are continuously ran: 1. Read/write of the micro's RAM registers. 2. Address check of the RAM address lines. 3. Verify that the RAM location used to store the persistent address line test address (offset) advances to the next address line address. 4. Perform data check on a RAM address that includes a dependency check against another RAM location that is address adjacent to the RAM location being tested. 5. Verify that the RAM location used to store the persistent data test address advances to the next test address.	Test Location in RAM Failure reaction: If any of the tests fail, the system is forced into a reset by writing an invalid watchdog key to the system registers. If the RAM failure is NOT detected by the bootloader static RAM check algorithm then a fault code is set and the exact type of RAM failure is written to NVRAM.	≠ to expected value		Upon Starting Scheduler in the Application	15ms	two trips
EBCM Read Only Memory (ROM)	C1FFF	This check is called from the scheduler each loop. Each ROM section is check-summed by byte. Each byte will be added to the current checksum for a section. If the byte being checked is the last byte of a section, then the section is verified for a correct checksum.	ROM Section's Checksum	≠ 0		Upon Starting Scheduler in the Application	Immediate	two trips
EBCM Stack Failure	C1FFF	To detect underflow and overflow of the system stacks, a word of RAM is reserved at the end of each of the system stacks. A word of RAM is also reserved at the upper-most address of the stack section. The contents of these reserved words will be monitored periodically to determine if they have been modified. To detect cases where	End of Stack RAM location	≠ to expected value Note: Set values changed after every run of the test		Upon Starting Scheduler in the Application	Immediate	two trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		the application could be pushing a value onto the stack that matches the test value, the test value that is stored at these reserved addresses will be changed each update.						
EBCM Processor Overrun	C1FFF	Processor did not perform a proper shutdown. NVRAM blocks written at shutdown do not match expected values upon startup. Processing interrupt occurred.	The contents of the two NVRAM blocks are compared upon start-up with expected values from shutdown process.	Blocks do not compare		Upon Starting Scheduler in the Application	15ms	two trips
EBCM Unimplemented Interrupt	C1FFF	This fault is set if an interrupt occurs that has no explicit interrupt handler defined.	Interrupt Set	Asserted Interrupt is not supported		Upon Starting Scheduler in the Application	15ms	two trips
EBCM Unexpected Exception	C1FFF	This fault is set if an exception that is not supported in our system has been generated.	Exception Set	Asserted Exception is not supported		Upon Starting Scheduler in the Application	15ms	two trips
EBCM High End Timer Program Error	C1FFF	Execution of the High End Timer (HET) program is limited to the actual instructions of the HET program. Execution of default instructions indicates program execution error.	Default Instruction get executed	N/A		Upon Starting Scheduler in the Application	15ms	two trips
EBCM High End Timer Program Overflow	C1FFF	If the HET program does not complete execution time within one HET loop time, the current HET program is aborted and the next program execution is started and a fault code is set.	HET Program Execution Time	> 4.6 microseconds		Upon Starting Scheduler in the Application	15ms	two trips
EBCM High End Timer (HET) Watchdog	C1FFF	If the HET monitor task is not executed within the allowed time frame, a counter is decremented. When the counter decrements to zero, an interrupt is generated and this fault is set.	Counter value	= 0 Note: Timer is initialized to 1739 counts (8 ms) every 6 ms		Upon Starting Scheduler in the Application	8ms	two trips
EBCM High End Timer Periodic Interrupt	C1FFF	This failsafe verifies that a solenoid feedback interrupt generates a high end timer(HET) interrupt every loop cycle.	Solenoid Feedback Interrupt from the HET	Threshold is Calculated based on Solenoid activity		Upon Starting Scheduler in the Application	15ms	two trips

Hybrid Brake System

COMPONENT/SYSTEM

List DTC of monitor that detects the following failure malfunction:

MONITORING REQUIREMENTS

List DTC of monitor used that detects the following failure mode:

Monitor/System		OOR-low	Circuit low	OOR- high	Circuit high	open circuit	Rationality-low	Rationality-high	Other Rationality	Functional #1	Functional #2	Other Functional
Right front wheel speed sensor		C1222	C1222	C1222	C1222	C1222			C1226			
Right rear wheel speed sensor		C1224	C1224	C1224	C1224	C1224			C1228			
Left front wheel speed sensor		C1221	C1221	C1221	C1221	C1221			C1225			
Left rear wheel speed sensor		C1223	C1223	C1223	C1223	C1223			C1227			
Brake Pressure Sensor		C1102	C1102	C1103	C1103	C1102	C1101	C1101				
Brake Booster Pressure Sensor		P0557	P0557	P0558	P0558	P0557			P0556			
Brake Booster									P050F			
Controller									C12E2	C1FFF		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Fuel Rail Pressure (FRP) Sensor Performance (Rationality)	P018B	This DTC detects if the fuel pressure sensor is stuck within the normal operating range	Absolute value of change in fuel pressure as sensed during intrusive test.	<= 30 kPa			Frequency: Continuous; 12.5 ms loop. 60 seconds between intrusive tests that pass Intrusive test requested if fuel system is clamped for >= 5 seconds or fuel pressure error variance <= typically (0.3 to 0.6) (calculated over a 2.5sec period); otherwise report pass	DTC Type A 1 trip
					1. FRP Circuit Low DTC (P018C)	not active		
					2. FRP Circuit High DTC (P018D)	not active		
					3. FuelPump Circuit Low DTC (P0231)	not active	Duration of intrusive test is fueling related (5 to 12 seconds).	
					4. FuelPump Circuit High DTC (P0232)	not active		
					5. FuelPump Circuit Open DTC (P023F)	not active	Intrusive test is run when fuel flow is below Max allowed fuel flow rate (Typical values in the range of 11 to 50 g/s)	
					6. Reference Voltage DTC (P0641)	not active		
					7. Reference Voltage DTC (P06A6)	not active		
					8. Fuel Pump Control Module Driver Over-temperature DTC's (P064A, P1255)	not active		
					9. Control Module Internal Performance DTC (P0606)	not active		
					10. Engine run time	>=5 seconds		
					11. Emissions fuel level (PPEI $3FB)	not low		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					12. Fuel pump control 13. Fuel pump control state 14. Engine fuel flow 15. ECM fuel control system failure (PPEI $1ED)	enabled normal or FRP Rationality control > 0.047 g/s failure has not occurred		
Fuel Rail Pressure (FRP) Sensor Circuit Low Voltage	P018C	This DTC detects if the fuel pressure sensor circuit is shorted to low	FRP sensor voltage	< 0.14 V	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Rail Pressure (FRP) Sensor Circuit High Voltage	P018D	This DTC detects if the fuel pressure sensor circuit is shorted to high	FRP sensor voltage	> 4.86 V	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Pump Control Circuit Low Voltage	P0231	This DTC detects if the fuel pump control circuit is shorted to low	Fuel Pump Current	> 14.48A	Ignition OR HS Comm OR Fuel Pump Control AND Ignition Run/Crank Voltage	Run or Crank enabled enabled 9V < voltage < 18V	72 test failures in 80 test samples if Fuel Pump Current <100A 3 test failures in 15 test samples if Fuel Pump Current >=100A 1 sample/12.5 ms	DTC Type A
Fuel Pump Control Circuit High Voltage	P0232	This DTC detects if the fuel pump control circuit is shorted to high	Voltage measured at fuel pump circuit	> 3.86 V	Commanded fuel pump output Fuel pump control enable Time that above conditions are	0% duty cycle (off) False >=4.0 seconds	36 test failures in 40 test samples; 1 sample/12.5ms Pass/Fail determination made only once per trip	DTC Type A

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Fuel Pump Control Circuit (Open)	P023F	This DTC detects if the fuel pump control circuit is open	Fuel Pump Current AND Fuel Pump Duty Cycle	<=0.5A >20%	Ignition OR HS Comm OR Fuel Pump Control AND Ignition Run/Crank Voltage	Run or Crank enabled enabled 9V < voltage < 18V	72 test failures in 80 test samples; 1 sample/12.5ms	DTC Type A
Fuel System Control Module Enable Control Circuit	P025A	This DTC detects if there is a fault in the fuel pump control enable circuit	PPEI (PPEI (Powertrain Platform Electrical Interface) Fuel System Request ($1ED)	≠ Fuel Pump Control Module Enable Control Circuit	Ignition AND PPEI Fuel System Request ($1ED)	Run or Crank valid	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if any software or calibration check sum is incorrect	Calculated Checksum (CRC16)	≠ stored checksum for any of the parts (boot, software, application calibration, system calibration)	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 failure if it occurs during the first ROM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background	DTC Type A 1 trip
Control Module Not Programmed	P0602	Indicates that the FSCM needs to be programmed	This DTC is set via calibration, when KeMEMD_b_NoStartCal	TRUE	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	Runs once at power up	DTC Type A 1 trip
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up	≠ checksum at power-down	Ignition	Run or Crank	1 failure Frequency: Once at power-up	DTC Type A 1 trip

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					OR HS Comm OR Fuel Pump Control	 enabled enabled		
Control Module Random Access Memory (RAM)	P0604	Indicates that control module is unable to correctly write and read data to and from RAM	Data read	≠ Data written	 Ignition OR HS Comm OR Fuel Pump Control	 Run or Crank enabled enabled	1 failure if it occurs during the first RAM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background.	DTC Type A 1 trip
Control Module Internal Performance 1. Main Processor Configuration Register Test 2. Processor clock test 3. External watchdog test	P0606	This DTC indicates the FSCM has detected an internal processor fault or external watchdog fault (PID $2032 can tell what causes the fault.)	1. For all I/O configuration register faults: •Register contents 2. For Processor Clock Fault: •EE latch flag in EEPROM. OR • RAM latch flag. 3. For External Watchdog Fault: • Software control of fuel pump driver	 Incorrect value. 0x5A5A 0x5A Control Lost	 Ignition OR HS Comm OR Fuel Pump Control 1. For all I/O configuration register faults: •KeMEMD_b_ProcFltCfgRegEnbl 2. For Processor Clock Fault: •KeMEMD_b_ProcFltCLKDiagEnbl 3. For External Watchdog Fault: •KeFRPD_b_FPExtWDogDiagEnbl 3. For External Watchdog Fault: •Control Module ROM(P0601) 3. For External Watchdog Fault: •Control Module RAM(P0604)	 Run or Crank enabled enabled TRUE TRUE TRUE not active not active	Tests 1 and 2 1 failure Frequency: Continuously (12.5ms) Test 3 3 failures out of 15 samples 1 sample/12.5 ms	DTC Type A 1 trip

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Control Module Long Term Memory (EEPROM) Performance	P062F	Indicates that the NVM Error flag has not been cleared	Last EEPROM write	Did not complete	Ignition OR HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 test failure Once on controller power-up	DTC Type A 1 trip
5 Volt Reference Circuit (Short High/Low)	P0641	Detects a continuous short on the #1 5V sensor reference circuit	Reference voltage AND Output OR Reference voltage AND Output OR Reference voltage AND Output	>= 0.5V . inactive >= 5.5V active <= 4.5V active	Ignition	Run or Crank	20 samples 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Pump Control Module - Driver Over-temperature 1	P064A	This DTC detects if an internal fuel pump driver overtemperature condition exists under normal operating conditions (Tier 1 supplier Continental responsibility)	Module Range of Operation **AND** Fuel pump driver Temp	1. Module is within Acceptable Operation Range (Continental's responsibility - FSCM is in normal operating range for module voltage versus PWM duty cycle. Linear range from 100% @ 12.5V to 70% @ 18V.) > 190C	Ignition OR HS Comm OR Fuel Pump Control KeFRPD_b_FPOverTempDiagEnbl Ignition Run/Crank	Run or Crank enabled enabled TRUE 9V<voltage<18V	3 failures out of 15 samples 1 sample/12.5 ms	DTC Type B 2 trips
5 Volt Reference Circuit (Out of Range)	P06A6	Detects that the #1 5 V sensor reference circuit is out of range	Reference voltage	> 102.5% nominal (i.e. 5.125V) OR < 97.5% nominal (i.e. 4.875V)	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Fuel Pump Control Module - Driver Over-temperature 2	P1255	This DTC detects if an internal fuel pump driver overtemperature condition exists under extreme operating conditions (GM's responsibility)	Module Range of Operation **AND** Fuel pump driver Temp	Outside normal range (FSCM is NOT in normal operating range for module voltage versus PWM duty cycle. Linear range from 100% @ 12.5V to 70% @ 18V.) > 190C	Ignition OR HS Comm OR Fuel Pump Control KeFRPD_b_FPOverTempDiagEnbl Ignition Run/Crank	Run or Crank enabled enabled TRUE 9V<voltage<18V	3 failures out of 15 samples 1 sample/12.5 ms	DTC Type B 2 trips
Ignition 1 Switch Circuit Low Voltage	P2534	This DTC detects if the Ignition1 Switch circuit is shorted to low or open	Ignition 1 voltage	<= 6 V	Engine	Running	180 failures out of 200 samples 1 sample/25.0 ms	DTC Type A 1 trip
Fuel Pump Flow Performance	P2635	This DTC detects degradation in the performance of the PFI electronic return-less fuel system	Filtered fuel rail pressure error	<= Low Threshold (function of desired fuel rail pressure and fuel flow rate. 15% of resultant Target Pressure in the range of -28.4 to -193.5 kPa.) **OR** <= High Threshold (function of desired fuel rail pressure and fuel flow rate. 15% of resultant Target Pressure in the range of +19.5 to +166.5 kPa.) .	1. FRP Circuit Low DTC (P018C) 2. FRP Circuit High DTC (P018D) 3. Fuel Rail Pressure Sensor Performance DTC (P018B) 4. FuelPump Circuit Low DTC (P0231) 5. FuelPump Circuit High DTC (P0232) 6. FuelPump Circuit Open DTC (P023F) 7. Reference Voltage DTC (P0641) 8. Reference Voltage DTC (P06A6)	not active not active . . . not active not active not active not active not active not active	Filtered fuel rail pressure error Time Constant = 12.5 seconds Frequency: Continuous 12.5 ms loop	DTC Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					9. Fuel Pump Control Module Driver Over-temperature DTC's (P064A, P1255)	not active		
					10. Control Module Internal Performance DTC (P0606)	not active		
					11. An ECM fuel control system failure (PPEI $1ED)	has not occurred		
					12. The Barometric pressure (PPEI $4C1) signal	valid (for absolute fuel pressure sensor)		
					13. Engine run time	>= 30 seconds		
					14. Emissions fuel level (PPEI $3FB)	not low		
					15. Fuel pump control	enabled		
					16. Fuel pump control state	normal		
					17. Battery Voltage	11V<=voltage=<18V		
					18. Fuel flow rate	> 0.047 g/s **AND** <= Max allowed fuel flow rate as a function of desired rail pressure & Vbatt (Typical values in the range of 11 to 50 g/s)		
					19. Fuel Pressure Control System	Is not responding to an over-pressurization due to pressure build during DFCO or a decreasing desired pressure command.		
Control Module Communication Bus "A" Off	U0073	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Bus Status	Off	1. Power mode	Run/Crank	5 failures out of 5 samples (5 seconds)	DTC Type B 2 trips
Lost Communication With ECM/PCM "A"	U0100	Detects that CAN serial data communication has been lost with the ECM	Message $0C9	Undetected	1. Power mode	Run/Crank	12 failures out of 12 samples (12 seconds)	DTC Type B 2 trips
					2. Ignition Run/Crank Voltage	(11 – 18 V)		
					3. U0073	not active		