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 7.5 Cam Deg for at least KtPHSD_t_StablePositionTimeIc1 seconds (see Supporting Table)	200 failures out of 1000 samples 100 ms /sample	Type B 2 trips
Exhaust Camshaft Actuator Solenoid Circuit – Bank 1 (for applications with a Bank 1 exhaust cam phaser)	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	19 failures out of 30 samples 250 ms /sample, continuous	Type B 2 trips
Exhaust Camshaft System Performance – Bank 1 (for applications with a Bank 1 exhaust cam phaser)	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 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 1.0 Cam Deg for at least KtPHSD_t_StablePositionTimeEc1 seconds (see Supporting Table)	135 failures out of 150 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.
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 11 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 P0340, P0341 5VoltReferenceA_FA 5VoltReferenceB_FA P0341	4 failures out of 5 samples if the engine is being assisted by the starter 24 failures out of 30 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 1 Sensor B (for applications with a Bank 1 exhaust cam phaser)	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 8 crank degrees before or 9 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 P0365, P0366 5VoltReferenceA_FA 5VoltReferenceB_FA P0366	4 failures out of 5 samples if the engine is being assisted by the starter 24 failures out of 30 samples if the engine is running without assistance from the starter One sample per cam rotation	Type B 2 trips
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	= Crank or Run position 11.0 volts < Ign Voltage < 18.0 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	
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
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 < 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 < 2.8 ohms -OR- Calculated Heater Resistance > 9.5 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 >= 3.00 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 < 4.1 ohms -OR- Calculated Heater Resistance > 10.8 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 >= 3.00 seconds		
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 < 18.0 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 < 2.8 ohms -OR- Calculated Heater Resistance > 9.5 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 >= 3.00 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 < 4.1 ohms -OR- Calculated Heater Resistance > 10.8 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 >= 3.00 seconds	Once per valid cold start	Type B 2 trips
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	Table, f(TPS). See supporting tables	Engine Speed	> 800 RPM	Continuously fail MAP and MAF portions of	Type: A

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Ref), or P0107 (MAP circuit low), or P0108 (MAP circuit high) have failed this key cycle, then MAP portion of diagnostic fails			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	diagnostic for 0.1875 sec Continuous in primary processor	MIL: YES Trips: 1
			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(RPM). See supporting tables Table, f(Volts). See supporting tables				
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 AND ABS(Measured MAP – MAP Model 2) Filtered	<= 400 kPa*(g/s) > 21 grams/sec > 22.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 450 RPM <= 5800 RPM > 69 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.00	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 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_FA IAT_SensorFA IAT_SensorFP CylDeacSystemTFTKO		
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	<= 1126 Hertz (~ 0.76 gm/sec)	Engine Run Time Engine Speed Ignition Voltage Above criteria present for a period of time	> 1.0 seconds >= 300 RPM >= 8.0 Volts >= 1.0 seconds	400 failures out of 500 samples 1 sample every cylinder firing event	Type B 2 trips
Mass Air Flow Sensor Circuit High Frequency	P0103	Detects a high frequency output from the MAF sensor	MAF Output	>= 14500 Hertz	Engine Run Time	> 1.0 seconds	400 failures out of 500 samples	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
				(~ 969.05 gm/sec)	Engine Speed Ignition Voltage Above criteria present for a period of time	>= 300 RPM >= 8.0 Volts >= 1.0 seconds	1 sample every cylinder firing event	
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	<= 400 kPa*(g/s) > 22.0 kPa > 22.0 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:	>= 450 RPM <= 5800 RPM > 69 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.00 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 EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensorFA	Continuous Calculations are performed every 12.5 msec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						ECT_sensor_FA ECT_Sensor_FP IAT_SensorFA IAT_SensorCircuitFP CylDeacSystemTFTKO		
Manifold Absolute Pressure Sensor Circuit Low	P0107	Detects a continuous short to low or open in either the signal circuit or the MAP sensor.	MAP Voltage	< 3.0 % of 5 Volt Range (0.2 Volts = 3.5 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips
Manifold Absolute Pressure Sensor Circuit High	P0108	Detects an open sensor ground or continuous short to high in either the signal circuit or the MAP sensor.	MAP Voltage	> 80.0 % of 5 Volt Range (4.0 Volts = 102.2 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips
Intake Air Temperature Sensor Circuit Low (High Temperature)	P0112	Detects a continuous short to ground in the IAT signal circuit or the IAT sensor	Raw IAT Input	< 45 Ohms (~150 deg C)	Engine Run Time Coolant Temp Vehicle Speed No Active DTCs:	> 10.0 seconds < 150 deg C >= 0 KPH 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	> 420000 Ohms (~-60 deg C)	Engine Run Time Coolant Temp Vehicle Speed Engine Air Flow No Active DTCs:	> 10.0 seconds > -40 deg C <= 512 KPH <= 512 gm/sec ECT_Sensor_Ckt_FA	50 failures out of 63 samples 1 sample every 100 msec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						ECT_Sensor_Ckt_FP VehicleSpeedSensorError MAF_SensorFA MAF_SensorFP MAF_SensorTFTKO		
Engine Coolant Temperature (ECT) Sensor Performance	P0116	This DTC detects ECT temp sensor stuck in mid range.	A failure will be reported if any of the following occur: 1) ECT at power up > IAT at power up by an IAT based table lookup value after a minimum 28800 second soak (fast fail). 2) ECT at power up > IAT at power up by 15.0 C after a minimum 28800 second soak and a block heater has not been detected. 3) ECT at power up > IAT at power up by 15.0 C after a minimum 28800 seconds soak and the time spent cranking the engine without starting is greater than 10.0 seconds with the LowFuelConditionDiag	See "P0116: Fail if power up ECT exceeds IAT by these values" in the Supporting tables section	No Active DTC's Non-volatile memory initiation Test complete this trip Test aborted this trip IAT LowFuelConditionDiag **Block Heater detection is enabled when either of the following occurs:** 1) ECT at power up > IAT at power up by 2) Cranking time **Block Heater is detected and diagnostic is aborted when 1)or 2) occurs. Diagnostic is aborted when 3) or 4) occurs:** 1a) Vehicle drive time 1b) Vehicle speed	VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA IgnitionOffTimeValid TimeSinceEngineRunningValid = Not occurred = False = False ≥ -7 ºC = False > 15.0 ºC < 10.0 Seconds > 400 Seconds with > 14.9 MPH	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.
				= False	1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is below 1b as follows: 1d) IAT drops from power up IAT	0.00 times the seconds with vehicle speed below 1b ≥ 8.0 ºC		
					2a) ECT drops from power up ECT 2b) Engine run time	> 256 ºC Within > 0 Seconds		
					3) Engine run time with vehicle speed below 1b 4) Minimum IAT during test	> 1800 Seconds ≤ -7 ºC		
Engine Coolant Temp Sensor Circuit Low	P0117	This DTC detects a short to ground in the ECT signal circuit or the ECT sensor.	ECT Resistance (@ 150ºC)	< 45 Ohms			5 failures out of 6 samples 1 sec/sample Continuous	Type B 2 trips
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)	> 450000 Ohms	Or IAT min	> 10.0 seconds ≥ -7.0 °C	5 failures out of 6 samples 1 sec/sample Continuous	Type B 2 trips
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 <	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	19/39 counts or 14 counts continuous; 12.5 msec/count in the secondary processor	Type:

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			or Secondary TPS1 Voltage >	4.75		No 5 V reference error No 5 V reference DTCs		A MIL: YES Trips: 1
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	> 400 kPa*(g/s) > 21 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:	>= 450 RPM <= 5800 RPM > 69 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.00 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 CrankSensorFA ECT_sensor_FA ECT_Sensor_FP	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.
						IAT_SensorFA IAT_SensorCircuitFP CylDeacSystemTFTKO		
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 <	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	79/159 counts; 57 counts continuous; 3.125 msec /count in the Primary processor	Type: A
						No 5 V reference error		MIL:
			Secondary TPS1 Voltage <	0.325		No 5 V reference DTCs	19/39 counts or 14 counts continuous; 12.5 msec/count in the Secondary processor	YES Trips: 1
TPS1 Circuit High	P0123	Detects a continuous or intermittent short in TPS1 circuit on both processors or just the primary processor	Primary TPS1 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	79/159 counts; 57 counts continuous; 3.125 msec /count in the Primary processor	Type: A
						No 5 V reference error		MIL:
			Secondary TPS1 Voltage >	4.75		No 5 V reference DTCs	19/39 counts or 14 counts continuous; 12.5 msec/count in the Secondary processor	YES Trips: 1
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:	See "P0128: Maximum Accumulated Airflow for IAT and Start-up ECT conditions" in the Supporting tables section	No Active DTC's	MAP_SensorFA MAF_SensorFA TPS_Performance_FA TPS_FA TPS_ThrottleAuthorityDefaulted	30 failures to set DTC 1 sec/sample	Type B 2 trips
			Range #1 (Primary) ECT reaches 75.0 °C			IAT_SensorFA ECT_Sensor_Ckt_FA ECT_Sensor_Perf_FA	Once per ignition key cycle	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			when IAT min is ≤ 54.5°C and ≥ 10.0°C.			VehicleSpeedSensor_FA		
			Range #2 (Alternate) ECT reaches 55.0 °C when IAT min is < 10.0°C and ≥ -7.0°C.		Engine not run time Engine run time Fuel Condition	≥ 1800 seconds ≥ 120 seconds Ethanol ≤ 87%		
					Range #1 (Primary) Test ECT at start run Average Airflow Vehicle speed	≤ 70.0 °C ≥ 5.0 gps > 5 mph for at least 2.4 miles		
					Range #2 (Alternate) Test ECT at start run Average Airflow Vehicle speed	≤ 50.0 °C ≥ 5.0 gps > 5 mph for at least 2.4 miles		
					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 4) With Decel Fuel Cut Off active, accumulated airflow is reduced by multiplying actual airflow by	 50.0 gps < 12.0 gps 50.00%		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						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	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	380 failures out of 475 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< 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	0.9922 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	3 % <= Throttle <= 70 %		
					Fuel Control State	= Closed Loop		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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 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		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Equivalence Ratio	0.9922 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	0.0 % <= Throttle <= 70.0 %		
					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		
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 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	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Bank 1 Sensor 1 DTC's not active	= P0131, P0132 or P01	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	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	> 55 ºC		
					IAT	> -40 ºC		
					Engine Run Time	> 160 seconds		
					Time since any AFM status change	> 0.0 seconds		
					Time since Purge On to Off change	> 0.0 seconds		
					Time since Purge Off to On change	> 0.0 seconds		
					Purge duty cycle	>= 0 % duty cycle		
					Engine airflow	15 gps <= engine airflow <= 55 gps		
					Engine speed	1000 <= RPM <= 3000		
					Fuel	< 87 % Ethanol		
					Baro	> 70 kpa		
					Throttle Position	>= 5 %		
					Low Fuel Condition Diag	= False		
					Fuel Control State	= Closed Loop		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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	> 4.5 seconds		
O2S Circuit Insufficient Activity Bank 1 Sensor 1	P0134	This DTC determines if the O2 sensor circuit is open.	Measure Oxygen Sensor Signal.	350 mvolts < Oxygen Sensor signal < 550 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 >= 0.0 %	
					AFM Status	= All Cylinders active		
					Heater Warm-up delay	= Complete		
					Predicted Exhaust Temp (by location)	= Warmed Up		
					Engine Run Time	> 300 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 > 3.1 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		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Heater Warm-up delay	= Complete	Frequency: 1 tests per trip	
					O2S Heater device control	= Not active	5 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		

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	0.9922 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	3 % <= Throttle <= 70 %		
					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 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_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		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Equivalence Ratio	0.9922 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	3.0 % <= Throttle <= 70.0 %		
					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		
O2 Sensor Slow Response Rich to Lean Bank 1 Sensor 2	P013A	This DTC determines if the post catalyst O2 sensor has Slow Response in a predefined Rich to Lean voltages range during Rich to Lean transition. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	The EWMA of the Post O2 sensor normalized integral value 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 > 8.5 units OR 2) Accumulated air flow during slow rich to lean test > 65 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_Reset FastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_Rapid ResponseActive = TRUE, multiple tests per trip are allowed	1 trips Type A EWMA
					B1S2 Failed this key cycle	P013B, P013E, P013F, P2270 or P2271		

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	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	
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay	= Not Valid		
					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).			
O2 Sensor Slow Response Lean to Rich Bank 1 Sensor 2	P013B	This DTC determines if the post catalyst O2 sensor has Slow Response in a predefined Lean to Rich voltages range during Lean to Rich transition. The diagnostic is an intrusive test which increases the delivered A/F ratio to achieve the required rich threshold.	The EWMA of the Post O2 sensor normalized integral value is greater than the threshold. OR The Accumulated mass air flow monitored during the Slow Response Test (between the	1) B1S2 EWMA normalized integral value > 30.0 units OR 2) Accumulated air flow during slow lean to rich test > 75 grams (lower threshold is 350 mvolts and upper threshold is 650 mvolts)	No Active DTC's	TPS_ThrottleAuthority Defaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA	Frequency: Once per trip Note: if NaPOPD_b_Reset FastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_Rapid	1 trips Type A EWMA

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			lower and upper voltage thresholds) is greater than the airflow threshold.			FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA	ResponseActive = TRUE, multiple tests per trip are allowed	
					B1S2 Failed this key cycle	P013A, 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))		
					DTC's Passed	= P013A (and P013C (if applicable))		
					DTC's Passed	= P2271 (and P2273 (if applicable))		
					DTC's Passed	= P013F (and P014B (if applicable))		
					After above conditions are met: Fuel Enrich mode continued.			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
O2 Sensor Slow Response Rich to Lean Bank 2 Sensor 2	P013C	This DTC determines if the post catalyst O2 sensor has Slow Response in a predefined Rich to Lean voltages range during Rich to Lean transition. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	The EWMA of the Post O2 sensor normalized integral value 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 > 8.5 units OR 2) Accumulated air flow during slow rich to lean test > 65 grams (upper threshold is 450 mvolts and lower threshold is 150 mvolts)	No Active DTC's B2S2 Failed this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Post fuel cell DTC's Passed DTC's Passed After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).	TPS_ThrottleAuthority Defaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013D, P014A, P014B, P2272 or P2273 10.0 volts < system voltage< 18.0 volts = Valid = Not Valid = Not Valid = False = enabled = P2270 (and P2272 (if applicable)) = P013E (and P014A (if applicable))	Frequency: Once per trip Note: if NaPOPD_b_Reset FastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_Rapid ResponseActive = TRUE, multiple tests per trip are allowed 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	1 trips Type A EWMA

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
							enabled in service	
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 > 30.0 units OR 2) Accumulated air flow during slow lean to rich test > 75 grams (lower threshold is 350 mvolts and upper threshold is 650 mvolts)	No Active DTC's B2S2 Failed this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Post fuel cell DTC's Passed	TPS_ThrottleAuthority Defaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013C, P014A, P014B, P2272 or P2273 10.0 volts < system voltage< 18.0 volts Green Sensor Delay Criteria = Valid = Not Valid = Not Valid = False = enabled = P2270 (and P2272 (if applicable))	Frequency: Once per trip Note: if NaPOPD_b_Reset FastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_Rapid ResponseActive = TRUE, multiple tests per trip are allowed 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	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 DTC's Passed DTC's Passed DTC's Passed	= P013E (and P014A (if applicable)) = P013A (and P013C (if applicable)) = P2271 (and P2273 (if applicable)) = P013F (and P014B (if applicable))	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	
					After above conditions are met: Fuel Enrich mode continued.			
O2 Sensor Delayed Response Rich to Lean Bank 1 Sensor 2	P013E	This DTC determines if the post catalyst O2 sensor has an initial delayed response to an A/F change from Rich to Lean. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	Post O2 sensor 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 > 50 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, 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 Post fuel cell DTC's Passed After above conditions are met: DFCO mode entered (wo driver initiated pedal input).	= Not Valid = False = enabled = P2270 and P2272 (if applicable)	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 Delayed Response Lean to Rich Bank 1 Sensor 2	P013F	This DTC determines if the post catalyst O2 sensor has an initial delayed response to an A/F change from Lean to Rich. The diagnostic is an intrusive test which increases the delivered A/F ratio to achieve the required rich threshold.	Post O2 sensor 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 > 316 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_Reset FastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_Rapid ResponseActive = 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.
					B1S2 Failed this key cycle	P013A, P013B, P013E, 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))		
					DTC's Passed	= P013A (and P013C (if applicable))		
					DTC's Passed	= P2271 (and P2273 (if applicable))		
					After above conditions are met: Fuel Enrich mode entered.			
O2S Circuit Insufficient Activity Bank 1 Sensor 2	P0140	This DTC determines if the O2 sensor circuit is open.	Measure Oxygen Sensor Signal.	410 mvolts < Oxygen Sensor signal < 490 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted MAF_SensorFA	590 failures out of 740 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 0 delta TPS changes required to report fail. Delta TPS is incremented when the TPS % change >= 0.0 %	
					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)	= Warmed Up		
					Engine Run Time	> 300 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 > 2.9 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: 1 tests per trip	
					Heater Warm-up delay	= Complete		
					O2S Heater device control	= Not active	5 seconds delay between tests and 1 second execution rate	
					B1S1 O2S Heater Duty Cycle	> zero		
					All of the above met for Time	> 120 seconds		

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 > 50 grams.	No Active DTC's B2S2 Failed this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Post fuel cell DTC's Passed After above conditions are met: DFCO mode entered (wo driver initiated pedal input).	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, P014B, P2272 or P2273 10.0 volts < system voltage< 18.0 volts = Valid = Not Valid = Not Valid = False = enabled = P2270 and P2272 (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 when the vehicle is new and cannot be	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
							enabled in service	
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 > 316 grams.	No Active DTC's B2S2 Failed this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Post fuel cell DTC's Passed 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 P013C, P013D, P014A, P2272 or P2273 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))	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 <u>Green Sensor Delay Criteria</u> 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	Type B 2 trips

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))	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	
					DTC's Passed	= P2271 (and P2273 (if applicable))		
					After above conditions are met: Fuel Enrich mode entered.			
O2S Circuit Low Voltage Bank 2 Sensor 1	P0151	This DTC determines if the O2 sensor circuit is shorted to low.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is < 50 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted	380 failures out of 475 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		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Equivalence Ratio	0.9922 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	3 % <= Throttle <= 70 %		
					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 MAP_SensorFA MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_F FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA	100 failures out of 125 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< 18.0 volts		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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	0.9922 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	0.0 % <= Throttle <= 70.0 %		
					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		
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	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	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						FuelTankPressureSnsr Ckt_FA	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	
						FuelInjectorCircuit_FA		
						AIR System FA		
						EthanolCompositionSensor_FA		
						EngineMisfireDetected_FA		
					Bank 2 Sensor 1 DTC's not active	= P0151, P0152 or P01		
					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	> 55 ºC		
					IAT	> -40 ºC		
					Engine Run Time	> 160 seconds		
					Time since any AFM status change	> 0.0 seconds		
					Time since Purge On to Off change	> 0.0 seconds		
					Time since Purge Off to On change	> 0.0 seconds		
					Purge duty cycle	>= 0 % duty cycle		
					Engine airflow	15 gps <= engine airflow <= 55 gps		
					Engine speed	1000 <= RPM <= 3000		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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	<= 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	> 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.	350 mvolts < Oxygen Sensor signal < 550 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted	400 failures out of 500 samples.	Type B 2 trips
						MAF_SensorFA		
						EthanolCompositionSensor_FA	Minimum of 0 delta TPS changes required to report fail. Delta TPS is incremented when the TPS % change >= 0.0 %	
					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)	= Warmed Up		
					Engine Run Time	> 300 seconds		
					Fuel	<= 87 % Ethanol		
							Frequency: Continuous	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
							100msec loop	
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 > 3.1 amps	No Active DTC's System Voltage Heater Warm-up delay O2S Heater device control B1S1 O2S Heater Duty Cycle **All of the above met for** Time	ECT_Sensor_FA 10.0 volts < system voltage< 18.0 volts = Complete = Not active > zero > 120 seconds	8 failures out of 10 samples Frequency: 1 tests per trip 5 seconds delay between tests and 1 second execution rate	Type B 2 trips
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 AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test	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	430 failures out of 540 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.
						10.0 volts < system voltage< 18.0 volts		
					System Voltage			
					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	0.9922 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	3 % <= Throttle <= 70 %		
					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 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 MAP_SensorFA MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA	100 failures out of 125 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.
					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	0.9922 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	3.0 % <= Throttle <= 70.0 %		
					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		
O2S Circuit Insufficient Activity Bank 2 Sensor 2	P0160	This DTC determines if the O2 sensor circuit is open.	Measure Oxygen Sensor Signal.	410 mvolts < Oxygen Sensor signal < 490 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted	590 failures out of 740 samples.	Type B 2 trips
						MAF_SensorFA		
						EthanolCompositionSensor_FA	Minimum of 0 delta TPS changes required to report fail. Delta TPS is incremented when the TPS % change >= 0.0 %	
					System Voltage	10.0 volts < system voltage< 18.0 volts		
					AFM Status	= All Cylinders active		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Heater Warm-up delay Predicted Exhaust Temp (by location) Engine Run Time Fuel	= Complete = Warmed Up > 300 seconds <= 87 % Ethanol	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 > 2.9 amps	No Active DTC's System Voltage Heater Warm-up delay O2S Heater device control B1S1 O2S Heater Duty Cycle **All of the above met for** Time	ECT_Sensor_FA 10.0 volts < system voltage< 18.0 volts = Complete = Not active > zero > 120 seconds	8 failures out of 10 samples Frequency: 1 tests per trip 5 seconds delay between tests and 1 second execution rate	Type B 2 trips
Fuel System Too Lean Bank 1	P0171	Determines if the fuel control system is in a lean condition, based on the filtered long-term fuel trim.	The filtered long-term fuel trim metric	≥ **Long Term Trim Lean** Table	Engine speed BARO Coolant Temp MAP Inlet Air Temp MAF VSS Fuel Level	375 <rpm< 7000 > 70 kPa -40 <°C< 150 10 <kPa< 255 -20 <°C< 150 1.0 <g/s< 510.0 < 83 mph > 10 % or if fuel sender is faulty	> 100 ms Frequency: Continuous Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during **93** % of the EPAIII	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:	> 25 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.	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.	
					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 > 35 and < 140		
				disable conditions:	Engine speed	rpm< 375 or rpm> 7000		
					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 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		
						EvapEmissionSystem_FA		
						FuelTankPressureSensorCircuit_FA		
						Ethanol Composition Sensor FA		
						FuelInjectorCircuit_FA		

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 Rich Bank 1	P0172	Determines if the fuel control system is in a rich condition, based on the filtered long-term fuel trim metric. There are two 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 Long Fuel Trim data accumulation:	> 70 kPa -40 <°C< 150 10 <kPa< 255 -20 <°C< 150 1.0 <g/s< 510.0 < 83 mph > 25 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)
					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 > 35 and < 140		
		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			> 100 ms Frequency: Continuous	
		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	If the Purge Long Term Fuel Trim metric AND	≤ **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 3 out of 5 intrusive	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		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.	The filtered Non-Purge Long Term Fuel Trim metric	≤ **Non Purge Rich Limit** Table			segments.	
			Segment Definition - Segments can last up to 30, and are separated by the lesser of 20 seconds of purge-on time or enough time to purge 16 grams of vapor. A maximum of 5 completed segments or 20 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 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 diagnosed during decels? **NO** No active DTCs:	rpm< 375 or rpm> 7000 IAC_SystemRPM_FA MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR System FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSensorCircuit_FA	Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during **93** % 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.
						Ethanol Composition Sensor FA FuelInjectorCircuit_FA EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit_FA MAP_EngineVacuumStatus AmbientAirDefault_NA		
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 BARO Coolant Temp MAP Inlet Air Temp MAF VSS Fuel Level Long Fuel Trim data accumulation:	375 <rpm< 7000 > 70 kPa -40 <°C< 150 10 <kPa< 255 -20 <°C< 150 1.0 <g/s< 510.0 < 83 mph > 10 % or if fuel sender is faulty > 25 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 **93** % 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 > 35 and < 140		
				disable conditions:	Engine speed Fuel Level	rpm< 375 or rpm> 7000 < 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.
					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 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		
						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	> 70 kPa	> 100 ms Frequency: Continuous	Type B 2 Trip(s)
					Coolant Temp	-40 <°C< 150		
					MAP	10 <kPa< 255		
					IAT	-20 <°C< 150		
					MAF	1.0 <g/s< 510.0		
					VSS	< 83 mph		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Long Fuel Trim data accumulation:	> 25 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 > 35 and < 140		
		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 3 out of 5 intrusive segments.	
			Segment Definition - Segments can last up to 30, and are separated by the lesser of 20 seconds of purge-on time or enough time to purge 16 grams of vapor. A maximum of 5 completed segments or 20 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	rpm< 375 or rpm> 7000	Development data indicates that the Fuel Adjustment System Diagnostic	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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 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 EvapEmissionSystem_FA FuelTankPressureSensorCircuit_FA Ethanol Composition Sensor FA FuelInjectorCircuit_FA EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit_FA MAP_EngineVacuumStatus AmbientAirDefault_NA	(FASD) is typically enabled during **93** % 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.	
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

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
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
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 ≤ 18 volts greater than 1 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 ≤ 18 volts greater than 1 seconds	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips
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 ≤ 18 volts greater than 1 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 ≤ 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	19/39 counts or 14 counts continuous; 12.5 msec/count in the Secondary processor	Type: A

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						No 5 V reference error No 5 V reference DTCs		MIL: YES Trips: 1
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	79/159 counts; 57 counts continuous; 3.125 msec /count in the Primary processor	Type: A
						No 5 V reference error		MIL:
			Secondary TPS2 Voltage <	0.25		No 5 V reference DTCs	19/39 counts or 14 counts continuous; 12.5 msec/count in the Secondary processor	YES Trips: 1
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	79/159 counts; 57 counts continuous; 3.125 msec /count in the Primary processor	Type: A
						No 5 V reference error		MIL:
			Secondary TPS2 Voltage >	4.59		No 5 V reference DTCs	19/39 counts or 14 counts continuous; 12.5 msec/count in the Secondary processor	YES Trips: 1
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 < 40.00% per 25 ms < 40.00% 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 = 200 rev block as data supports for catalyst damage.	Type B 2 trips (Mil Flashes with Catalyst Damaging Misfire)
			Misfire Percent Emission Failure Threshold Misfire Percent Catalyst Damage	≥ 1.00% P0300 ≥ 1.04% emission >"Catalyst Damaging Misfire Percentage" Table, except single cylinder misfire above 11.25% rate below 750 rpm and 15% load.	Engine Speed	375 < rpm < (Engine Speed Limit) - 400 Engine speed limit is a function of inputs like Gear and temperature typical Engine Speed Limit = 6200 rpm	Continuous 4 cycle delay	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
				disable conditions:	No active DTCs:	TPS_FA EnginePowerLimited MAF_SensorTFTKO 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 mode	4 cycle delay	
					Fuel System Status	≠ Fuel Cut	4 cycle delay	
					Active Fuel Management	Transition in progress	7 cycle delay	
					Undetectable engine speed and engine load region	invalid speed load range in **decel index** tables	4 cycle delay	
					Abusive Engine Over Speed	> 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	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Below zero torque:		4 cycle delay	
					TPS (area)	≤ 0%		
					Veh Speed	> 48 KPH		
					EGR Intrusive test	Active	0 cycle delay	
					Manual Trans	Clutch shift	4 cycle delay	
					Throttle Position AND Automatic transmission shift	> 95.00%	7 cycle delay	
					Driveline Ring Filter active After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.			
					Filter Driveline ring: Stop filter early:	4 engine cycles after misfire 3 Engine cycles after misfire		
					Abnormal engine speed oscillations: (Rough road etc) Off Idle, number of consecutive decelerating cylinders after accelerating,: (Number of decels can vary with misfire detection equation)			
					TPS			
					Engine Speed			
					Veh Speed			
					SCD	> 3 %		
					Cyl Mode	> 1000 rpm		
					Rev Mode	> 5 kph		
						= 4 consecutive cyls = 4 consecutive cyls = 4 consecutive cyls		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					ABS/TCS system RoughRoad	not active not detected (wheel sensor)		
Crankshaft Position System Variation Not Learned	P0315	Monitor for valid crankshaft error compensation factors	Sum of Compensation factors	≥ 4.0040 OR ≤ 3.9960	OBD Manufacturer Enable Counter	0	0.50 seconds Frequency Continuous 100 msec	1 Trips Type A
Knock Sensor (KS) 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 Engine Air Flow No Active DTC's Engine Speed Engine Air Flow No Active DTC's	≥ 400 RPM > 50 mg/cylinder KS_Ckt_Perf_B1B2_F ≥ 400 RPM > 50 mg/cylinder KS_Ckt_Perf_B1B2_F	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
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) Engine Speed ECT Engine Run Time No Active DTC's	= 1 ≥ 400 RPM ≥ -40 deg. C ≥ 2 seconds KS_Ckt_Perf_B1B2_F	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
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 + 6.0 degrees - 2.0) degrees spark	Diagnostic Enabled (1 = Enabled) Knock Detection Enabled	= 1 > 0	31 Failures out of 63 Samples	Type: B MIL: YES Trips: 2

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
				See Supporting Tables for FastRtdMax		**Knock Detection Enabled** is calculated by multiplying the following three factors: FastAttackRate FastAttackCoolGain FastAttackBaroGain (see Supporting Tables)	100 msec rate	
					Engine Speed	≥ 400 RPM		
					MAP	≥ 10 kPa		
					No Active DTC's	TPS_ThrottleAuthority Defaulted		
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 ≥ 2 seconds	50 Failures out of 63 Samples	Type: B MIL: YES Trips: 2
					Valid Oil Temp Required? (1= Yes, 0 = No)	= 0	100 msec rate	
					If Yes: Engine Oil Temp and ValidOilTempModel or No Oil Temp Sensor DTC's If No: No Eng Oil Temp enable criteria	 < 256 deg. C EngOilModeledTempValid EngOilTempSensorCircuitFA		
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 ≥ 2 seconds	50 Failures out of 63 Samples	Type: B MIL: YES Trips: 2
					Valid Oil Temp Required? (1= Yes, 0 = No)	= 0	100 msec rate	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					If Yes: Engine Oil Temp and ValidOilTempModel or No Oil Temp Sensor DTC's If No: No Eng Oil Temp enable criteria	 < 256 deg. C EngOilModeledTempValid EngOilTempSensorCircuitFA		
Knock Sensor (KS) Circuit Bank 2	P0330	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) Engine Speed ECT Engine Run Time No Active DTC's	= 1 ≥ 400 RPM ≥ -40 deg. C ≥ 2 seconds KS_Ckt_Perf_B1B2_F	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
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	> 2.86 Volts < 1.48 Volts	ECT Engine Run Time Valid Oil Temp Required? (1= Yes, 0 = No) If Yes: Engine Oil Temp and ValidOilTempModel or No Oil Temp Sensor DTC's	≥ -40 deg. C ≥ 2 seconds = 0 < 256 deg. C EngOilModeledTempValid EngOilTempSensorCircuitFA	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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	< 2.02 Volts > 3.76 Volts	ECT Engine Run Time Valid Oil Temp Required? (1= Yes, 0 = No) If Yes: Engine Oil Temp and ValidOilTempModel or No Oil Temp Sensor DTC's If No: No Eng Oil Temp enable criteria	≥ -40 deg. C ≥ 2 seconds = 0 < 256 deg. C EngOilModeledTempValid EngOilTempSensorCircuitFA	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
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	>= 4.0 seconds	Engine-Cranking Crankshaft Test: Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102	 = FALSE = FALSE	Engine-Cranking Crankshaft Test: Continuous every 100 msec	Type A 1 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					AND DTC P0103 AND Engine Air Flow	= FALSE > 3.0 grams/second))		
			Time-Based Crankshaft Test: No crankshaft pulses received	>= 0.1 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	
			Event-Based Crankshaft Test: No crankshaft pulses received		Event-Based Crankshaft Test: Engine is Running OR Starter is engaged No DTC Active:	 5VoltReferenceA_FA 5VoltReferenceB_FA P0340 P0341	Event-Based Crankshaft Test: 2 failures out of 10 samples One sample per engine revolution	
Crankshaft Position (CKP) Sensor A Performance	P0336	Determines if a performance fault exists with the crank position sensor signal	Crank Re-synchronization Test: Time in which 25 or more crank re synchronizations occur	< 20.0 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 A 1 trips
			Time-Based Crankshaft Test: No crankshaft synchronization gap found		Time-Based Crankshaft Test: Engine is Running		Time-Based Crankshaft Test: Continuous every 12.5 msec	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			gap found		Starter is not engaged		12.5 msec	
				>= 0.4 seconds				
					No DTC Active:	5VoltReferenceB_FA		
			Engine Start Test during Crank:		Engine Start Test during Crank:		Engine Start Test during Crank:	
			Time since starter engaged without detecting crankshaft synchronization gap		Starter engaged AND (cam pulses being received		Continuous every 100 msec	
				>= 1.5 seconds				
					OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow	 = FALSE = FALSE = FALSE > 3.0 grams/second))		
			Event-Based Crankshaft Test:		Event-Based Crankshaft Test:		Event-Based Crankshaft Test:	
			Crank Pulses received in one engine revolution OR Crank Pulses received in one engine revolution	< 53 > 63	Engine is Running OR Starter is engaged No DTC Active:	 5VoltReferenceA_FA 5VoltReferenceB_FA P0340 P0341	8 failures out of 10 samples One sample per engine revolution	
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:		Engine Cranking Camshaft Test:		Engine Cranking Camshaft Test:	Type B 2 trips
			Time since last camshaft position sensor pulse received	>= 5.5 seconds	Starter engaged AND (cam pulses being received		Continuous every 100 msec	

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 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		Slow Event-Based Camshaft Test: Crankshaft is synchronized No DTC Active:	5VoltReferenceA_FA	Slow Event-Based Camshaft Test: 8 failures out of 10 samples	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
				= 0		5VoltReferenceB_FA CrankSensor_FA	Continuous every engine cycle	
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor A	P0341	Determines if a performance fault exists with the cam position bank 1 sensor A signal	Fast Event-Based Camshaft Test: The number of camshaft pulses received during first 24 MEDRES events is less than 2 or greater than 8 (There are 24 MEDRES events per engine cycle) Slow Event-Based Camshaft Test: The number of camshaft pulses received during 100 engine cycles AND	< 398 > 402	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 #1 CIRCUIT	P0351	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 1	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	**> 6.00 Volts**	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2

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	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	**> 6.00 Volts**	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #3 CIRCUIT	P0353	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 3	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	**> 6.00 Volts**	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #4 CIRCUIT	P0354	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 4	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	**> 6.00 Volts**	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #5 CIRCUIT	P0355	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 5	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	**> 6.00 Volts**	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #6 CIRCUIT	P0356	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 6	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	**> 6.00 Volts**	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
IGNITION CONTROL #7 CIRCUIT	P0357	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 7	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	 **> 6.00 Volts**	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #8 CIRCUIT	P0358	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 8	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	 **> 6.00 Volts**	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor B (For applications with a bank 1 sensor B CMP sensor)	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 OR Time that starter has been engaged without a camshaft sensor pulse <u>Time-Based Camshaft Test:</u> Fewer than 4 camshaft pulses received in a time	 >= 5.5 seconds >= 4.0 seconds > 3.0 seconds	<u>Engine Cranking Camshaft Test:</u> Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow <u>Time-Based Camshaft Test:</u> Engine is Running Starter is not engaged No DTC Active:	 = FALSE = FALSE = FALSE > 3.0 grams/second)) 5VoltReferenceA_FA	<u>Engine Cranking Camshaft Test:</u> Continuous every 100 msec <u>Time-Based 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.
			Fast Event-Based Camshaft Test: No camshaft pulses received during first 12 MEDRES events (There are 12 MEDRES events per engine cycle) Slow Event-Based Camshaft Test: The number of camshaft pulses received during 100 engine cycles	= 0	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	
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor B (For applications with a bank 1 sensor B CMP sensor)	P0366	Determines if a performance fault exists with the cam position bank 1 sensor B signal	Fast Event-Based Camshaft Test: The number of camshaft pulses received during first 12 MEDRES events is less than 3 or greater than 11 (There are 12 MEDRES events		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	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			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	
					No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA		
			AND	< 398 > 402			Continuous every engine cycle	
Secondary AIR Incorrect Airflow Single Bank Systems (For applications with AIR)	P0411	Detects an insufficient flow condition This test is run during Phase 1 (AIR pump commanded On, Valve commanded Open)	Predicted System Pressure versus Actual System Pressure Error	> 5.0 kPa or < -4.5 kPa	BARO Inlet Air Temp Coolant Temp	> 60 kPa > 5.0 deg C. > 5.0 deg C. < 60.0 deg C.	Phase 1 Conditional test weight > 4.0 seconds	2 trip(s) Type B
			OR		Engine off time System Voltage SL Stability time	> 3600.0 seconds > 10.0 OR < 18.0 > 3.0 seconds	Total 'String Length' accumulation time	
		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.	System Pressure Error while the Average String Length	> 5.0 kPa or < -2.0 kPa >**SL Threshold** **Bank 1** Table	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**	rpm < 5600 and >	> 10 seconds	
				disable conditions:	MAP Engine Speed	< 20 kPa for 2 seconds > 5000 RPM		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					MAF No active DTCs:	> 50 gm/s for 3 seconds 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	Frequency: Once per trip when AIR pump commanded On	
Secondary AIR Solenoid Control Circuit (For applications with AIR)	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	> 10.0 Volts < 18.0 Volts	50 failures out of 63 samples 250 ms loop Continuous	2 trip(s) Type B
Secondary AIR Pump Control Circuit (For applications with AIR)	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	> 10.0 Volts < 18.0 Volts	50 failures out of 63 samples 250 ms loop Continuous	2 trip(s) Type B

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	Normalized Ratio OSC Value (EWMA filtered)	< 0.365	***Valid Idle Period Criteria***		1 test attempted per valid idle period Minimum of 1 test per trip Maximum of 8 tests per trip Frequency: Fueling Related : 12.5 ms OSC Measurements: 100 ms Temp Prediction: 1000ms	Type A 1 Trip(s)
		The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and O2 during lean A/F excursions to store the excess oxygen (I.e. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H2 to release this stored oxygen (I.e. Cerium Reduction). This is referred to as the Oxygen Storage Capacity, or OSC. CatMon's strategy is to "measure" the OSC of the catalyst through forced Lean and Rich A/F excursions Normalized Ratio OSC Value Calculation Information and Definitions = 1. Raw OSC Calculation = (post cat O2 Resp time - pre cat O2 Resp time) 2. BestFailing OSC value from a calibration table (based on temp and exhaust gas flow) 3. WorstPassing OSC value (based on temp and exhaust gas flow) Normalized Ratio Calculation = (1-2) / (3-2) A Normalized Ratio of 1 essentially represents a good part and a ratio of 0 essentially represents a very bad part.			Throttle Position	< 1.00 %		
		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	*< 2.00 Kph*		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Engine speed	> 1100 RPM for a minimum of 5 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 < 126*		
					Barometric Pressure	> 70 KPA		
					Idle Time before going intrusive is	< 50 Seconds		
					Idle time is incremented if Vehicle speed	< 2 Kph and the throttle position < 1.00 % as identified in the Valid Idle Period Criteria section.		
					Short Term Fuel Trim	*0.90 < ST FT < 1.10*		
					Predicted catalyst temp > MinCatTemp table (degC) (refer to "Supporting Tables" tab)			
					AND			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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 15 seconds with a closed throttle time < 90 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 15 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			
					PRNDL			
					Idle Stable Criteria :: Must hold true from after Catalyst Idle Conditions Met to the end of test			
					MAF	*5.00 < g/s < 14.00*		
					Predicted catalyst temperature	< 900 degC		
					Engine Fueling Criteria at Beginning of Idle Period			
					The following fueling related must also be met from between 4 and 7 seconds after the Catalyst Idle Conditions Met Criteria has been met for at least 4 seconds prior to allowing intrusive control			
					Number of pre-O2 switches	>= 2		
					Short Term Fuel Trim Avg	*0.960 < ST FT Avg < 1.040*		
					Rapid Step Response (RSR) feature will initiate multiple tests:			
					If the difference between current EWMA value and the current OSC Normalized Ratio value is > 0.430 and the current OSC Normalized Ratio value is < 0.300			
					Maximum of 24 RSR tests to detect failure when RSR is enabled.			
					Green Converter Delay Criteria			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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 > 550 ° 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			
					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			
Catalyst System Low Efficiency Bank 2	P0430	Oxygen Storage	Normalized Ratio OSC Value (EWMA filtered)	< 0.365	***Valid Idle Period Criteria***		1 test attempted per valid idle period Minimum of 1 test per trip	Type A 1 Trip(s)

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
							Maximum of 8 tests per trip Frequency: Fueling Related : 12.5 ms OSC Measurements: 100 ms	
		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	< 1.00 %		
		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 Engine speed Engine run time	*< 2.00 Kph* > 1100 RPM for a minimum of 5 seconds since end of last idle period. > MinimumEngineRunTime**, This is a function of Coolant Temperature, please see Supporting Tables**		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Tests attempted this trip	< 255		
					The catalyst diagnostic has not yet completed for the current trip.			
					Catalyst Idle Conditions Met Criteria			
					General Enable met and the Valid Idle Period Criteria met			
					Green Converter Delay	Not Active		
					Induction Air	*-20 < ° C < 250*		
					Intrusive test(s): Fueltrim Post O2 EVAP EGR	Not Active		
					RunCrank Voltage	> 10.90 Volts		
					Ethanol Estimation	NOT in Progress		
					ECT	*40 < ° C < 126*		
					Barometric Pressure	> 70 KPA		
					Idle Time before going intrusive is	< 50 Seconds		
					Idle time is incremented if Vehicle speed	< 2 Kph and the throttle position < 1.00 % as identified in the Valid Idle Period Criteria section.		
					Short Term Fuel Trim	*0.90 < ST FT < 1.10*		
					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 15 seconds with a closed throttle time < 90 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 15 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.			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Closed loop fueling Enabled **PRNDL** ***Idle Stable Criteria :: Must hold true from after Catalyst Idle Conditions Met to the end of test*** MAF | *5.00 < g/s < 14.00* Predicted catalyst temperature | < 900 degC ***Engine Fueling Criteria at Beginning of Idle Period*** **The following fueling related must also be met from between 4 and 7 seconds after the Catalyst Idle Conditions Met Criteria has been met for at least 4 seconds prior to allowing intrusive control** Number of pre-O2 switches | >= 2 Short Term Fuel Trim Avg | *0.96 < 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 > 0.420 and the current OSC Normalized Ratio value is < 0.290 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 > 550 ° 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*** **DTC's Not Set** MAF_SensorFA AmbientAirDefault_SC			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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			
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	10 % ≤ Percent ≤ 90 % ≥ 600 seconds ≥ 5.0 miles ≥ 70 °C ≥ 70 kPa ≥ 10.0 miles ≥ 17 hours ≥ 10 hours	Once per trip, during hot soak (up to 2400 sec.). No more than 2 unsuccessful attempts between completed tests.	1 trip Type A EWMA Average run length is 7 under normal conditions Run length is 2 to 6 trips after code clear or non-volatile reset

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Estimated ambient temperature at end of drive	0 °C ≤ Temperature ≤ 34 °C		
					Estimate of Ambient Air Temperature Valid			
			When EWMA is	> 0.60 (EWMA Fail Threshold)				
		After the volatility check, the vent solenoid will close. After the vent is closed, typically a build up of pressure from the hot soak begins (phase-1). The pressure typically will peak and then begin to decrease as the fuel cools. When the pressure drops (-62.27) Pa from peak pressure, the vent is then opened for 60 seconds to normalize the system pressure. The vent is again closed to begin the vacuum portion of the test (phase-2). As the fuel temperature continues to fall, a vacuum will begin forming. The vacuum will continue until it reaches a vacuum peak. When the pressure rises 62.27 Pa from vacuum peak, the test then completes. If the key is turned on while the diagnostic test is in progress, the test will abort.	, the DTC light is illuminated. The DTC light can be turned off if the EWMA is	≤ 0.35 (EWMA Re-Pass Threshold)				
			and stays below the EWMA fail threshold for 2 additional consecutive trips.		**Conditions for Estimate of Ambient Air Temperature (EAT) to be valid:**			
					1. Cold Start			
					Startup delta deg C (ECT-IAT)	≤ 8 °C		
					OR			
					2. Short Soak and Previous EAT Valid			
					Previous time since engine off	≤ 7200 seconds		
					OR			
					3. Not a Cold Start and Previous EAT Valid and between Short and Long Soak			
					Previous time since engine off	7200 seconds < Time <		
					AND			
					Must expire Estimate of Ambient Temperature Valid Conditioning Time. **Please see "P0442: Estimate of Ambient Temperature Valid Conditioning Time" in Supporting Tables Tab.**	Vehicle Speed ≥ 29.2 mph AND Mass Air Flow ≥ 0 g/sec		
					4. Not a Cold Start and Previous EAT Not Valid and less than Long Soak			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Previous time since engine off	< 25200 seconds		
					AND			
					Must expire maximum value in Estimate of Ambient Temperature Valid Conditioning Time. **Please see "P0442: Estimate of Ambient Temperature Valid Conditioning Time" in Supporting Tables Tab.**	Vehicle Speed ≥ 29.2 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			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for information on fuel level refueling. OR **5. Vacuum Out of Range and Refueling Detected** See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for information on fuel level refueling. OR **6. Vent Valve Override Failed** Device control using an off-board tool to control the vent solenoid, cannot exceed during the EONV test	 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		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
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
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 ≥ 6 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.	1 trip Type A EWMA Average run length: 6 Run length is 2 trips after code clear or non-volatile reset

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
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. The abrupt change is defined as a change in vacuum: in the span of 1.0 seconds.	112 Pa < Vacuum < 249 Pa	This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period. The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete. The test will report a failure if 2 out of 3 samples are failures.	1 trips Type A

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			A refueling event is confirmed if the fuel level has a persistent change for 30 seconds.	of 15 %				
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. Weak Vacuum Follow-up Test (fuel cap replacement test) Weak Vacuum Test failed. Passes if tank vacuum Note: Weak Vacuum Follow-up Test can only report a pass.	> 14 liters ≤ 2740 Pa ≥ 2740 Pa	Fuel Level System Voltage BARO No active DTCs: Cold Start Test If ECT > IAT, Startup temperature delta (ECT-IAT): Cold Test Timer Startup IAT Temperature Startup ECT Weak Vacuum Follow-up Test This test can run following a weak vacuum failure or on a hot restart.	10% ≤ Percent ≤ 90% 11 volts ≤ Voltage ≤ 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 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C	Once per cold start Time is dependent on driving conditions Maximum time before test abort is 1000 seconds Weak Vacuum Follow-up Test With large leak detected, the follow-up test is limited to 1300 seconds. Once the MIL is on, the follow-up test runs indefinitely.	Type B 2 trips
Fuel Level Sensor 1 Performance	P0461	This DTC will detect a fuel sender stuck in range in the primary fuel tank.	Fuel Level in Primary Tank Remains in an Unreadable Range too Long		Engine Running No active DTCs:	VehicleSpeedSensor_FA	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.
			If fuel volume in primary tank is AND Fuel volume in secondary tank and remains in this condition for OR	>= 28.0 liters < 3.5 liters 68 miles				
			After Refuel Event					
			If the secondary fuel volume changes by 14.0 liters from engine “off” to engine “on” the primary volume should change by 3.0 liters. OR		6 Seconds after shutdown the primary tank volume plus 3.0 liters must be AND maximum primary tank volume plus 3.0 Liters must be	< 25.0 liters < 25.0 liters		
			Distance Traveled without a Primary Fuel Level Change					
			Delta Fuel Volume change over an accumulated 50 miles.	< 3 liters				
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	2 trips Type B
Fuel Level Sensor 1 Circuit High Voltage	P0463	This DTC will detect a fuel sender stuck out ofrange high in the primary fuel tank.	Fuel level Sender % of 5V range	> 60 %	Run/Crank Voltage	11 volts ≤ Voltage ≤ 18 volts	180 failures out of 225 samples 100 ms / sample Continuous	2 trips Type B
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		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.	1 trip Type A

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			is considered failing indicating an intermittent signal problem. 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 15 % > 15 %			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	2 trips Type B 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 Engine Speed	11 volts ≤ Voltage ≤ 18 volts ≥ 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous with fan operation	2 trips Type B 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	Tank Vacuum for 5 seconds BEFORE	> 2491 Pa	Fuel Level System Voltage BARO	10% ≤ Percent ≤ 90% 11 volts ≤ Voltage ≤ 18 volts ≥ 70 kPa	Once per cold start Cold start: max time is 1000 seconds	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		valve closed and the vent valve closed.	Test time	≥ refer to "P0496: Purge Valve Leak Test Engine Vacuum Test Time (Cold Start) as a Function of Fuel Level table" in Supporting Tables Tab.	Startup IAT Temperature Startup ECT Engine Off Time No active DTCs:	4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C ≥ 28800.0 seconds MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454		
Transmission Output Speed Sensor (TOSS)	P0502	No activity in the TOSS circuit	TOSS Raw Speed	<= 60 RPM	Maximum Engine Torque Minimum Engine Torque Maximum Engine Torque in Park or Neutral Minimum Engine Torque in Park or Neutral Minimum Throttle opening Minimum Engine Speed when there is a Brake DTC Minimum Engine Speed when there is no Brake DTC Maximum Engine Speed Minimum Transmission Fluid Temperature Disable P0502 if PTO Active	<= 8192 N-m >= 68 N-m >= 8192 N-m >= 90 N-m >= 3.5 % >= 1500 RPM >= 1500 RPM <= 6500 RPM >= -40 º C. = 0 Boolean	>= 4.5 sec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Time at Engine Speed	>= 5 sec		
					Maximum Ignition Voltage	<= 18 volts		
					Minimum Ignition Voltage	>= 11 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, P0716, P0717, P0851, P0852, P1106, P1107, P1120, P1122, P1123, P1220, P1221, P1183, 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		
Transmission Output Speed Sensor (TOSS)	P0503	TOSS Signal Intermittent	Loop-to-Loop change in TOSS	>= 350 RPM			>= 4.5 sec	Type B 2 trips
					Loop-to-Loop Input Speed Change	<= 500 RPM		
					Raw Output Speed	>= 300 RPM		
					Output Speed change	<= 150 RPM		
					Time for Input Speed Change	>= 2 sec		
					Time since Range Change	>= 6 sec		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Time for Positive Output Speed Change	>= 2 sec		
					Time above raw Output Speed	>= 2 sec		
					Time since 4WD Range change	>= 6 sec		
				Disable Conditions:	MIL not Illuminated for DTC's:	None		
					Maximum Ignition Voltage	<= 18 volts		
					Minimum Ignition Voltage	>= 11 volts		
Low Engine Speed Idle system	P0506	This DTC will determine if a low idle exists	Filtered Engine Speed Error filter coefficient	< 91.00 rpm 0.003	Baro Coolant Temp Engine run time Ignition voltage Time since gear change Time since a TCC mode change IAT Vehicle speed Commanded RPM delta Idle time	> 70 kPa > 60 °C ≥ 60 sec 18 ≥ volts ≥ 11 ≥ 3 sec > 3 sec > -20 °C ≤ 2 mph ≤ 25 rpm > 10 sec	Diagnostic runs in every 12.5 ms loop Diagnostic reports pass or fail in 10 sec once all enable conds are met	2 trips Type B
						PTO not active Transfer Case not in 4WD LowState Output control state normal Output control state instrumentation		
					No active DTCs	AmbientAirDefault ECT_Sensor_FA EngCoolHot EGRValveCircuit_FA EGRValvePerformance_FA IAT_SensorCircuitFA EvapFlowDuringNonPurge_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						FuelInjectorCircuit_FA MAF_SensorFA EngineMisfireDetected_FA IgnitionOutputDriver_FA EnginePowerLimited TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA FuelLevelDataFault LowFuelConditionDiagnostic ClchPstnEmisFA ClchToT_TypedABC		
High Engine Speed Idle system	P0507	This DTC will determine if a high idle exists	Filtered Engine Speed Error filter coefficient	> -182.00 rpm 0.003	Baro Coolant Temp Engine run time Ignition voltage Time since gear change Time since a TCC mode change IAT Vehicle speed Commanded RPM delta Idle time No active DTCs	> 70 kPa > 60 °C ≥ 60 sec 18 ≥ volts ≥ 11 ≥ 3 sec > 3 sec > -20 °C ≤ 2 mph ≤ 25 rpm > 10 sec PTO not active Transfer Case not in 4WD LowState Output control state normal Output control state instrumentation AmbientAirDefault ECT_Sensor_FA EngCoolHot EGRValveCircuit_FA EGRValvePerformance_FA	Diagnostic runs in every 12.5 ms loop Diagnostic reports pass or fail in 10 sec once all enable conds are met	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						IAT_SensorCircuitFA EvapFlowDuringNonPurge_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA FuelInjectorCircuit_FA MAF_SensorFA EngineMisfireDetected_FA IgnitionOutputDriver_FA EnginePowerLimited TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA FuelLevelDataFault LowFuelConditionDiagnostic ClchPstnEmisFA ClchToT_TypedABC		
Engine Oil Pressure (EOP) Sensor Performance	P0521	Determines if the Engine Oil Pressure (EOP) Sensor is stuck or biased in range	**To fail a currently passing test:** The filtered difference between measured EOP and predicted EOP (a function of engine speed and engine oil temp.):	> 0.3 kPa and (< -50.0 kPa OR > 47.0 kPa)	Diagnostic enabled/disabled	Enabled	Performed every 100 msec	2 trip(s) Type B
					Oil Pressure Sensor In Use	Present		
					Filtered engine oil pressure test weighting (function of engine speed, engine oil temperature, predicted oil pressure, and engine load stability). Details on Supporting Tables Tab (P0521 Section)	>= 0.30 ratio		
			To pass a currently failing test: The filtered difference between measured EOP and predicted EOP (a function of engine speed and engine oil temp.):	> 0.3 kPa and (> -47.0 kPa AND < 44.0 kPa)				
					No active DTC's	Fault bundles:		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						CrankSensorFA ECT_Sensor_FA MAF_SensorFA IAT_SensorFA EOPCircuit_FA		
Engine Oil Pressure (EOP) Sensor Circuit Low Voltage	P0522	Determines if the Engine Oil Pressure (EOP) Sensor circuit voltage is too low	(Engine Oil Pressure Sensor Circuit Voltage) / 5 Volts	< 5 percent	Engine Running Ignition Voltage Sensor Present Diagnostic enabled/disabled	= True <= 18.0 V and >= 11.0 V Yes Enabled	50 failures out of 63 samples Performed every 100 msec	2 trip(s) Type B
Engine Oil Pressure (EOP) Sensor Circuit High Voltage	P0523	Determines if the Engine Oil Pressure (EOP) Sensor circuit voltage is too high	(Engine Oil Pressure Sensor Circuit Voltage) / 5 Volts	> 85 percent	Engine Running Ignition Voltage Sensor Present Diagnostic enabled/disabled	= True <= 18.0 V and >= 11.0 V Yes Enabled	220 failures out of 255 samples Performed every 100 msec	2 trip(s) Type B
Brake Booster Pressure Sensor Performance	P0556	Determines if the Brake Booster Vacuum Sensor is stuck or skewed within the normal operating range by comparing the engine vacuum to the brake booster vacuum when the engine is producing a large amount of vacuum	Engine vs brake booster vacuum sensor values are compared when % throttle < value for a time period. When throttle once again > calibrated value, min and max vacuum sensor values are normalized and subtracted from a 1st order lag filter value of 1. A properly operating vacuum sensor would have a normalized result of 1 or greater. If the normalized result is greater than 1 it is considered 1. The 1st order lag filter value would be 0 in a passing system.		Throttle Area (with idle included) for time period of Ignition Voltage BrkBoostVacDiff For time period of AND Vacuum Delta Diagnostic enabled/disabled No active DTC's	<= 1 Percent for > 3 seconds <= 18.0 V and >= 11.0 V > 0.3 kPa >= 0.2 Seconds >= 6.0 kPa Enabled Fault bundles: MAP_SensorFA GetTPSR_FaultActive_TPS	Pass counter incremented when enable conditions are met, pass achieved when counter >= 8	2 trip(s) Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			1st order lag fail threshold 1st order lag re-pass threshold	> 0.5 < 0.6			Performed every 100 msec	
Brake Booster Pressure Sensor Circuit Low Voltage	P0557	Determines if the Brake Booster Pressure Sensor circuit voltage is too low	(Brake Booster Pressure Sensor Voltage) / 5 Volts	< 2.0 percent	Brake booster diagnostic enabled/disabled Brake booster pressure sensor present	Enabled Yes	320 failures out of 400 samples Performed every 12.5 msec	2 trip(s) Type B
Brake Booster Pressure Sensor Circuit High Voltage	P0558	Determines if the Brake Booster Pressure Sensor circuit voltage is too high	(Brake Booster Pressure Sensor Voltage) / 5 Volts	> 87.0 percent	Brake booster diagnostic enabled/disabled Brake booster pressure sensor present	Enabled Yes	2000 failures out of 2400 samples Performed every 12.5 msec	2 trip(s) Type B
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 0 is TRUE, general switch diagnostic enable 1 is TRUE	fail continuously for greater than 0.500 seconds	Type: C MIL: NO Trips: 1

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						Switch architecture CeCRZG_e_CAN is ANALOG, general switch diagnostic enable 1 is TRUE	fail continuously for greater than 0.500 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 0 is TRUE, general switch diagnostic enable 1 is TRUE	fail continuously for greater than 90.000 seconds	Type: C MIL: NO
						Switch architecture CeCRZG_e_CAN is ANALOG or DISCRETE, general switch diagnostic enable 1 is TRUE	fail continuously for greater than 90.000 seconds	Trips: 1
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 0 is TRUE, general switch diagnostic enable 1 is TRUE	fail continuously for greater than 90.000 seconds	Type: C MIL: NO
						Switch architecture CeCRZG_e_CAN is ANALOG or DISCRETE, general switch diagnostic enable 1 is TRUE	fail continuously for greater than 90.000 seconds	Trips: 1
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	Type: C MIL: NO

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
								Trips: 1
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if the calibration check sum is incorrect	Output state invalid		PCM State	= crank or run	Diagnostic runs continuously in the background Diagnostic reports a fault if 1 failure occurs on the first pass. Diagnostic reports a fault if 5 failures occur after the first pass is complete.	Type A 1 trips
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 trips
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up does not match checksum at power-down				Diagnostic runs at powerup Diagnostic reports a fault if 1 failure occurs	Type A 1 trips
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:

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			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	A
			3. Secondary processor copy of calibration area to RAM failed for a count >	2counts			3. Completion at initialization, <500 ms	MIL:
			4. Secondary Processor data pattern written doesn't match the pattern read consecutive times				4. Will finish within 30 seconds at all engine conditions.	YES
			5. Secondary Processor TPS or APPS minimum learned values fail compliment check continuously				5. 0.0625sec continuous	Trips: 1
ECM Processor	P0606	Indicates that the ECM has detected an internal processor integrity fault						Type: A MIL: YES Trips:
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 Secondary processor detects Primary's calculated throttle position is greater > than Secondary's calculated Throttle Position when reduce engine power is active by	42.00%. 6.04%. 39.26%.		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	1

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
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.	0.1250sec 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. 0.1250sec continuous	
			Software tasks on the Primary Processor in the 25 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 50 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 100 ms loop were not executed or were not executed in the correct order.	1.0000sec continuous			1.0000sec continuous	
			Software tasks on the Primary Processor in the 250 ms loop were not executed or were not executed in the correct order.	2.5000sec continuous			2.5000sec 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	
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			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	

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

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
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	
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 Engine Running TPS minimum learn is not active No Pedal related errors or diagnostic faults. Diagnostic is enabled (Only applicable for Legacy accelerator pedals)	Consecutive checks within 200ms or 2/2 counts; 175msec/count	Type: A MIL: YES Trips:
			2. Difference between primary processor indicated accelerator pedal position and secondary indicated accelerator pedal position is >	5		2. Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	44/40 counts or 39 counts continuous; 12.5 msec/count in the Secondary processor	1

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						Primary processor Pedal Sync Error is FALSE		
Starter Relay Control Circuit	P0615	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	1 trip Type C
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 trips
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
			Primary Processor Vref1 >	5.125				
			Secondary Processor Vref1 <	4.875			19/39 counts or 15 counts continuous; 12.5 msec/count in Secondary processor	MIL: YES
			Secondary Processor Vref1 >	5.125				Trips: 1
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	2 trip Type B YES MIL
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
			or Primary Processor Vref2 >	5.125				

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Secondary Processor Vref1 < Secondary Processor Vref1 >	4.875 5.125			19/39 counts or 15 counts continuous; 12.5 msec/count in Secondary processor	MIL: YES Trips: 1
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	2 trips Type B
Powertrain Relay Feedback Circuit High	P0690	This DTC is a check to determine if the Powertrain relay is functioning properly.	PT Relay feedback voltage is Stuck Test: PT Relay feedback voltage is when commanded 'OFF'	≥ 18 volts > 2 volts	Powertrain relay commanded "ON" No active DTCs:	PowertrainRelayStateOn_Error	5 failures out of 6 samples 1second / sample Stuck Test: 100 ms/ sample Continuous failures ≥ 2	2 trips Type B
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 trips MIL: NO
Transmission Control Module (TCM) Requested MIL Illumination	P0700	Monitors the TCM MIL request line to determine when the TCM has detected a MIL illuminating fault.	Transmission Emissions-Related DTC set			Time since power-up > 3 seconds	Continuous	Type A 1 trips MIL: NO
Reverse Inhibit Solenoid Control Circuit (Manual Trans Only)	P0801	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 > 600 RPM	20 failures out of 25 samples 250 ms / sample Continuous	1 trips Type C

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 (Manual Transmission Only)	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.	> 1 %	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	1 trip(s) Type A
				disable conditions:	No active DTCs:	ClutchPositionSensorCktLo FA ClutchPositionSensorCkitHi FA CrankSensorFA VehicleSpeedSensor_FA		
Clutch Pedal Position Sensor Circuit Low (Manual Transmission Only)	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:	> 9.0 Volts 5VoltReferenceB_FA	200 failures out of 250 samples 25 ms loop Continuous	1 trip(s) Type A
Clutch Pedal Position Sensor Circuit High (Manual Transmission Only)	P0808	Detects Continuous Circuit Short toHigh	Clutch Position Sensor Circuit	> 96 % of Vref disable conditions:	Engine Not Cranking System Voltage No active DTCs:	> 9.0 Volts 5VoltReferenceB_FA	200 failures out of 250 samples 25 ms loop Continuous	1 trip(s) Type A
Clutch Pedal Position Not Learned (Manual Transmission Only)	P080A	Monitor for Valid Clutch Pedal Fully Applied Learn Position values	Fully Applied Learn Position OBD Manufacturer Enable Counter	<9.00 or >36.00 = 0	Clutch Pedal Position Not Learned		250 ms loop Continuous	1 trip(s) Type A
Skip Shift Solenoid Control Circuit Low	P080C	This DTC checks for an open and shorted low circuit while the device is commanded off.	The ECM detects that the commanded state of the driver and the actual state of the control		Run/Crank Voltage Engine Speed	11 volts ≤ Voltage ≤ 18 volts > 600 RPM	20 failures out of 25 samples 250 ms / sample	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
(Manual Transmission Only)			circuit do not match.				Continuous with device off	
Skip Shift Solenoid Control Circuit High (Manual Transmission Only)	P080D	This DTC checks for a shorted high circuit while the device is commanded on.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Engine Speed	11 volts ≤ Voltage ≤ 18 volts > 600 RPM	20 failures out of 25 samples 250 ms / sample Continuous with device on	2 trips Type B
Traction Control Torque Request Circuit	P0856	Determines if torque request from the EBTCM is valid	**With GMLAN:** Serial Communication 2's complement message - ($140 for PPEI2 or $1C7/$1C9 for PPEI3 engine torque or $1CA for PPEI3 axle torque) **OR** Serial Communication message ($140 for PPEI2 or $1C7/$1C9 for PPEI3 engine torque or $1CA for PPEI3 axle torque) rolling count value **OR** Too many minimum limit torque request transitions occur from TRUE to FALSE to TRUE within a time period	Message <> 2's complement of message Message rolling count value <> previous message rolling count value plus one Requested torque intervention type toggles from not increasing request to increasing request	**With GMLAN:** Serial communication to EBTCM (U0108) Power Mode Engine Running Status of traction in GMLAN message ($380 for PPEI2 or $4E9 for PPEI3)	No loss of communication = Run = True = Traction Present	**With GMLAN:** Count of 2's complement values not equal >= 10 **OR** 3 rolling count failures out of 10 samples >= 3 multi-transitions out of 5 samples	1 trip(s) Type C "Special Type C"

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Torque request greater than allowed				>= 10 out of 10 samples above 250 Nm Performed every 25 msec	
			With PWM: PWM Duty cycle **OR** PWM Duty cycle	< 5 Pct > 95 Pct	**With PWM:** Traction Status for PWM ($2B3C Class2 message) Engine Run Time	 = Traction Present > 10 Seconds	**With PWM:** 100 failures out of 250 samples Performed every 50 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	<= 400 kPa*(g/s) > 21 grams/sec > 22.0 kPa)	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 450 RPM <= 5800 RPM > 69 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.00 Filtered Throttle Model	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.
			ABS(Measured MAP – MAP Model 2) Filtered	> 22.0 kPa	No Active DTCs:	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 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 CrankSensorFA ECT_sensor_FA ECT_Sensor_FP IAT_SensorFA IAT_SensorCircuitFP CylDeacSystemTFTKO		
O2S Insufficient Switching Bank 1 Sensor 1	P1133	This DTC determines if the O2 sensor is no longer sufficiently switching.	Fault condition present if Half Cycle L/R or R/L Switches are below the threshold.	H/C L/R switches < Threshold, or H/C R/L switches < Threshold, (refer to table named "P1133 -	No Active DTC's	TPS_ThrottleAuthority Defaulted MAP_SensorFA	Sample time is 60 seconds	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			OR If Slope Time L/R or R/L Switches are below the threshold.	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 < 3, or S/T R/L switches < 3		IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA EthanolCompositionSensor_FA EngineMisfireDetected_FA = P0131, P0132 or P0134 10.0 volts < system voltage< 18.0 volts = Not active = Not active = Not active = Not active = False = Not Valid >= 40 seconds = Valid > 55 ºC	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	
					Bank 1 Sensor 1 DTC's not active System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Diag Green O2S Condition O2 Heater on for Learned Htr resistance Engine Coolant			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					IAT	> -40 ºC		
					Engine Run Time	> 160 seconds		
					Time since any AFM status change	> 0.0 seconds		
					Time since Purge On to Off change	> 0.0 seconds		
					Time since Purge Off to On change	> 0.0 seconds		
					Purge duty cycle	>= 0 % duty cycle		
					Engine airflow	15 gps <= engine airflow <= 55 gps		
					Engine speed	1000 <= RPM <= 3000		
					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	<= 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	> 4.5 seconds		
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	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	No Active DTC's	TPS_ThrottleAuthority Defaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA	Sample time is 60 seconds	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			If Slope Time L/R or R/L Switches are below the threshold.	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		AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA EthanolCompositionSensor_FA EngineMisfireDetected_FA	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	
					Bank 2 Sensor 1 DTC's not active System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Diag Green O2S Condition O2 Heater on for Learned Htr resistance Engine Coolant IAT Engine Run Time	= P0151, P0152 or P01 10.0 volts < system voltage< 18.0 volts = Not active = Not active = Not active = Not active = False = Not Valid >= 40 seconds = Valid > 55 ºC > -40 ºC > 160 seconds		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Time since any AFM status change	> 0.0 seconds		
					Time since Purge On to Off change	> 0.0 seconds		
					Time since Purge Off to On change	> 0.0 seconds		
					Purge duty cycle	>= 0 % duty cycle		
					Engine airflow	15 gps <= engine airflow <= 55 gps		
					Engine speed	1000 <= RPM <= 3000		
					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	<= 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	> 4.5 seconds		
EngineMetal OvertempActive	P1258	The objective of the algorithm is to protect the engine in the event of engine metal overtemperature, mainly due to loss of coolant	The ECM detects that the engine coolant has exceeded a threshold for certain amount of time.	Engine Coolant > 132 for 10 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 > 10	Time that EMOP active must be true for P1258 to be set is 0 seconds	Type A 1 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
ABS Rough Road malfunction	P1380	This diagnostic detects if the ABS controller is indicating a fault, and misfire is present. When this occurs, misfire will continue to run.	GMLan Message: "Wheel Sensor Rough Road Magnitude Validity"	= FALSE	Vehicle Speed Engine Speed Engine Load RunCrankActive Active DTC	VSS ≥ 8 kph rpm < 8192 load < 60 = TRUE P0300, MIL Request	40 failures out of 80 samples 250 ms /sample Continuous	1 Trips Type C "Special Type C"
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 Engine Speed Engine Load RunCrankActive Active DTC	VSS ≥ 8 kph rpm < 8192 load < 60 = TRUE P0300, MIL Request	40 failures out of 80 samples 250 ms /sample Continuous	1 Trips Type C "Special Type C"
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)	< -3.10 KJ/s (high RPM failure mode) > -0.32 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) <= 6.00 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 < 2 kph Throttle Position < 0.50 percent		Runs once per trip when the cold start emission reduction strategy is active Frequency: 100ms Loop Test completes after 10 seconds of accumulated qualified data.	Type A 1 Trip(s)

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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 < 16.00 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			
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	1 0.5	Diagnostic runs in 25 ms loop	Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					# of Protect Errors # of Alive Rolling Errors No idle diagnostic 506/507 code No Serial communication loss to TCM Engine Running Power mode	10 6 IAC_SystemRPM_FA (U0101) = TRUE Run Crank Active		
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 <	6.036%. 6.036%.	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 MIL: YES Trips: 1
		2) Detect throttle control is driving the throttle in the incorrect direction	Throttle Position >	39.761%.	(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	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		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 >	11	0.4875sec continuous on secondary processor	
					and Ignition Voltage >	5.4		
					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)			
Remote Vehicle Speed Limiting Signal Circuit	P162B	Determines if the speed request from OnStar is valid	**Password Protect error** - Serial Communication message - ($3ED)	Message <> two's complement of message	Vehicle Requested Speed Limit	< 155 MPH	>= 10 Password Protect errors out of 10 samples	1 trip(s) Type C
			OR					
			Rolling count error - Serial Communication message ($3ED) rolling count value	Message <> previous message rolling count value + one			>= 10 Rolling count errors out of 10 samples	
							Performed every 25 msec	
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			240/480 counts or 0.1750sec continuous; 12.5 msec/count in main processor	Type: A MIL: YES Trips:
					Powertrain commanded on and			
					Run/crank voltage >	Table, f(IAT). See supporting tables		
					and Run/crank voltage >	5.5		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
								1
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	2 trips Type B
			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	>= 28.0 liters < 3.5 liters 68 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	< 28 liters > 3.5 liters 2700 seconds				
			Distance Traveled without a Secondary Fuel Level Change					
			If the vehicle is driven a distance of 62 miles without the secondary fuel level changing by 3 liters, then the sender must be stuck.		Volume in Secondary Tank	>= 3.5 liters		
Fuel Level Sensor 2 Circuit Low Voltage	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	2 trips Type B
Fuel Level Sensor 2 Circuit High Voltage	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 Continuous	2 trips Type B
Control Module Throttle Actuator Position Performance	P2101	1) Detect a throttle positioning error	Difference between measured throttle position and modeled throttle position >	6.04%.		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:

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					TPS minimum learn is not active and Throttle is being Controlled and			A MIL:
			Difference between measured throttle position and modeled throttle position <	6.04%.	(Engine Running or Ignition Voltage > or Ignition Voltage >)	11 5.5		YES Trips:
					Ignition voltage failure is false (P1682)			1
		2) Detect throttle control is driving the throttle in the incorrect direction or exceed the reduced power limit	Throttle Position >	39.26%.	TPS minimum learn is active		2. 11counts; 12.5 msec/count in the primary processor	
			Throttle Position >	39.06%.	Reduced Power is True			
Throttle return to default	P2119	Throttle unable to return to default throttle position after de-energizing ETC motor.	TPS1 Voltage >	1.689		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:
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 14counts continuous; 12.5 msec/count in the secondary processor	Type:
			or Secondary APP1 Voltage >	4.75	No 5 V reference 2 error No 5 V reference 2 fault (P0651)			A MIL: YES Trips: 1
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		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:

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					No 5 V reference 2 error			A MIL: YES Trips: 1
			2. Secondary APP1 Voltage <	0.463	No 5 V reference 2 fault (P0651)		2. 19/39counts or 14counts 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 MIL: YES Trips: 1
			2. Secondary APP1 Voltage >	4.75	No 5 V reference 2 error No 5 V reference 2 fault (P0651)		2. 19/39counts or 14counts 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 14counts continuous; 12.5 msec/count in the secondary processor	Type: A MIL: YES Trips: 1
			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:

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			2. Secondary APP2 Voltage <	0.325	No 5 V reference 1 error No 5 V reference 1 fault (P0641)		2. 19/39counts or 14counts continuous; 12.5 msec/count in the secondary processor	A MIL: YES Trips: 1
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
			2. Secondary APP2 Voltage >	2.6	No 5 V reference 1 fault (P0641)		2. 19/39counts or 14counts continuous; 12.5 msec/count in the secondary processor	MIL: YES Trips: 1
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 >	6.998% 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 MIL: YES Trips: 1
			On the Secondary processor, the difference between TPS1 displaced and TPS2 displaced >	7.00% 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%.		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	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					No TPS Sensor Faults No 5 V reference DTCs			
			On the secondary processor, the difference between (raw min TPS1) and (raw_min TPS2) >	5.000%.				
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 >	6.004% offset at min. throttle position with it linearly increasing to 10% at max pedal position	No APP 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	1. 19/39 counts intermittent or 15 counts continuous, 12.5 msec/count in the primary processor	Type: A MIL: YES Trips: 1
			On the secondary processor, the difference between APP 1 displaced and APP 2 displaced is >	6.00% offset at min. throttle position with it linearly increasing to 10% at max pedal position				
			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 >	18.700%.		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

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			or During TPS min learn on the Secondary processor, TPS Voltage > and Number of learn attempts > AND TPS2 Voltage > On the Primary processor OR TPS1 Voltage > AND TPS2 Voltage > On the Secondary processor	 18.700%. 10counts 1.789 1.689 1.789	 No TPS circuit errors No TPS circuit faults Ignition voltage failure is false (P1682) Minimum TPS learn active Throttle de-energized No TPS circuit faults PT Relay Voltage >	 5.5		MIL: YES Trips: 1
Air Fuel Imbalance Bank 1	P219A	Determines if the air-fuel delivery system is imbalanced by monitoring the pre-catalyst O2 sensor voltage characteristics	The Bank 1 AFIM Filtered Length Ratio variable exceeds a value of	> 0.35	System Voltage Engine Run Time ECT Engine speed Mass Airflow PerCent Ethanol Delta O2 voltage during previous 12.5ms O2 sensor switches	*10 < V < 18 for > 4 seconds* > 120 seconds > -20 oC *425 < rpm < 2500* *15 < g/s < 65* < 87 % > 5.000 and -5.000 > 1 times during current 2.5 second sample period	Frequency: Continuous Monitoring of O2 voltage signal in 12.5ms loop AFIM Filtered Length Ratio variable is updated after every 2.5 seconds of valid data.	Type B 2 Trip(s)

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Quality Factor	> 0.80 in the current operating region		
					For DoD equipped vehicles only	No DoD state change during current 2.5 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 2.5 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.			
					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:			
					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			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA			
					EvapEmissionSystem_FA			
					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-catalyst O2 sensor voltage characteristics	The Bank 2 AFIM Filtered Length Ratio variable exceeds a value of	> 0.35	System Voltage	*10 < V < 18 for > 4 seconds*	Frequency: Continuous Monitoring of O2 voltage signal in 12.5ms loop	Type B 2 Trip(s)
					Engine Run Time	> 120 seconds	AFIM Filtered Length Ratio variable is updated after every 2.5 seconds of valid data.	
					ECT	> -20 oC		
					Engine speed	*425 < rpm < 2500*		
					Mass Airflow	*15 < g/s < 65*		
					PerCent Ethanol	< 87 %		
					Delta O2 voltage during previous 12.5ms	> 5.000 and -5.000		
					O2 sensor switches	> 1 times during current 2.5 second sample period		
					Quality Factor	> 0.80 in the current operating region		
					For DoD equipped vehicles only	No DoD state change during current 2.5 second sample period.		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					The AFIM Filtered Length Ratio is determined by calculating the difference between the measured O2 voltage length (accumulated O2 voltage over a 2.5 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.			
					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:			
					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**		
O2 Sensor Signal Stuck Lean Bank 1 Sensor 2	P2270	This DTC determines if the post catalyst O2 sensor is stuck in a normal lean voltage range and thereby can no longer be used for post oxygen sensor fuel control or for catalyst monitoring. The diagnostic is an intrusive test (during coast) which increases the delivered fuel to achieve the required rich threshold.	Post O2 sensor 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 < 700 mvolts AND 2) Accumulated air flow during stuck lean test > 90 grams.	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 Engine Speed to enable test Engine Speed to disable test	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 = Not Valid = False 1050 <= RPM <= 2600 1000 <= RPM <= 2750	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. 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	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Engine Airflow	3 gps <= Airflow <= 20 gps	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	
					Vehicle Speed to enable test	42.3 mph <= Veh Speed <= 80.8 mph		
					Vehicle Speed to disable test	37.3 mph <= Veh Speed <= 83.9 mph		
					Closed loop integral	0.74 <= C/L Int <= 1.08		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					Power Take Off	= not active		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater on Time	>= 100.0 sec		
					Predicted Catalyst temp	600 ºC <= Cat Temp <= 900 ºC		
					Fuel State	= DFCO possible		
					All of the above met for at least 0.5 seconds, and then the Force Cat Rich intrusive stage is requested.			
O2 Sensor Signal Stuck Rich Bank 1 Sensor 2	P2271	This DTC determines if the post catalyst O2 sensor is stuck in a normal rich voltage range and thereby can no longer be used for post oxygen sensor fuel control or for catalyst monitoring. The diagnostic is an intrusive test which requests the DFCO mode to achieve the required lean threshold.	Post O2 sensor 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 > 70 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	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.
						EngineMisfireDetected_FA EthanolCompositionSensor_FA		
					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	1050 <= RPM <= 2600		
					Engine Airflow	3 gps <= Airflow <= 20 gps		
					Vehicle Speed	42.3 mph <= Veh Speed <= 80.8 mph		
					Closed loop integral	0.74 <= C/L Int <= 1.08		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					Power Take Off	= not active		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater on Time	>= 100.0 sec		
					Predicted Catalyst temp	600 ºC <= Cat Temp <= 900 ºC		
					Fuel State	= DFCO possible		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					DTC's Passed DTC's Passed DTC's Passed	= P2270 (and P2272 (if applicable)) = P013E (and P014A (if applicable)) = P013A (and P013C (if applicable))		
					After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).			
O2 Sensor Signal Stuck Lean Bank 2 Sensor 2	P2272	This DTC determines if the post catalyst O2 sensor is stuck in a normal lean voltage range and thereby can no longer be used for post oxygen sensor fuel control or for catalyst monitoring. The diagnostic is an intrusive test (during coast) which increases the delivered fuel to achieve the required rich threshold.	Post O2 sensor 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 < 700 mvolts AND 2) Accumulated air flow during stuck lean test > 90 grams.	No Active DTC's B2S2 Failed this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition	TPS_ThrottleAuthority Defaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013C, P013D, P014A, P014B, P2272 or P2273 10.0 volts < system voltage< 18.0 volts = Valid = Not 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 ignition cycle after the following has been met: Airflow greater than 22	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Low Fuel Condition Diag Engine Speed Engine Speed to disable test Engine Airflow Vehicle Speed Vehicle Speed to disable 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 0.5 seconds, and then the Force Cat Rich intrusive stage is requested.	= False 1050 <= RPM <= 2600 1000 <= RPM <= 2750 3 gps <= Airflow <= 20 gps 42.3 mph <= Veh Speed <= 80.8 mph 37.3 mph <= Veh Speed <= 83.9 mph 0.74 <= C/L Int <= 1.08 = TRUE not in control of purge not in estimate mode = enabled = not active = not active = not active >= 100.0 sec 600 ºC <= Cat Temp <= 900 ºC = DFCO possible	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 2 Sensor 2	P2273	This DTC determines if the post catalyst O2 sensor is stuck in a normal rich voltage range and thereby can no longer be used for post oxygen sensor fuel control or for catalyst monitoring. The diagnostic is an intrusive test which requests the DFCO mode	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	1) Post O2S signal > 100 mvolts AND 2) Accumulated air flow during stuck rich test > 70 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	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		which requests the BPCC 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.	
					B2S2 Failed this key cycle	P013C, P013D, P014A, P014B or P2272		
					System Voltage	10.0 volts < system voltage< 18.0 volts		
							Green Sensor Delay Criteria	
					Learned heater resistance	= Valid		
					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	1050 <= RPM <= 2600		
					Engine Airflow	3 gps <= Airflow <= 20 g		
					Vehicle Speed	42.3 mph <= Veh Speed <= 80.8 mph		
					Closed loop integral	0.74 <= C/L Int <= 1.08		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					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	>= 100.0 sec		
					Predicted Catalyst temp	600 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).			
Secondary AIR System Pressure Sensor Circuit Bank 1 (For applications with AIR)	P2430	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. < 60.0 deg C. > 3600.0 seconds > 10.0 OR < 18.0	Stuck in range cumulative time > 5.0 seconds	2 trip(s) Type B
				disable conditions:	MAP Engine Speed MAF No active DTCs:	< 20 kPa for 2 seconds > 5000 RPM > 50 gm/s for 3 seconds AIRValveControlCircuit FA AIRPumpControlCircuit FA AIRSysPressSnsrB1CktLoFA AIRSysPressSnsrB1CktHiFA ControllerProcessorPerf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA	Frequency: Once per trip when SAI pump commanded On	

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 (For applications with AIR)	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)	> 14.0 kPa < -10.0 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. < 60.0 deg C. > 3600.0 seconds > 10.0 OR < 18.0 Volts	Skewed sensor cumulative test weight > 5.0 seconds Continuous 6.25ms loop	2 trip(s) Type B
				disable conditions:	MAP Engine Speed MAF No active DTCs:	< 20 kPa for 2 seconds > 5000 RPM > 50 gm/s for 3 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 (For applications with AIR)	P2432	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	2 trip(s) Type B

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 (For applications with AIR)	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	2 trip(s)
				disable conditions:	No active DTCs:	ControllerProcessorPerf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA	6.25 ms loop Continuous	Type B
Secondary AIR System Shut-off Valve Stuck Open Single Bank System (For applications with AIR)	P2440	This DTC detects if one or both of the AIR system control valves is stuck open This test is run during Phase 2 (Pump commanded On, valve commanded closed)	AIR pressure error	< **Bank 1 Valve Pressure Error** table or > 32.0 kPa	BARO Inlet Air Temp Coolant Temp Engine off time System Voltage Stability Time	> 60 kPa > 5.0 deg C. > 5.0 deg C. < 60.0 deg C. > 3600.0 seconds > 10.0 OR < 18.0 > 0.5 seconds AIR diagnostic Phase 1 passed	Phase 2 Conditional test weight > 2.0 seconds	2 trip(s) Type B
					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 Engine Speed MAF No active DTCs:	< 20 kPa for 2 seconds > 5000 RPM > 50 gm/s for 3 seconds AIRSystemPressureSensor FA AIRValveControlCircuit FA AIRPumpControlCircuit FA MAF_SensorFA MAP_SensorFA IAT_SensorFA ECT_Sensor_FA EngineMisfireDetected_FA CatalystSysEfficiencyLoB1_FA		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						CatalystSysEfficiencyLoB2_FA ControllerProcessorPerf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA IgnitionOutputDriver_FA FuelInjectorCircuit_FA		
Secondary AIR System Pump Stuck On Single Bank System (For applications with AIR)	P2444	This DTC detects if the SAI pump is stuck On This test is run during Phase 3 (Pump commanded Off, valve commanded closed)	AIR pressure error	> **Bank 1 Pump Pressure Error** table or < -32 kPa	BARO Inlet Air Temp Coolant Temp Engine off time System Voltage Stability Time	> 60 kPa > 5.0 deg C. > 5.0 deg C. < 60.0 deg C. > 3600.0 seconds > 10.0 OR < 18.0 > 6.0 seconds AIR diagnostic Phase 1 passed AIR diagnostic Phase 2 passed	Phase 3 Cumlatative test weight > 3.0 seconds Frequency: Once per trip when AIR pump commanded On	1 trip(s) Type A
					Phase 3 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 3 seconds AIRSystemPressureSensor FA AIRValveControlCircuit FA AIRPumpControlCircuit FA MAF_SensorFA MAP_SensorFA IAT_SensorFA ECT_Sensor_FA EngineMisfireDetected_FA CatalystSysEfficiencyLoB1_FA CatalystSysEfficiencyLoB2_FA		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						ControllerProcessorPerf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA IgnitionOutputDriver_FA FuelInjectorCircuit_FA		
Transmission Control Torque Request Circuit	P2544	Determines if the torque request from the TCM is valid	**Protect error** - Serial Communication message - ($199 - PTEI3)	Message <> two's complement of message			>= 16 Protect errors during key cycle	2 trip(s)
			OR					
			Rolling count error - Serial Communication message ($199 - PPEI3) rolling count value	Message <> previous message rolling count value + one	Diagnostic enabled/disabled Power Mode Engine Running Run/Crank Active	Enabled = Run = True > 0.50 Sec	>= 6 Rolling count errors out of ten samples	Type B
			OR					
			RAM Error - Serial Communication message ($199 - PPEI3)	Trans torque reduction or type request portion of message 2's complement values <>			>= 3 RAM errors during key cycle	
			OR					
			Range Error - TCM Requested Torque Increase message $199	> 600 Nm			>= 3 out of 10 samples	
			OR					
			Multi-transition error - Trans torque intervention type request change	Requested torque intervention type toggles from not increasing request to increasing request			>= 3 multi-transitions out of 5 samples	
							Performed every 12.5 msec	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Torque Management Request Input Signal B	P2548	Determines if the performance launch torque request is valid	**Protect error** - Serial Communication message - ($1C8 Message)	Message <> two's complement of message	Diagnostic enabled/disabled Run/Crank Active	Enabled > 0.50 Sec	>= 10 Protect errors out of 10 samples	2 trip(s) Type B
			OR					
			Rolling count error - Serial Communication message ($1C8) rolling count value	Message <> previous message rolling count value + one			>= 6 Rolling count errors out of 10 samples	
					No active DTC's	Fault bundles: IAC_SystemRPM_FA	Performed every 100 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	2 trips Type B DTC sets on next key cycle if failure detected
Four Wheel Drive Low Switch Circuit (Four wheel drive applications only)	P2771	Detects Fail Case 1: Continuous Open (Stuck Off) Fail Case 2: Ground (Stuck On) in	Fail Case 1: 4WD Low Switch MTCR High	= Open Boolean <= 8 ratio			>= 2 Fail Time (Sec)	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			MTCR Low	>= 2.4 ratio			>= 7 Fail Time (Sec)	
			Fail Case 2: MTCR High	<= 1.85 ratio				
			MTCR Low	>= 0.65 ratio				
					Engine Torque High	<= 8192 N-m		
					Engine Torque Low	>= 30 N-m		
					Engine Speed High	<= 5500 RPM		
					Engine Speed Low	>= 1000 RPM		
					System Voltage High	<= 18 V		
					System Voltage Low	>= 11 V		
					Throttle Position Sensor High	<= 99 %		
					Throttle Position Sensor Low	>= 5.0 %		
					Transmission Temperature High	<= 130 º C.		
					Transmission Temperature Low	>= -20 º C.		
					Engine Run time	>= 10 Sec		
					Vehicle Speed	>= 5 KPH		
				Disable Conditions:	MIL not Illuminated for DTC's:	ECM: P0068, P0120, P0122, P0123, P0220, P0222, P0223, P0607, P060D, P060E, P1120, P1220, P1221, P1271, P1275, P1277, P1278, P1280, P1282, P1283, P1512, P1514, P1516, P151A, P1523, P1680, P1681, P1682, P1791, P1ECF, P2100, P2101, P2119, P2120, P2122, P2123, P2125, P2127, P2128, P2135, P2138, P2176, P0502, P0503, P0721, P0722, P0723, P077B, P150A, P150B, P1729, P215C, P2160, P2161, P0016, P0017, P0018, P0018, P0335, P0336, P0340, P0341, P0345, P0346, P0365, P0366, P0385, P0386, P0390, P0391, P0654, P1372		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Deactivation System Performance	P3400	Detects a “failed to deactivate” condition when Deactivation Mode allowed:	ABS(Measured MAP – MAP Model 2) Filtered **AND** ((Measured MAP – MAP Model 2) filtered) (*stored from previous all-Cylinder mode event*) - ((Measured MAP – MAP Model 2) filtered) (*current*)	< -10.0 kPa > 10.0 kPa	**DIAGNOSTIC ENABLE CONDITIONS** Total filtered residual weight factors ECT IAT Engine RPM	>= 0 factor > 69 and < 125 Deg C > -20 and < 125 Deg C > 450 and < 5800 RPM MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM. See table IFRD Residual Weighting Factors	100 cylinder deactivation lag residual failures out of 200 samples	2 trip(s) Type B
					CYLINDER DEACTIVATION ENABLE CONDITIONS (Conditions below must be met for >= 0 seconds before cylinder deactivation will begin) Engine running Engine RPM Engine coolant Ignition voltage Pct throttle pedal Brake booster vacuum Engine oil temp PRNDL State	> 30.0 seconds > **EngSpeedLwrLimitEnableTable** AND < **EngSpeedUprLimitEnableTable** - Details on Supporting Tables Tab (P3400 Section) >= 40 and <= 132 Deg C >= 11.0 and <= 18.0 Volts < 5 Percent >= 0.0 kPa [illegible] C **HalfCylDisabledPRNDL** - See details on Supporting Tables Tab (P3400 Section)	Performed once every 100 msec	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Trans Gear	**HalfCylDisabledTransGr** - See details on Supporting Tables Tab (P3400 Section)		
					Vehicle speed	>= 14.9 MPH		
					FCO not active for	>= 3.0 Seconds		
					Time since last cylinder deac mode event	>= 3.0 Seconds		
					Gear Shift	Not currently in progress		
					AC Clutch transition	Not currently in progress		
					Tip In Bump Accelerator pedal delta	Not active <= 50.0 Percent		
					Engine oil pressure	>= 187.4 and <= 455 kPa		
					Filtered engine vacuum	> AllCylToHalfCylVacuum or EcoAllCylToHalfCylVacuum (in Eco mode) - See details on Supporting Tables Tab (P3400 Section) for 0 sec.		
					PRNDL state	HalfCylDisabledPRNDL and HalfCylDisabledPRNDL DeviceControl tables (when in device control) - See details on Supporting Tables Tab (P3400 Section)		
					Oil aeration present	Aeration enabled by engine RPM > 5000 for 15 seconds, disabled by engine RPM < 4000 for 90 seconds		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					After exiting deac mode, must be in all cylinder mode for	>= 60 seconds		
					DFCO mode	Not currently in DFCO		
					Fuel shut off mode other than DFCO	Not currently in fuel shut-off		
					ETC Power management mode	Not active		
					Heater Perf.	Not in Heater Performance Mode		
					POSD Intrusive	POSD diagnostic not active		
					POPD Intrusive	POPD diagnostic not active		
					Low range 4WD	Not in Low Range 4WD		
					AFM is disabled at high percent ethanol	Ethanol concentration > 95 % disables AFM. Once disabled, ethanol concentration must be < 85 % to re-enable		
					If feature is enabled, AFM is allowed only when percent ethanol learn is not in progress	Feature is Disabled		
					IF DEACTIVATED, ANY OF THE CONDITIONS BELOW WILL FORCE CYLINDER REACTIVATION			
					If deactivation mode is active for	>= 600 seconds		
					then reactivation will occur if:			
					Deac mode active	>= 600 seconds		
					OR			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Delta vacuum	> 5 kPa or < -5 kPa		
					Engine RPM	> **EngSpeedDisableLwrLimitTable** AND < **EngSpeedDisableUprLimitTable** - Details on Supporting Tables Tab (P3400 Section)		
					Engine Power Limited Mode	Active		
					Pct throttle pedal	> 6 Percent		
					Piston protection	Active		
					Engine Oil Temperature	< 18Deg C or > 130 Deg C		
					Engine Oil Pressure	< 172.3 kPa or > 470 kPa		
					Oil aeration present	Aeration enabled by engine RPM > 5000 for 15 seconds, disabled by engine RPM < 4000 for 90 seconds		
					Engine Metal Overtemp Protection	Active		
					Accelerator pedal delta	<= 50.0 percent		
					in device control only, when in Park or Neutral, Vehicle speed	<= 0.0 MPH		
					Trans Gear	AllCylDisabledTransGr See details on Supporting Tables Tab (P3400 Section)		
					PRNDL state	HalfCylDisabledPRNDL		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						and HalfCylDisabledPRNDL DeviceControl tables (when in device control) - See details on Supporting Tables Tab (P3400 Section)		
					Ignition voltage	< 11.0 or > 18.0 Volts		
					Engine Coolant	< 11.0 or > 128.0 Deg C		
					Vehicle speed	< 13.7 MPH		
					Brake booster vacuum	< 0.0 kPa		
					Pct Throttle Pedal	< 6 Percent		
					Filtered engine vacuum	> HalfCylToAllCylVacuum or EcoHalfCylToAllCylVacuum (in Eco mode) - See details on Supporting Tables Tab (P3400 Section) for 0 sec.		
					ETC Power management mode	Active		
					Converter overtemp protect	Active		
					Hot Coolant Mode	Active		
					Engine running	= False		
					Engine overspeed protection	Active		
					Gear Shift	In progress		
					AC Clutch transition	In progress		
					Tip In Bump	Active		
					Engine Metal Overtemp Protect	Active		
					Cat. Temp Low	Active		
					POSD Intrusive	Active		
					FWD	In low range		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Engine Misfire Heater Performance POPD Intrusive No active DTC's	Detected Active Active Fault bundles: Map_SensorFA VehicleSpeedSensorError ECT_Sensor_FA EOP_Sensor_FA PowertrainRelayFault BrakeBoosterSensorFA CrankSensorFA CamSensorFA IAT_SensorFA CylnderDeacDriverTFTKO FourWheelDriveLowStateValid EngineTorqueEstInaccurate TransmissionGearDefaulted EnginePowerLimited		
Cylinder 1 Deactivation Solenoid Control Circuit	P3401	Checks the Solenoid Control Circuit electrical integrity for cylinder #1	The ECM detects that commanded state of driver and actual state of the control circuit do not match. (Short to ground, short to voltage, open circuit)		Engine RPM Ignition Voltage Diagnostic enabled/disabled	>= 400.0 RPM <= 18.0 and >= 11.0 Vo Enabled	20 failures out of 25 samples Performed every 250 msec	2 trip(s) Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Cylinder 4 Deactivation Solenoid Control Circuit	P3425	Checks the Solenoid Control Circuit electrical integrity for cylinder #4	The ECM detects that commanded state of driver and actual state of the control circuit do not match. (Short to ground, short to voltage, open circuit)		Engine RPM Ignition Voltage Diagnostic enabled/disabled	>= 400.0 RPM <= 18.0 and >= 11.0 Volts Enabled	20 failures out of 25 samples Performed every 250 msec	2 trip(s) Type B
Cylinder 6 Deactivation Solenoid Control Circuit	P3441	Checks the Solenoid Control Circuit electrical integrity for cylinder #6	The ECM detects that commanded state of driver and actual state of the control circuit do not match. (Short to ground, short to voltage, open circuit)		Engine RPM Ignition Voltage Diagnostic enabled/disabled	>= 400.0 RPM <= 18.0 and >= 11.0 Volts Enabled	20 failures out of 25 samples Performed every 250 msec	2 trip(s) Type B
Cylinder 7 Deactivation Solenoid Control Circuit	P3449	Checks the Solenoid Control Circuit electrical integrity for cylinder #7	The ECM detects that commanded state of driver and actual state of the control circuit do not match. (Short to ground, short to voltage, open circuit)		Engine RPM Ignition Voltage Diagnostic enabled/disabled	>= 400.0 RPM <= 18.0 and >= 11.0 Volts Enabled	20 failures out of 25 samples Performed every 250 msec	2 trip(s) Type B
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures out of these samples	≥ 3 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	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.
					Normal Transmit capability is TRUE			
					The diagnostic system is not disabled			
					The bus has been on for	> 3.0000 seconds		
					A message has been selected to			
					monitor.			
Lost Communication With 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	12 counts	Run/Crank Voltage	11 volts ≤ Voltage ≤ 18 volts	The diagnostic runs in the 1000 ms loop	Type B 2 trips
			out of these samples	12 counts	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.			
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	12 counts	Run/Crank Voltage	11 volts ≤ Voltage ≤ 18 volts	The diagnostic runs in the 1000 ms loop	Type C 1 trips "Special Type C"
			out of these samples	12 counts	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.			
Lost Communication With Vehicle Dynamics Control Module	U0122	This DTC monitors for a loss of communication with the Vehicle Dynamics Control Module.	Message is not received from controller for this many counts	12 counts	Run/Crank Voltage	11 volts ≤ Voltage ≤ 18 volts	The diagnostic runs in the 1000 ms loop	Type B 2 trips
			out of these samples	12 counts	Power mode is RUN			
					Communication bus is not OFF			
					or is typed as a C code			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Normal Communication is enabled			
					Normal Transmit capability is TRUE			
					The diagnostic system is not disabled			
					The bus has been on for	> 3.0000 seconds		
					A message has been selected to			
					monitor.			
Lost Communication With Body Control Module	U0140	This DTC monitors for a loss of communication with the Control Module.	Message is not received from controller for this many counts	12 counts	Run/Crank Voltage	11 volts ≤ Voltage ≤ 18 volts	The diagnostic runs in the 1000 ms loop	Type C 1 trips
			out of these samples	12 counts	Power mode is RUN			
					Communication bus is not OFF			
					or is typed as a C code			"Special Type C"
					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.			

LOOK-UP TABLES

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	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
-4.3750	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
1.2500	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
6.8750	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
12.5000	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
18.1250	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
23.7500	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
29.3750	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
35.0000	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
40.6250	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
46.2500	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
51.8750	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
57.5000	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
63.1250	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
68.7500	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
74.3750	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358
80.0000	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358	-373.6358

P0442: Estimate of Ambient Temperature Valid Conditioning Time

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

Axis	Curve
0	300
600	600
1200	600
1800	500
2400	500
3000	700
3600	700
4200	700
4800	671
5400	643
6000	614
6600	586
7200	557
7800	529
8400	500
9000	467
9600	433
10200	400
10800	367
11700	317
12600	300
13500	296
14400	292
15300	288
16200	283
17100	279
18000	275
19200	271
20400	267
21600	263
22800	258
24000	254
25200	250

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

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

Axis	Curve
0	40
6	40
12	40
19	40
25	40
31	40
37	40
44	40
50	40
56	40
62	40
69	40
75	40
81	40
87	40
94	40
100	40

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

CATD Section

MinimumEngineRunTime

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

MinCatTemp		X_AXIS_PTS
CATD_ExhaustWarm Min_Loc_0	300	0
CATD_ExhaustWarm Min_Loc_1	300	1
CATD_ExhaustWarm Min_Loc_2	300	2
CATD_ExhaustWarm Min_Loc_3	300	3
CATD_ExhaustWarm Min_Loc_4	300	4
CATD_ExhaustWarm Min_Loc_5	300	5
CATD_ExhaustWarm Min_Loc_6	300	6
CATD_ExhaustWarm Min_Loc_7	300	7

MinAirflowToWarmCatalyst

Engine Coolant	0	45	90
MinAirFlowToWrmCat	18	10	6

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
ıse Loop Enable Temp	85	80	75	65	45	39	39	39	39	39	39	39	39	39	39	39	39

KtFSTA_t_ClosedLoopTime

Start-Up Coolant	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
ose Loop Enable Time	120	90	65	45	25	10	10	10	10	10	10	10	10	70	70	70	70

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	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
60	0.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
70	0.0	6.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
80	0.0	6.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
90	0.0	6.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
100	0.0	6.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
110	0.0	6.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
120	0.0	6.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
130	0.0	6.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
140	0.0	6.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
150	0.0	6.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
160	0.0	6.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
170	0.0	6.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
180	0.0	6.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0

Knock Detection Enabled Factors:

Knock Detection Enabled = FastAttackRate * FastAttackCoolGain * FastAttackBaroGain

RPM:	**0**	**512**	**1024**	**1536**	**2048**	**2560**	**3072**	**3584**	**4096**	**4608**	**5120**	**5632**	**6144**	**6656**	**7168**	**7680**	**8192**
FastAttackRate:	2.50	2.50	2.50	2.75	3.00	3.50	3.50	3.50	3.50	4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00

ECT (deg. C):	**-40**	**-30**	**-20**	**-10**	**0**	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**	**110**	**120**
FastAttackCoolGain:	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.50	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.10	1.20

Baro:	**55.00**	**61.25**	**67.50**	**73.75**	**80.00**	**86.25**	**92.50**	**98.75**	**105.00**
FastAttackBaroGain:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

AFIM Section

KtOXYD_cmp_AFIM_LngthThrsh1

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
80	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
125	100000	100000	7200	8256	11120	7600	7760	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
160	100000	100000	6112	7648	8224	7936	8288	9760	9632	100000	100000	100000	100000	100000	100000	100000	100000
200	100000	100000	6128	7952	7888	8208	8688	9968	10608	100000	100000	100000	100000	100000	100000	100000	100000
240	100000	100000	100000	7824	8000	8544	9296	11424	11872	100000	100000	100000	100000	100000	100000	100000	100000
280	100000	100000	100000	8032	8480	8848	10688	11120	11744	100000	100000	100000	100000	100000	100000	100000	100000
320	100000	100000	100000	8384	9344	9360	11120	11120	11456	100000	100000	100000	100000	100000	100000	100000	100000
360	100000	100000	100000	9088	9056	9152	10784	11808	11952	100000	100000	100000	100000	100000	100000	100000	100000
400	100000	100000	100000	11664	9776	9632	10112	12064	11760	100000	100000	100000	100000	100000	100000	100000	100000
440	100000	100000	100000	8320	8992	10496	9968	11632	10976	100000	100000	100000	100000	100000	100000	100000	100000
480	100000	100000	100000	7552	9520	10736	10368	11040	10320	100000	100000	100000	100000	100000	100000	100000	100000
520	100000	100000	100000	9056	10784	11456	10672	10944	10384	100000	100000	100000	100000	100000	100000	100000	100000
560	100000	100000	100000	11216	9952	11536	11216	10320	9856	100000	100000	100000	100000	100000	100000	100000	100000
640	100000	100000	100000	100000	11744	13312	12160	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
720	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
800	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000

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	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
80	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
125	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
160	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
200	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
240	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
280	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
320	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
360	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
400	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
440	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
480	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
520	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
560	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
640	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
720	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
800	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000

KtOXYD_cmp_AFIM_LngthThrsh2

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
80	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
125	100000	100000	7568	10192	11584	7392	7568	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
160	100000	100000	6336	7648	9280	9232	8896	10288	9808	100000	100000	100000	100000	100000	100000	100000	100000
200	100000	100000	6384	7488	7520	8080	8864	10512	11424	100000	100000	100000	100000	100000	100000	100000	100000
240	100000	100000	100000	7344	8128	8688	9936	11280	11488	100000	100000	100000	100000	100000	100000	100000	100000
280	100000	100000	100000	7328	8512	8656	10528	11504	11120	100000	100000	100000	100000	100000	100000	100000	100000
320	100000	100000	100000	9008	9120	9472	10576	11040	11872	100000	100000	100000	100000	100000	100000	100000	100000
360	100000	100000	100000	9248	9120	9872	11472	11632	13312	100000	100000	100000	100000	100000	100000	100000	100000
400	100000	100000	100000	11568	9120	9680	10912	12192	13168	100000	100000	100000	100000	100000	100000	100000	100000
440	100000	100000	100000	9632	9888	10368	11248	11536	13024	100000	100000	100000	100000	100000	100000	100000	100000
480	100000	100000	100000	10128	10848	10688	11968	12656	14048	100000	100000	100000	100000	100000	100000	100000	100000
520	100000	100000	100000	15296	11760	10928	13200	12896	15728	100000	100000	100000	100000	100000	100000	100000	100000
560	100000	100000	100000	12880	11248	11488	13520	16240	14688	100000	100000	100000	100000	100000	100000	100000	100000
640	100000	100000	100000	100000	14896	15536	14272	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
720	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
800	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000

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	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
80	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
125	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
160	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
200	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
240	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
280	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
320	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
360	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
400	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
440	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
480	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
520	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
560	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
640	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
720	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
800	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000

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
125	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	1	1	0	0	0	0	0	0	0	0
320	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0
360	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0
400	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0
440	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0
480	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0
520	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0
560	0	0	0	1	1	1	1	1	1	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_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
125	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
125	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	1	1	1	0	0	0	0	0	0	0	0	0	0
240	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0
280	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0
320	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0
360	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0
400	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0
440	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0
480	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0
520	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0
560	0	0	0	1	1	1	1	1	1	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
125	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	85	80	75	65	45	39	39	39	39	39	39	39	39	39	39	39	39

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	120	90	65	45	25	10	10	10	10	10	10	10	10	70	70	70	70

Tables supporting Clutch Diagnostics

P0806

EngTorqueThreshold Table **AXIS is Percent Clutch Petal Position, 0 = bottom of travel**

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	30.0	30.0	30.0	30.0	30.0	30.0	40.0	72.0	80.0	85.0	-8192.0	-8192.0	-8192.0	-8192.0	-8192.0	-8192.0	-8192.0

P0806

ResidualErrorEnableLow Table **AXIS is Gear**

Axis	1st	2nd	3rd	4th	5th	6th	rev	neutral
Curve	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

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

FASD Section

P0171 & P0174 **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	1.245	1.245	1.245	1.245	1.245	1.245	1.245	1.245	1.245	1.245	1.245	1.245	1.245	1.245	1.245	1.245	1.245

P0172 & P0175 **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	0.755	0.755	0.755	0.755	0.755	0.755	0.755	0.755	0.755	0.755	0.755	0.755	0.755	0.755	0.755	0.755	0.755

P0172 & P0175 **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	0.760	0.760	0.760	0.760	0.760	0.760	0.760	0.760	0.760	0.760	0.760	0.760	0.760	0.760	0.760	0.760	0.760

The following tables define when the engine goes closed loop

P0171, P0172, P0174 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	85	80	75	65	45	39	39	39	39	39	39	39	39	39	39	39	39

P0171, P0172, P0174 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	120	90	65	45	25	10	10	10	10	10	10	10	10	70	70	70	70

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

TPS Residual Weight Factor based on RPM

RPM	0	600	1000	1400	1800	2200	2600	3000	3400	3800	4200	4600	5000	5400	5800	6200	6600
	0.000	1.000	1.000	1.000	0.956	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.339

MAF Residual Weight Factor based on RPM

RPM	0	600	1000	1400	1800	2200	2600	3000	3400	3800	4200	4600	5000	5400	5800	6200	6600
	0.000	0.734	1.000	0.680	0.290	0.488	0.330	0.361	0.430	0.177	0.327	0.279	0.283	0.245	0.272	0.000	0.000

MAF Residual Weight Factor Based on MAF Estimate

gm/sec	0.0	40.0	47.0	56.0	67.0	79.0	93.0	111.0	131.0	156.0	184.0	218.0	259.0	307.0	363.0	431.0	510.0
	1.000	1.000	0.909	0.836	0.773	0.719	0.660	0.584	0.501	0.408	0.336	0.294	0.268	0.243	0.219	0.191	0.159

MAP1 Residual Weight Factor based on RPM

RPM	0	600	1000	1400	1800	2200	2600	3000	3400	3800	4200	4600	5000	5400	5800	6200	6600
	0.000	0.707	0.754	0.599	0.509	0.695	0.704	0.682	0.700	0.580	1.000	1.000	1.000	0.750	0.750	0.000	0.000

MAP2 Residual Weight Factor based on RPM

RPM	0	600	1000	1400	1800	2200	2600	3000	3400	3800	4200	4600	5000	5400	5800	6200	6600
	0.000	0.818	1.000	0.575	0.406	1.000	0.858	1.000	1.000	0.755	1.000	1.000	1.000	0.508	0.477	0.000	0.000

SCIAP1 Residual Weight Factor based on RPM

RPM	0	600	1000	1400	1800	2200	2600	3000	3400	3800	4200	4600	5000	5400	5800	6200	6600
	0.000	0.674	1.000	1.000	1.000	1.000	0.872	1.000	1.000	0.801	1.000	1.000	1.000	0.682	0.710	0.000	0.000

SCIAP2 Residual Weight Factor based on RPM

RPM	0	600	1000	1400	1800	2200	2600	3000	3400	3800	4200	4600	5000	5400	5800	6200	6600
	0.000	0.827	1.000	1.000	1.000	1.000	0.851	1.000	1.000	0.851	1.000	1.000	1.000	0.649	0.686	0.000	0.000

Boost Residual Weight Factor based on % of Boost

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

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

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

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

-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
80	80	80	70	60	45	35	25	25	25	15	15	15	15	15	15	15

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

Z axis is the accumulated airflow failure threshold (grams)
X axis is ECT Temperature 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	13185	13185	13185	13185	13185	11804	10422	9041	7660	6279	4898
Alternate	-7.0 ° C	10.0 ° C	13418	13418	13418	12217	11015	9814	8612	7410	6209	6209	6209

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

		400	500	600	700	800	900	1000	1100	1200
load	**8**	400	325	250	140	105	75	70	50	43
Load	**9**	450	350	250	150	110	80	75	55	43
	11	475	375	275	175	115	85	80	62	45
	12	500	400	300	200	130	90	85	65	50
	13	525	425	325	225	150	100	90	70	55
	14	538	438	338	238	163	113	95	75	58
	15	550	450	350	250	175	125	100	80	60
	16	550	463	375	263	188	138	105	85	63
	17	550	475	400	275	200	150	110	90	65
	18	550	488	425	288	213	163	118	95	68
	19	550	500	450	300	225	175	125	100	70
	21	575	525	475	325	238	188	138	110	75
	22	600	550	500	350	250	200	150	120	80
	24	625	575	525	375	275	213	163	130	85
	25	650	600	550	400	300	225	175	140	90
	27	32767	32767	32767	32767	32767	32767	32767	32767	32767
	29	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: Idle SCD ddt

		400	500	600	700	800	900	1000	1100	1200
load	**8**	400	325	250	140	105	75	70	50	43
	9	450	350	250	150	110	80	75	55	43
	11	475	375	275	175	115	85	80	60	45
	12	500	400	300	200	130	90	85	65	50
	13	525	425	325	225	150	100	90	70	55
	14	538	438	338	238	163	113	95	75	58
	15	550	450	350	250	175	125	100	80	60
	16	550	463	375	263	188	138	100	85	63
	17	550	475	400	275	200	150	100	90	65
	18	550	488	425	288	213	163	113	95	68
	19	550	500	450	300	225	175	125	100	70
	21	575	525	475	325	238	188	138	110	75
	22	600	550	500	350	250	200	150	120	80
	24	625	575	525	375	275	213	163	130	85
	25	650	600	550	400	300	225	175	140	90
	27	32767	32767	32767	32767	32767	32767	32767	32767	32767
	29	32767	32767	32767	32767	32767	32767	32767	32767	32767

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

		400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
load	**8**	400	325	250	140	105	75	70	50	43	32767	32767	32767	32767
Load	**9**	450	350	250	150	110	80	75	55	43	32767	32767	32767	32767
	11	475	375	275	175	115	85	80	62	45	32767	32767	32767	32767
	12	500	400	300	200	130	90	85	65	50	32767	32767	32767	32767
	13	525	425	325	225	150	100	90	70	55	32767	32767	32767	32767
	15	550	450	350	250	175	125	100	80	60	32767	32767	32767	32767
	17	550	475	400	275	200	150	110	90	65	32767	32767	32767	32767
	19	550	500	450	300	225	175	125	100	70	32767	32767	32767	32767
	22	600	550	500	350	250	200	150	120	80	32767	32767	32767	32767
	25	650	600	550	400	300	225	175	140	90	32767	32767	32767	32767
	29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	33	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	42	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	48	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	61	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: SCD Delta ddt

load		400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
	8	400	325	250	140	105	75	70	50	43	32767	32767	32767	32767
	9	450	350	250	150	110	80	75	55	43	32767	32767	32767	32767
	11	475	375	275	175	115	85	80	60	45	32767	32767	32767	32767
	12	500	400	300	200	130	90	85	65	50	32767	32767	32767	32767
	13	525	425	325	225	150	100	90	70	55	32767	32767	32767	32767
	15	550	450	350	250	175	125	100	80	60	32767	32767	32767	32767
	17	550	475	400	275	200	150	100	90	65	32767	32767	32767	32767
	19	550	500	450	300	225	175	125	100	70	32767	32767	32767	32767
	22	600	550	500	350	250	200	150	120	80	32767	32767	32767	32767
	25	650	600	550	400	300	225	175	140	90	32767	32767	32767	32767
	29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	33	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	42	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	48	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
	61	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

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

load		400	500	600	700	800	900	1000	1100	1200
	8	825	725	625	400	275	225	170	125	100
Load	**9**	850	750	650	375	250	215	165	130	100
	11	875	775	675	400	275	200	170	130	100
	12	900	800	700	425	300	200	175	135	105
	13	925	825	725	450	300	225	180	140	110
	14	938	838	738	463	313	238	185	145	113
	15	950	850	750	475	325	250	190	150	115
	16	963	863	763	488	338	263	195	155	120
	17	975	875	775	500	350	275	200	160	125
	18	988	888	788	513	363	288	210	170	130
	19	1000	900	800	525	375	300	220	180	135
	21	1025	925	825	538	388	313	235	190	143
	22	1050	950	850	550	400	325	250	200	150
	24	1075	975	875	575	425	338	263	213	155
	25	1100	1000	900	600	450	350	275	225	160
	27	1125	1025	925	625	475	375	288	238	168
	29	1150	1050	950	650	500	400	300	250	175

P0300-P0308: Idle Cyl Mode ddt

load		400	500	600	700	800	900	1000	1100	1200
	8	825	725	625	400	275	225	170	120	90
	9	850	750	650	375	250	215	165	125	90
	11	875	775	675	400	275	200	170	125	100
	12	900	800	700	425	300	225	175	130	105
	13	925	825	725	450	325	250	180	135	105
	14	938	838	738	475	338	263	185	140	108
	15	950	850	750	500	350	275	190	145	110
	16	963	863	763	513	363	288	195	148	115
	17	975	875	775	525	375	300	200	150	120
	18	988	888	788	538	388	300	210	160	123
	19	1000	900	800	550	400	300	220	170	125
	21	1025	925	825	563	400	313	235	175	133
	22	1050	950	850	575	400	325	250	180	140
	24	1075	975	875	588	425	338	263	190	145
	25	1100	1000	900	600	450	350	275	200	150
	27	1125	1025	925	625	475	375	288	213	155
	29	1150	1050	950	650	500	400	300	225	160

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

load		400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3500	4000	4500	5000	5500	6000	6500	7000
	8	825	725	625	400	275	225	170	125	110	80	55	45	40	28	22	20	18	14	6	5	5	4	3	3	3	3
Load	**9**	850	750	650	375	250	215	165	130	100	70	50	38	36	24	20	16	16	13	5	5	5	4	3	3	3	3
	11	875	775	675	400	275	200	170	140	100	65	45	35	32	22	18	13	14	12	5	4	4	4	3	3	3	3
	12	900	800	700	425	300	225	180	150	110	70	43	32	28	19	13	11	11	11	5	5	4	3	3	3	3	3
	13	925	825	725	450	325	250	200	160	115	75	45	35	24	20	14	12	10	10	5	5	4	4	3	3	3	3
	15	950	850	750	500	350	300	220	180	125	80	50	40	28	23	16	13	10	9	6	5	4	4	3	3	3	3
	17	975	875	775	550	400	350	250	210	150	85	55	45	32	25	18	14	10	9	6	5	4	4	3	3	3	3
	19	1000	900	800	600	450	400	300	240	175	90	60	50	35	25	20	15	11	9	7	5	5	4	3	3	3	3
	22	1050	950	850	650	500	450	350	270	200	100	65	60	40	30	24	18	14	11	7	5	5	5	3	3	3	3
	25	1100	1000	900	700	550	500	400	300	225	120	80	75	50	40	28	21	17	13	8	6	5	5	3	3	3	3
	29	1150	1050	950	750	600	550	450	350	250	140	100	85	65	45	35	24	20	15	8	6	5	5	3	3	3	3
	33	1200	1100	1000	800	650	600	500	400	275	160	120	100	80	50	40	28	23	18	9	7	5	5	4	3	3	3
	38	1250	1150	1050	850	700	650	550	450	300	180	150	115	90	60	45	32	26	21	10	8	6	6	4	4	4	4
	42	1300	1200	1100	900	750	700	600	500	350	250	180	150	100	70	50	38	30	24	12	9	6	6	5	4	4	4
	48	1350	1250	1150	950	800	750	650	550	400	300	220	165	110	80	55	44	35	27	14	11	7	7	5	5	5	5
	54	1400	1300	1200	1000	850	800	700	600	450	350	260	175	120	85	60	48	40	29	16	13	9	7	6	5	5	5
	61	1450	1350	1250	1050	900	850	750	650	500	400	300	200	130	100	70	55	50	35	18	15	11	9	7	6	6	6

P0300-P0308: Cyl Mode ddt

load	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3500	4000	4500	5000	5500	6000	6500	7000
8	825	725	625	400	275	225	170	120	100	80	55	40	36	28	20	20	18	13	0	0	0	0	0	0	0	0
9	850	750	650	375	250	215	165	125	90	70	50	35	32	24	18	14	16	12	0	0	0	0	0	0	0	0
11	875	775	675	400	275	200	170	135	100	65	45	30	28	20	16	12	12	11	0	0	0	0	0	0	0	0
12	900	800	700	425	300	225	180	145	110	70	43	30	24	15	10	10	10	10	0	0	0	0	0	0	0	0
13	925	825	725	450	325	250	200	155	105	75	45	35	20	15	12	9	8	9	0	0	0	0	0	0	0	0
15	950	850	750	500	350	300	220	175	115	80	50	40	24	18	13	10	7	8	0	0	0	0	0	0	0	0
17	975	875	775	550	400	350	250	200	140	85	55	40	28	20	15	11	7	7	0	0	0	0	0	0	0	0
19	1000	900	800	600	450	400	300	240	160	90	60	45	30	23	16	12	8	8	0	0	0	0	0	0	0	0
22	1050	950	850	650	500	450	350	270	180	100	60	50	40	28	20	15	10	8	0	0	0	0	0	0	0	0
25	1100	1000	900	700	550	500	400	300	200	100	70	65	45	35	24	17	13	9	0	0	0	0	0	0	0	0
29	1150	1050	950	750	600	550	450	350	225	100	80	75	60	38	25	20	15	11	0	0	0	0	0	0	0	0
33	1200	1100	1000	800	650	600	500	400	250	120	100	90	70	40	30	22	18	14	0	0	0	0	0	0	0	0
38	1250	1150	1050	850	700	650	550	450	275	140	125	110	80	50	35	24	21	17	0	0	0	0	0	0	0	0
42	1300	1200	1100	900	750	700	600	500	325	200	165	135	90	60	40	26	25	20	0	0	0	0	0	0	0	0
48	1350	1250	1150	950	800	750	650	550	375	250	200	150	100	70	45	30	30	23	0	0	0	0	0	0	0	0
54	1400	1300	1200	1000	850	800	700	600	425	300	240	165	110	80	50	35	35	25	0	0	0	0	0	0	0	0
61	1450	1350	1250	1050	900	850	750	650	500	350	300	185	120	100	60	40	45	30	0	0	0	0	0	0	0	0

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
8	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	105	55	38	30	28	24	22	22	22
9	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	110	60	40	30	24	20	18	18	18
11	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	115	65	45	32	26	18	16	16	16
12	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	120	70	50	35	28	20	18	18	18
13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	125	75	55	40	30	22	20	20	20
15	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	130	80	60	45	32	24	22	22	22
17	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	135	90	65	50	34	26	24	24	24
19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	140	105	70	55	38	28	26	26	26
22	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	150	120	80	65	45	32	30	30	30
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	165	140	95	75	55	40	35	35	35
29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	180	160	120	85	65	50	40	40	40
33	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	200	180	150	100	80	60	50	50	50
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	250	200	175	120	95	70	60	60	60
42	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	300	250	200	140	110	80	70	70	70
48	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	350	300	225	160	125	90	80	80	80
54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	400	350	250	180	150	100	90	90	90
61	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	450	400	300	225	175	125	110	110	110

P0300-P0308: AFM Mode Table **OR** (decel index > AFM Table if active fuel management)

load	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3500	4000	4500	5000	5500	6000	6500	7000
8	2000	1600	1200	800	500	400	325	225	190	100	55	45	30	25	20	17	14	11	32767	32767	32767	32767	32767	32767	32767	32767
Load **9**	1850	1500	1150	760	450	325	275	200	160	85	45	40	25	20	16	13	12	10	32767	32767	32767	32767	32767	32767	32767	32767
11	1700	1400	1100	725	425	300	250	175	140	70	40	35	23	19	14	11	10	10	32767	32767	32767	32767	32767	32767	32767	32767
12	1550	1300	1050	700	435	260	230	180	125	75	45	32	24	19	15	12	11	9	32767	32767	32767	32767	32767	32767	32767	32767
13	1800	1400	1000	725	450	280	235	190	130	80	50	35	25	20	16	13	11	8	32767	32767	32767	32767	32767	32767	32767	32767
15	2050	1500	950	750	475	300	250	200	140	90	60	40	30	22	18	14	12	8	32767	32767	32767	32767	32767	32767	32767	32767
17	2200	1600	1000	775	525	350	275	225	160	100	70	45	35	26	22	18	12	10	32767	32767	32767	32767	32767	32767	32767	32767
19	2350	1700	1050	800	550	400	300	250	180	110	80	50	40	30	26	20	15	12	32767	32767	32767	32767	32767	32767	32767	32767
22	2500	1800	1100	850	600	450	350	275	200	125	90	60	45	35	30	22	18	14	32767	32767	32767	32767	32767	32767	32767	32767
25	2650	1900	1150	900	650	500	400	300	225	150	100	70	50	40	32	26	20	16	32767	32767	32767	32767	32767	32767	32767	32767
29	2800	2000	1200	950	700	550	450	325	250	175	115	80	55	45	35	30	22	20	32767	32767	32767	32767	32767	32767	32767	32767
33	2950	2100	1250	1000	750	600	500	350	275	200	130	90	65	50	40	35	24	22	32767	32767	32767	32767	32767	32767	32767	32767
38	3100	2200	1300	1050	800	650	550	400	300	225	150	100	85	60	45	40	30	24	32767	32767	32767	32767	32767	32767	32767	32767
42	3250	2300	1350	1100	850	700	600	450	350	250	175	120	100	70	55	45	35	26	32767	32767	32767	32767	32767	32767	32767	32767
48	3400	2400	1400	1150	900	750	650	500	400	275	200	140	110	80	60	50	40	30	32767	32767	32767	32767	32767	32767	32767	32767
54	3550	2500	1450	1200	950	800	700	550	450	300	225	160	120	90	80	65	50	40	32767	32767	32767	32767	32767	32767	32767	32767
61	3700	2600	1500	1250	1000	850	750	600	500	350	250	190	130	100	90	80	60	50	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: Zero torque engine load

RPM	Pct load
400	8.00
500	7.60
600	7.40
700	7.35
800	7.30
900	7.25
1000	7.20
1100	7.15
1200	7.15
1400	7.15
1600	7.15
1800	7.20
2000	7.20
2200	7.25
2400	7.30
2600	7.40
2800	7.50
3000	7.60
3500	10.34
4000	13.08
4500	15.82
5000	18.56
5500	21.30
6000	24.04
6500	26.78
7000	29.52

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

KcMISF_OneCylNoCatDamLvl

Catalyst Damaging Misfire Percentage

load	0	1000	2000	3000	4000	5000	6000	7000
0	11	11	11	10	8	6	5	5
10	11	11	10	8	7	5	5	5
20	11	10	8	6	6	5	5	5
30	10	8	7	6	5	5	5	5
40	8	7	6	5	5	5	5	5
50	7	6	6	5	5	5	5	5
60	6	6	5	5	5	5	5	5
70	6	5	5	5	5	5	5	5
80	5	5	5	5	5	5	5	5
90	5	5	5	5	5	5	5	5
100	5	5	5	5	5	5	5	5

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

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

	0.000	0.060	0.077	0.094	0.111	0.128	0.145	0.162	0.179	0.196	0.213	0.230	0.247	0.264	0.281	0.298	63.999
0.000	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.070	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.087	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.104	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.121	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.138	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.155	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.172	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.189	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.206	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0
0.223	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
0.240	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0
0.257	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0
0.274	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0
0.291	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
0.308	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0
63.999	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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

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

	0.000	0.060	0.077	0.094	0.111	0.128	0.145	0.162	0.179	0.196	0.213	0.230	0.247	0.264	0.281	0.298	63.999
0.000	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.070	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.087	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.104	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.121	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.138	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.155	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.172	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.189	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.206	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0
0.223	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
0.240	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0
0.257	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0
0.274	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0
0.291	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
0.308	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0
63.999	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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

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

	0.0	10.0	20.0	50.0	80.0
0.0	38	38	38	38	38
6.3	38	38	38	38	38
12.5	38	38	38	38	38
18.8	38	38	38	38	38
25.0	38	38	38	38	38
31.3	38	38	38	38	38
37.5	38	38	38	38	38
43.8	38	38	38	38	38
50.0	38	38	38	38	38
56.3	38	38	38	38	38
62.5	38	38	38	38	38
68.8	38	38	38	38	38
75.0	38	38	38	38	38
81.3	38	38	38	38	38
87.5	38	38	38	38	38
93.8	38	38	38	38	38
100.0	38	38	38	38	38

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

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

	0.0	10.0	20.0	50.0	80.0
0.0	38	38	38	38	38
6.3	38	38	38	38	38
12.5	38	38	38	38	38
18.8	38	38	38	38	38
25.0	38	38	38	38	38
31.3	38	38	38	38	38
37.5	38	38	38	38	38
43.8	38	38	38	38	38
50.0	38	38	38	38	38
56.3	38	38	38	38	38
62.5	38	38	38	38	38
68.8	38	38	38	38	38
75.0	38	38	38	38	38
81.3	38	38	38	38	38
87.5	38	38	38	38	38
93.8	38	38	38	38	38
100.0	38	38	38	38	38

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

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

	0.0	10.0	20.0	50.0	80.0
0.0	38	38	38	38	38
6.3	38	38	38	38	38
12.5	38	38	38	38	38
18.8	38	38	38	38	38
25.0	38	38	38	38	38
31.3	38	38	38	38	38
37.5	38	38	38	38	38
43.8	38	38	38	38	38
50.0	38	38	38	38	38
56.3	38	38	38	38	38
62.5	38	38	38	38	38
68.8	38	38	38	38	38
75.0	38	38	38	38	38
81.3	38	38	38	38	38
87.5	38	38	38	38	38
93.8	38	38	38	38	38
100.0	38	38	38	38	38

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

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

	0.0	10.0	20.0	50.0	80.0
0.0	38	38	38	38	38
6.3	38	38	38	38	38
12.5	38	38	38	38	38
18.8	38	38	38	38	38
25.0	38	38	38	38	38
31.3	38	38	38	38	38
37.5	38	38	38	38	38
43.8	38	38	38	38	38
50.0	38	38	38	38	38
56.3	38	38	38	38	38
62.5	38	38	38	38	38
68.8	38	38	38	38	38
75.0	38	38	38	38	38
81.3	38	38	38	38	38
87.5	38	38	38	38	38
93.8	38	38	38	38	38
100.0	38	38	38	38	38

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	1.120117	1.120117	1.120117	1.120117	1.120117
25.0	1.120117	1.120117	1.120117	1.120117	1.120117
50.0	1.129883	1.129883	1.129883	1.129883	1.129883
75.0	1.140137	1.140137	1.140137	1.140137	1.140137
100.0	1.149902	1.149902	1.149902	1.149902	1.149902

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	0.899902	0.899902	0.899902	0.899902	0.899902
25.0	0.899902	0.899902	0.899902	0.899902	0.899902
50.0	0.899902	0.899902	0.899902	0.899902	0.899902
75.0	0.899902	0.899902	0.899902	0.899902	0.899902
100.0	0.899902	0.899902	0.899902	0.899902	0.899902

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

Tables supporting Deactivation System Performance

P3400

EngSpeedLwrLimitEnableTable **AXIS is Gear State, Curve is Nm Torque**

Axis	1st Gear	2nd Gear	3rd Gear	4th Gear	5thGear	6th Gear	Neutral	Reverse	Park
Curve	755.0	755.0	755.0	755.0	755.0	755.0	755.0	755.0	755.0

EngSpeedUprLimitEnableTable — **AXIS is Gear State, Curve is Nm Torque**

Axis	1st Gear	2nd Gear	3rd Gear	4th Gear	5thGear	6th Gear	Neutral	Reverse	Park
Curve	2800.0	2800.0	2800.0	2800.0	2800.0	2800.0	2800.0	2800.0	2800.0

EngSpeedLwrLimitDisableTable — **AXIS is Gear State, Curve is Nm Torque**

Axis	1st Gear	2nd Gear	3rd Gear	4th Gear	5thGear	6th Gear	Neutral	Reverse	Park
Curve	675	675	675	675	675	675	675	675	675

EngSpeedUprLimitDisableTable — **AXIS is Gear State, Curve is Nm Torque**

Axis	1st Gear	2nd Gear	3rd Gear	4th Gear	5thGear	6th Gear	Neutral	Reverse	Park
Curve	3000	3000	3000	3000	3000	3000	3000	3000	3000

EngSpeedDisableLwrLimitTable — **AXIS is Gear State, Curve is Nm Torque**

Axis	1st Gear	2nd Gear	3rd Gear	4th Gear	5thGear	6th Gear	Neutral	Reverse	Park
Curve	675	755	755	755	755	755	755	755	755

EngSpeedDisableUprLimitTable — **AXIS is Gear State, Curve is Nm Torque**

Axis	1st Gear	2nd Gear	3rd Gear	4th Gear	5thGear	6th Gear	Neutral	Reverse	Park
Curve	3000	2800	2800	2800	2800	2800	2800	2800	2800

HalfCylToAllCylVacuum — **Horizontal AXIS is Gear State, Vertical axis is Engine RPM**

RPM	1st Gear	2nd Gear	3rd Gear	4th Gear	5th Gear	6th Gear	Neutral	Park	Reverse
0.0	6	6	20	20	20	20	6	6	6
100.0	5	5	20	20	20	20	5	5	5
200.0	4	4	20	20	20	20	4	4	4
300.0	4	4	20	20	20	20	4	4	4
400.0	4	4	20	20	20	20	4	4	4
500.0	4	4	20	20	20	20	4	4	4
600.0	4	4	20	20	20	20	4	4	4
700.0	4	4	20	20	20	20	4	4	4
800.0	4	4	20	20	20	20	4	4	4
900.0	4	4	20	20	20	20	4	4	4
1000.0	4	4	18	18	18	18	4	4	4
1100.0	4	4	12	12	12	12	4	4	4
1200.0	4	4	5	5	5	5	4	4	4
1300.0	4	4	4	4	4	4	4	4	4
1400.0	4	4	3	3	3	3	4	4	4
1500.0	4	4	3	3	3	3	4	4	4
1600.0	4	4	3	3	3	3	4	4	4
1700.0	4	4	3	3	3	3	4	4	4
1800.0	4	4	3	3	3	3	4	4	4
1900.0	4	4	3	3	3	3	4	4	4
2000.0	4	4	3	3	3	3	4	4	4
2100.0	4	4	3	3	3	3	4	4	4
2200.0	4	4	3	3	3	3	4	4	4
2300.0	4	4	3	3	3	3	4	4	4
2400.0	4	4	3	3	3	3	4	4	4
2500.0	4	4	3	3	3	3	4	4	4
2600.0	4	4	3	3	3	3	4	4	4
2700.0	4	4	3	3	3	3	4	4	4
2800.0	4	4	3	3	3	3	4	4	4
2900.0	4	4	4	4	4	4	4	4	4
3000.0	4	4	4	4	4	4	4	4	4
3100.0	4	4	4	4	4	4	4	4	4
3200.0	4	4	5	5	5	5	4	4	4

EcoHalfCylToAllCylVacuum **Horizontal AXIS is Gear State, Vertical axis is Engine RPM**

RPM	1st Gear	2nd Gear	3rd Gear	4th Gear	5th Gear	6th Gear	Neutral	Park	Reverse
0.0	4	4	4	4	4	4	4	4	4
100.0	4	4	4	4	4	4	4	4	4
200.0	4	4	4	4	4	4	4	4	4
300.0	4	4	4	4	4	4	4	4	4
400.0	4	4	4	4	4	4	4	4	4
500.0	4	4	4	4	4	4	4	4	4
600.0	4	4	4	4	4	4	4	4	4
700.0	4	4	4	4	4	4	4	4	4
800.0	4	4	4	4	4	4	4	4	4
900.0	4	4	4	4	4	4	4	4	4
1000.0	4	4	4	4	4	4	4	4	4
1100.0	4	4	4	4	4	4	4	4	4
1200.0	4	4	4	4	4	4	4	4	4
1300.0	4	4	4	4	4	4	4	4	4
1400.0	4	4	4	4	4	4	4	4	4
1500.0	4	4	4	4	4	4	4	4	4
1600.0	4	4	4	4	4	4	4	4	4
1700.0	4	4	4	4	4	4	4	4	4
1800.0	4	4	4	4	4	4	4	4	4
1900.0	4	4	4	4	4	4	4	4	4
2000.0	4	4	4	4	4	4	4	4	4
2100.0	4	4	4	4	4	4	4	4	4
2200.0	4	4	4	4	4	4	4	4	4
2300.0	4	4	4	4	4	4	4	4	4
2400.0	4	4	4	4	4	4	4	4	4
2500.0	4	4	4	4	4	4	4	4	4
2600.0	4	4	4	4	4	4	4	4	4
2700.0	4	4	4	4	4	4	4	4	4
2800.0	4	4	4	4	4	4	4	4	4
2900.0	4	4	4	4	4	4	4	4	4
3000.0	4	4	4	4	4	4	4	4	4
3100.0	4	4	4	4	4	4	4	4	4
3200.0	4	4	4	4	4	4	4	4	4

HalfCylDisabledPRNDL

PRNDL Drive 1	1
PRNDL Drive 2	1
PRNDL Drive 3	0
PRNDL Drive 4	0
PRNDL Drive 5	0
PRNDL Drive 6	0
PRNDL Neutral	1
PRNDL Reverse	1
PRNDL Park	1
PRNDL Transitional 1	1
PRNDL Transitional 2	1
PRNDL Transitional 4	1
PRNDL Transitional 7	1
PRNDL Transitional 8	1
PRNDL Transitional 11	1
PRNDL Transitional 13	1
PRNDL Transitional Illegal	1
PRNDL Transitional Between State	0

HalfCylDisabledPRNDLDeviceControl

PRNDL Drive 1	1
PRNDL Drive 2	1
PRNDL Drive 3	0
PRNDL Drive 4	0
PRNDL Drive 5	0
PRNDL Drive 6	0
PRNDL Neutral	0
PRNDL Reverse	1
PRNDL Park	0
PRNDL Transitional 1	1
PRNDL Transitional 2	1
PRNDL Transitional 4	1
PRNDL Transitional 7	1
PRNDL Transitional 8	1
PRNDL Transitional 11	1
PRNDL Transitional 13	1
PRNDL Transitional Illegal	1
PRNDL Transitional Between State	0

HalfCylDisabledTransGr Table **AXIS is Gear State**

Axis	1st Gear	2nd Gear	3rd Gear	4th Gear	5thGear	6th Gear	Neutral	Reverse	Park
Curve	1	1	0	0	0	0	1	1	1

AllCylDisabledTransGr Table **AXIS is Gear State**

Axis	1st Gear	2nd Gear	3rd Gear	4th Gear	5thGear	6th Gear	Neutral	Reverse	Park
Curve	1	1	0	0	0	0	1	1	1

AllCylToHalfCylVacuum **Horizontal AXIS is Gear State, Vertical axis is Engine RPM**

RPM	1st Gear	2nd Gear	3rd Gear	4th Gear	5th Gear	6th Gear	Neutral	Park	Reverse
0.0	40	40	56	56	56	56	40	40	40
100.0	40	40	56	56	56	56	40	40	40
200.0	40	40	56	56	56	56	40	40	40
300.0	40	40	56	56	56	56	40	40	40
400.0	40	40	56	56	56	56	40	40	40
500.0	40	40	56	56	56	56	40	40	40
600.0	40	40	54	54	54	54	40	40	40
700.0	40	40	51	51	51	51	40	40	40
800.0	40	40	50	50	50	50	40	40	40
900.0	40	40	48	48	48	48	40	40	40
1000.0	40	40	47	47	47	47	40	40	40
1100.0	40	40	47	47	47	47	40	40	40
1200.0	40	40	46	46	46	46	40	40	40
1300.0	40	40	48	48	48	48	40	40	40
1400.0	40	40	47	47	47	50	40	40	40
1500.0	40	40	47	47	47	50	40	40	40
1600.0	40	40	47	47	47	51	40	40	40
1700.0	40	40	47	47	47	51	40	40	40
1800.0	40	40	47	47	47	51	40	40	40
1900.0	40	40	49	49	49	50	40	40	40
2000.0	40	40	52	52	52	48	40	40	40
2100.0	40	40	53	53	53	48	40	40	40
2200.0	40	40	52	52	52	47	40	40	40
2300.0	40	40	47	47	47	46	40	40	40
2400.0	40	40	44	44	44	46	40	40	40
2500.0	40	40	44	44	44	47	40	40	40
2600.0	40	40	44	44	44	49	40	40	40
2700.0	40	40	44	44	44	51	40	40	40
2800.0	40	40	44	44	44	53	40	40	40
2900.0	40	40	54	54	54	54	40	40	40
3000.0	40	40	55	55	55	55	40	40	40
3100.0	40	40	55	55	55	55	40	40	40
3200.0	40	40	55	55	55	55	40	40	40

EcoAllCylToHalfCylVacuum **Horizontal AXIS is Gear State, Vertical axis is Engine RPM**

RPM	1st Gear	2nd Gear	3rd Gear	4th Gear	5th Gear	6th Gear	Neutral	Park	Reverse
0.0	48	48	48	48	48	48	48	48	48
100.0	48	48	48	48	48	48	48	48	48
200.0	48	48	48	48	48	48	48	48	48
300.0	48	48	48	48	48	48	48	48	48
400.0	48	48	48	48	48	48	48	48	48
500.0	48	48	48	48	48	48	48	48	48
600.0	48	48	48	48	48	48	48	48	48
700.0	48	48	48	48	48	48	48	48	48
800.0	48	48	48	48	48	48	48	48	48
900.0	48	48	48	48	48	48	48	48	48
1000.0	48	48	48	48	48	48	48	48	48
1100.0	48	48	48	48	48	48	48	48	48
1200.0	48	48	48	48	48	48	48	48	48
1300.0	48	48	48	48	48	48	48	48	48
1400.0	48	48	48	48	48	48	48	48	48
1500.0	48	48	48	48	48	48	48	48	48
1600.0	48	48	48	48	48	48	48	48	48
1700.0	48	48	48	48	48	48	48	48	48
1800.0	48	48	48	48	48	48	48	48	48
1900.0	48	48	48	48	48	48	48	48	48
2000.0	48	48	48	48	48	48	48	48	48
2100.0	48	48	48	48	48	48	48	48	48
2200.0	48	48	48	48	48	48	48	48	48
2300.0	48	48	48	48	48	48	48	48	48
2400.0	48	48	48	48	48	48	48	48	48
2500.0	48	48	48	48	48	48	48	48	48
2600.0	48	48	48	48	48	48	48	48	48
2700.0	48	48	48	48	48	48	48	48	48
2800.0	48	48	48	48	48	48	48	48	48
2900.0	48	48	48	48	48	48	48	48	48
3000.0	48	48	48	48	48	48	48	48	48
3100.0	48	48	48	48	48	48	48	48	48
3200.0	48	48	48	48	48	48	48	48	48

P0521

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

Axis	0	500	900	1000	1500	1750	2000	3500	4000
Curve	0.00	0.00	0.00	0.45	0.45	0.45	0.46	0.44	0.00

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

Axis	-40	40	60	80	90	100	120	130	140
Curve	0.58	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.00

EngLoadStabilityWeightFactorTable AXIS is Engine RPM, Curve is Weight Factor

Axis	0	5	10	20	30	50	100	200	399
Curve	1.00	1.00	0.50	0.30	0.00	0.00	0.00	0.00	0.00

EngOilPredictionWeightFacotrTable AXIS is Engine RPM, Curve is Engine Oil Prediction Weight Factor Ratio

Axis	0	170	250	275	360	375	400	500	600
Curve	0.00	0.00	0.10	1.00	1.00	1.00	1.00	0.86	0.00

CSED Section

KnIDLC_T_ECT_Axis

Coolant Temperature	-12	-10	5	7	15	17	38	40	50

KalDLC_n_CLO_ThrshOfst[CilDLR_DR]

RPM Offset to be considered Cat Light Off	1000	125	125	125	125	125	125	1000	1000

KalDLC_n_CLO_ThrshOfst[CilDLR_PN]

RPM Offset to be considered Cat Light Off	1000	125	125	125	125	125	125	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	800	800	800	800	800	750	705	665	600	525	525	525	525	525	525	525	525

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	800	800	800	800	800	750	705	665	600	525	525	525	525	525	525	525	525

Phaser Section

KtPHSD_phi_CamPosErrorLimIc1

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

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	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
1200	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
1600	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
2000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
2400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
2800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
3200	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
3600	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
4000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
4400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
4800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
5200	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
5600	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
6000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
6400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
6800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000

KtPHSD_phi_CamPosErrorLimIc2

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	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
1200	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
1600	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
2000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
2400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
2800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
3200	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
3600	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
4000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
4400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
4800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
5200	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
5600	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
6000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
6400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
6800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000

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	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
1200	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
1600	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
2000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
2400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
2800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
3200	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
3600	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
4000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
4400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
4800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
5200	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
5600	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
6000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
6400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
6800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000

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	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
800	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
1200	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
1600	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
2000	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
2400	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
2800	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
3200	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
3600	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
4000	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
4400	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
4800	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
5200	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
5600	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
6000	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
6400	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350
6800	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350	3.350

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	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
1200	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
1600	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
2000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
2400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
2800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
3200	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
3600	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
4000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
4400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
4800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
5200	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
5600	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
6000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
6400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
6800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000

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	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
1200	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
1600	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
2000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
2400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
2800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
3200	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
3600	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
4000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
4400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
4800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
5200	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
5600	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
6000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
6400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
6800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000

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	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
1200	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
1600	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
2000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
2400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
2800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
3200	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
3600	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
4000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
4400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
4800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
5200	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
5600	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
6000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
6400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
6800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000

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	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
800	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
1200	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
1600	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
2000	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
2400	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
2800	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
3200	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
3600	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
4000	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
4400	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
4800	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
5200	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
5600	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
6000	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
6400	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
6800	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500

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

P0068: MAP / MAF / TPS Correlation

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

X-axis	5.0003	10.0006	14.9994	19.9997	25.0000	30.0003	35.0006	39.9994	99.9985
Data	21.4609	29.4219	22.9688	20.9766	17.3828	14.4688	100.0000	100.0000	100.0000

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

X-axis	5.0003	10.0006	14.9994	19.9997	25.0000	30.0003	35.0006	39.9994	99.9985
Data	15.9531	24.2891	23.2031	28.2188	31.3125	41.9141	255.0000	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	25.0000	60.0000	100.0000	140.0000	180.0000	220.0000	250.0000	280.0000	300.0000

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	0.0000	18.0000	40.0000	75.0000	135.0000	250.0000	500.0000	500.0000	500.0000

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

Tables supporting AIR Diagnostics

P0411

SL Threshold Bank 1 Table **axis is average engine airflow during test 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	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0

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	1.0	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	0.5	0.8	1.0	1.0	1.0	1.0	1.0	0.8	0.5	0.0	0.0	0.0

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

P02440

Bank 1 Valve Pressure Error — axis weighted time in seconds

Axis	0	1	2	3	4	5	6	7	8
Curve	-6.0	-6.0	-5.0	-4.0	-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	1.0	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	1.0	1.0	1.0	0.5	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	0.5	0.8	1.0	1.0	1.0	1.0	1.0	0.8	0.5	0.0	0.0	0.0

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

P02431 P02440

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

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

FAULT BUNDLES

TS	PDT	Ring	Fault Bundles Produced	Cert Doc Bundle Name	Pcodes											
Genslak		CATR	GetCATR_b_CatSysEffLoB1_FA	CatalystSysEfficiencyLoB1_FA	P0420											
			GetCATD_b_CatSysEffLoB2_FA	CatalystSysEfficiencyLoB2_FA	P0430											
MacEwen	Flex Fuel Sensor	E85R	CeDFIR_e_FuelCompSnsrCktLo	FuelCompositionSensorCktLow	P0178											
			CeDFIR_e_FuelCompSnsrCktHi	FuelCompositionSensorCktHi	P0179											
			CeDFIR_e_WaterInFuel	WaterInFuel	P2269											
		CSED	**No fault bundle produced that is consumed by other rings**													
Hall	Evap	EVPR	GetEVPR_b_Purg1SlndCkt_FA	EvapPurgeSolenoidCircuit_FA	P0443											
			GetEVPR_b_FlowDurNonPurg_FA	EvapFlowDuringNonPurge_FA	P0496											
			GetEVPR_b_VentSlndCkt_FA	EvapVentSolenoidCircuit_FA	P0449											
			GetEVPR_b_SmallLeak_FA	EvapSmallLeak_FA	P0442											
			GetEVPR_b_EmissionSys_FA	EvapEmissionSystem_FA	P0455	P0446										
			GetEVPR_b_FTP_Circuit_FA	FuelTankPressureSnsrCkt_FA	P0452	P0453										
Hall	Eng Interface	FANR	GetFANR_b_FanSpeedTooHiFA	CoolingFanSpeedTooHigh_FA	P0495											
Hall	Evap	FLVR	GetFLVR_b_FuelLvlDataFlt	FuelLevelDataFault	P0461	P0462	P0463	P2066	P2067	P2068						
Hall	Engine Interface	PMDR	GetPMDR_b_PT_RelayFlt	PowertrainRelayFault	P1682											
			GetPMDR_b_PT_RelayStOnFA	PowertrainRelayStateOn_FA	P0685											
			GetPMDC_b_PT_RelayStOnError	PowertrainRelayStateOn_Error	P0685											
			GetPMDR_b_IgnOffTmeFA	IgnitionOffTimer_FA	P2610											
			GetPMDR_b_IgnOffTmeVld	IgnitionOffTimeValid	P2610											
			GetEPSR_TmSinceEngRunningValid	TimeSinceEngineRunningValid	P2610											
Hall	Vehicle Infrastructure PMT	VSPR	GetVSPR_b_VehicleSpeedFA	VehicleSpeedSensor_FA	P0502	P0503	P0722	P0723								
			GetVSPR_b_VehicleSpeedError	VehicleSpeedSensorError	P0502	P0503	P0722	P0723								
MacEwan		FADR	GetFADR_b_FuelTrimSysB1_FA	FuelTrimSystemB1_FA	P0171	P0172										
			GetFADR_b_FuelTrimSysB2_FA	FuelTrimSystemB2_FA	P0174	P0175										
		OXYR	GetOXYR_b_AFIM_Bank1_FA	A/F Imbalance Bank1	P1174 or	P219A										
			GetOXYR_b_AFIM_Bank2_FA	A/F Imbalance Bank2	P1175 or	P219B										
MacEwen	Secondary Air	AIRR	GetAIRR_b_AIR_PresSensorFault	AIRSystemPressureSensor FA	P2430	P2431	P2432	P2433	P2435	P2436	P2437	P2438				
			GetAIRR_b_AIR_Sys_FA	AIR System FA	P0411	P2440	P2444									
			GetDFIR_FaultActive(CeDFIR_e_AIR_SlndCktB1)	AIRValveControlCircuit FA	P0412											
			GetDFIR_FaultActive(CeDFIR_e_AIR_PmpCktB1)	AIRPumpControlCircuit FA	P0418											
MacEwen	Clutch	MTCR	GetMTCR_b_ClchPstnSnsrFlt	Clutch Sensor FA	P0806	P0807	P0808									
			GetDFIR_FaultActive(CeDFIR_e_ClchPstnSnsrCktLo)	ClutchPositionSensorCircuitLo F	P0807											
			GetDFIR_FaultActive(CeDFIR_e_ClchPstnSnsrCktHi)	ClutchPositionSensorCircuitHi F	P0808											
MacEwen	Open Loop Fuel	E85R	GetE85R_b_FFS_CompFA	Ethanol Composition Sensor FA	P0178	P0179	P2269									
			Fault Bundles Consumed													
MacEwen		FASD	GetIDLR_b_IAC_SysRPM_FA													
			GetMAPR_b_MAP_SnsrFA													
			GetMAFR_b_MAF_SnsrFA													
			GetMAFR_b_MAF_SnsrTFTKO													
			GetAIRR_b_AIR_Sys_FA													
			GetEVPR_b_Purg1SlndCkt_FA													
			GetEVPR_b_FlowDurNonPurg_FA													
			GetEVPR_b_VentSlndCkt_FA													
			GetEVPR_b_SmallLeak_FA													
			GetEVPR_b_EmissionSys_FA													
			GetEVPR_b_FTP_Circuit_FA													
			GetE85R_b_FFS_CompFA													
			GetFULR_b_FuelInjCkt_FA													
			GetMSFR_b_EngMisfDtctd_FA													

			GetEGRR_b_EGR_ValvePerf_FA														
			GetEGRR_b_EGR_ValveCkt_FA														
			GetMAPR_e_EngVacStatus														
			GetAAPR_e_AAP_DfltdStatus														
MacEwen		AFIM	GetMSFR_b_EngMisfDtctd_FA														
			GetMAPR_b_MAP_SnsrFA														
			GetMAFR_b_MAF_SnsrFA														
			GetECTR_b_ECT_SnsrFA														
			GetE85R_b_FFS_CompFA														
			GetTPSR_ThrotAuthDefault														
			GetFULR_b_FuelInjCkt_FA														
			GetAIRR_b_AIR_Sys_FA														
			GetOXYI_b_Bank1Snsr1_FA														
			GetOXYI_b_Bank2Snsr1_FA														
			GetEVPR_b_Purg1SlndCkt_FA														
			GetEVPR_b_FlowDurNonPurg_FA														
			GetEVPR_b_VentSlndCkt_FA														
			GetEVPR_b_SmallLeak_FA														
			GetEVPR_b_EmissionSys_FA														
			GetEVPR_b_FTP_Circuit_FA														
	Clutch	Clutch	GetEPSR_b_CrankSnsr_FA														
			GetVSPR_b_VehicleSpeedFA														
			GetDFIR_FaultActive(CeDFIR_e_ClchPstnSnsrCktLo)														
			GetDFIR_FaultActive(CeDFIR_e_ClchPstnSnsrCktHi)														
	Secondary Air	AIRR	GetAIRD_b_AIR_PresSensorFault														
			GetDFIR_FaultActive(CeDFIR_e_AIR_SlndCktB1)														
			GetDFIR_FaultActive(CeDFIR_e_AIR_PmpCktB1)														
			GetMAFR_b_MAF_SnsrFA														
			GetAAPR_e_AAP_DfltdStatus														
			GetEITR_b_IAT_SnsrFA														
			GetECTR_b_ECT_SnsrFA														
			GetMSFR_b_EngMisfDtctd_FA														
			GetCATR_b_CatSysEffLoB1_FA														
			GetCATR_b_CatSysEffLoB2_FA														
			GetMEMR_b_ECM_PCM_ProcPerf_FA														
			GetVLTR_b_V5A_FA														
			GetVLTR_b_V5B_FA														
			GetSPKR_b_EST_DriverFltActive														
			GetFULR_b_FuelInjCkt_FA														
		E85R	None														
Mathews	Misfire PDT	MSFR	GetMSFR_b_EngMisfDtctd_TFTKO	EngineMisfireDetected_TFTKO	P0300	P0301	P0302	P0303	P0304	P0305	P0306	P0307	P0308				
			GetMSFR_b_EngMisfDtctd_FA	EngineMisfireDetected_FA	P0300	P0301	P0302	P0303	P0304	P0305	P0306	P0307	P0308				
Sawdon	Spark/ESC	KNKR	VeKNKR_b_KS_CktPerfB1B2_FA	KS_Ckt_Perf_B1B2_FA	P0324	P0325	P0326	P0327	P0328	P0330	P0332	P0333					
Sawdon	Spark/ESC	SPKR	VeSPKR_b_EST_DriverFltActive	IgnitionOutputDriver_FA	P0351	P0352	P0353	P0354	P0355	P0356	P0357	P0358					
Siekkinen	O2 PDT	OXYR	VaOXYI_O2_TestFailedThisKeyOn[CiFADR_FuelBank1]	O2S_Bank_ 1_TFTKO	P0131	P0132	P0134	P2A00									
			VaOXYI_O2_TestFailedThisKeyOn[CiFADR_FuelBank2]	O2S_Bank_ 2_TFTKO	P0151	P0152	P0154	P2A03									
			NeOXYI_b_Bank1Snsr1_FA	O2S_Bank_1_Sensor_1_FA	P2A00	P0131	P0132	P0133	P0134	P0135	P0053	P1133					
			NeOXYI_b_Bank1Snsr2_FA	O2S_Bank_1_Sensor_2_FA	P013A	P013B	P013E	P013F	P2270	P2271	P0137	P0138	P0140	P0141	P0054		
			NeOXYI_b_Bank2Snsr1_FA	O2S_Bank_2_Sensor_1_FA	P2A03	P0151	P0152	P0153	P0154	P0155	P0059	P1153					
			NeOXYI_b_Bank2Snsr2_FA	O2S_Bank_2_Sensor_2_FA	P013C	P013D	P014A	P014B	P2272	P2273	P0157	P0158	P0160	P0161	P0060		
		ECTI	NeECTI_b_ECT_SnsrCktFA	ECT_Sensor_Ckt_FA	P0117	P0118											
		ECTI	NeECTI_b_ECT_SnsrCktTPTKO	ECT_Sensor_Ckt_TPTKO	P0117	P0118											
		ECTI	NeECTI_b_ECT_SnsrCktTFTKO	ECT_Sensor_Ckt_TFTKO	P0117	P0118											
		ECTI	NeECTI_b_DfltECT_CondDtctd	ECT_Sensor_DefaultDetected	P0117	P0118	P0116	P0125									
		ECTI	NeECTI_b_ECT_SnsrFA	ECT_Sensor_FA	P0117	P0118	P0116	P0125	P0128								
		ECTI	NeECTI_b_ECT_SnsrTFTKO	ECT_Sensor_TFTKO	P0117	P0118	P0116	P0125									
		ECTI	NeECTI_b_ECT_SnsrPerfFA	ECT_Sensor_Perf_FA	P0116												
		ECTI	VeECTI_b_ECT_SnsrCktFP	ECT_Sensor_Ckt_FP	P0117	P0118											
		ECTI	GetECTI_b_ECT_SnsrCktHiFP	ECT_Sensor_Ckt_High_FP	P0118												
		ECTI	GetETCI_b_ECT_SnsrCktLoFP	ECT_Sensor_Ckt_Low_FP	P0117												
Wiggins	Air Measurement	AAPR	GetAAPR_b_AAP_SnsrCktFA (baro/TIAP sensor)	AmbientAirPressCktFA	P2228	P2229											
			GetAAPR_b_AAP_SnsrCktFA (no baro/TIAP sensor)	AmbientAirPressCktFA_NoSnsr	P0106	P0107	P0108										

			GetAAPR_e_AAP_DfltdStatus (baro/TIAP sensor, nat aspir)	AmbientAirDefault_NA	P0106	P0107	P0108	P2227	P2228	P2229							
			GetAAPR_e_AAP_DfltdStatus (baro/TIAP sensor, SupCharge	AmbientAirDefault_SC	P012B	P012C	P012D	P2227	P2228	P2229							
			GetAAPR_e_AAP_DfltdStatus (no baro/TIAP sensor)	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												
Wiggins	Air Measurement	EITR	GetEITI_b_IAT_SnsrCktTFTKO	IAT_SensorCircuitTFTKO	P0112	P0113											
			GetEITI_b_IAT_SnsrCktFA	IAT_SensorCircuitFA	P0112	P0113											
			GetEITR_b_IAT_SnsrCktFP	IAT_SensorCircuitFP	P0112	P0113											
			GetEITI_b_IAT_SnsrTFTKO	IAT_SensorTFTKO	P0111	P0112	P0113										
			GetEITI_b_IAT_SnsrFA	IAT_SensorFA	P0111	P0112	P0113										
			GetEITI_b_IAT_2_SnsrCktTFTKO (IAT2 Present)	IAT2_SensorCktTFTKO	P0097	P0098											
			GetEITI_b_IAT_2_SnsrCktTFTKO (IAT2 Not Present)	IAT2_SensorCktTFTKO_NoSnsr	P0112	P0113											
			GetEITI_b_IAT_2_SnsrCktFA (IAT2 Present)	IAT2_SensorCircuitFA	P0097	P0098											
			GetEITI_b_IAT_2_SnsrCktFA (IAT2 Not Present)	IAT2_SensorCircuitFA_NoSnsr	P0112	P0113											
			GetEITR_b_IAT_2_SnsrCktFP (IAT2 Present)	IAT2_SensorcircuitFP	P0097	P0098											
			GetEITR_b_IAT_2_SnsrCktFP (IAT2 Not Present)	IAT2_SensorcircuitFP_NoSnsr	P0112	P0113											
			GetEITI_b_IAT_2_SnsrTFTKO (IAT2 Present)	IAT2_SensorTFTKO	P0096	P0097	P0098										
			GetEITI_b_IAT_2_SnsrTFTKO (IAT2 Not Present)	IAT2_SensorTFTKO_NoSnsr	P0111	P0112	P0113										
			GetEITI_b_IAT_2_SnsrFA (IAT2 Present)	IAT2_SensorFA	P0096	P0097	P0098										
			GetEITI_b_IAT_2_SnsrFA (IAT2 Not Present)	IAT2_SensorFA_NoSnsr	P0111	P0112	P0113										
Wiggins	Air Measurement	IFRR	GetIFRR_b_ChgrBypVlvFault	SuperchargerBypassValveFA	P2261												
			GetIFRR_b_CylDeacSys_TFTKO	CylDeacSystemTFTKO	P3400												
			GetIFRR_b_MAF_SnsrPerfFault	MAF_SensorPerfFA	P0101												
			GetIFRR_b_MAF_SnsrPerf_TFTKO	MAF_SensorPerfTFTKO	P0101												
			GetIFRR_b_MAP_SnsrPerfFault	MAP_SensorPerfFA	P0106												
			GetIFRR_b_MAP_SnsrPerf_TFTKO	MAP_SensorPerfTFTKO	P0106												
			GetIFRR_b_SCIAP_SnsrPerfFault	SCIAP_SensorPerfFA	P012B												
			GetIFRR_b_SCIAP_SnsrPerf_TFTKO	SCIAP_SensorPerfTFTKO	P012B												
			GetIFRR_b_TP_SnsrPerfFault	ThrottlePositionSnsrPerfFA	P0121												
			GetIFRR_b_TP_SnsrPerf_TFTKO	ThrottlePositionSnsrPerfTFTKO	P0121												
Wiggins	Air Measurement	MAFR	GetMAFR_b_MAF_SnsrFA	MAF_SensorFA	P0101	P0102	P0103										
			GetMAFR_b_MAF_SnsrTFTKO	MAF_SensorTFTKO	P0101	P0102	P0103										
			GetMAFR_b_MAF_SnsrFP	MAF_SensorFP	P0102	P0103											
			GetMAFR_b_MAF_SnsrCktFA	MAF_SensorCircuitFA	P0102	P0103											
			GetMAFR_b_MAF_SnsrCktTFTKO	MAF_SensorCircuitTFTKO	P0102	P0103											
Wiggins	Air Measurement	MAPR	GetMAPR_b_MAP_SnsrTFTKO	MAP_SensorTFTKO	P0106	P0107	P0108										
			GetMAPR_b_MAP_SnsrFA	MAP_SensorFA	P0106	P0107	P0108										
			GetMAPR_b_SCIAP_SnsrFA	SCIAP_SensorFA	P012B	P012C	P012D										
			GetMAPR_b_SCIAP_SnsrTFTKO	SCIAP_SensorTFTKO	P012B	P012C	P012D										
			GetMAPR_b_SCIAP_SnsrCktFP	SCIAP_SensorCircuitFP	P012C	P012D											
			GetMAPR_b_AfterThrotBlade_FA (naturally aspirated)	AfterThrottlePressureFA_NA	P0106	P0107	P0108										
			GetMAPR_b_AfterThrotBlade_FA (supercharged)	AfterThrottlePressureFA_SC	P012B	P012C	P012D										
			GetMAPR_b_AftThrotVacSnsr_TFTKO (naturally aspirated)	AfterThrottleVacuumTFTKO_NA	P0106	P0107	P0108										
			GetMAPR_b_AftThrotVacSnsr_TFTKO (supercharged)	AfterThrottleVacuumTFTKO_SC	P012B	P012C	P012D										
			GetMAPR_b_SCIAP_SnsrCktFA	SCIAP_SensorCircuitFA	P012C	P012D											
			GetMAPR_b_AftThrotPresSnsrTFTKO (naturally aspirated)	AfterThrottlePressTFTKO_NA	P0106	P0107	P0108										
			GetMAPR_b_AftThrotPresSnsrTFTKO (supercharged)	AfterThrottlePressTFTKO_SC	P012B	P012C	P012D										
			GetMAPR_b_MAP_SnsrCktFA	MAP_SensorCircuitFA	P0107	P0108											
			GetMAPR_e_EngVacStatus() == CeMAPR_e_Defaulted	MAP_EngineVacuumStatus	MAP_SensorFA OR P0107, P0108 Pending												
Wiggins	Engine Positioning	EPSR	GetEPSR_b_CkpToCamCorr_TFTKO	CrankCamCorrelationTFTKO	P0016	P0017	P0018	P0019									
			GetEPSR_b_CrankSnsr_FA	CrankSensorFA	P0335	P0336											
			GetEPSR_b_CrankSnsr_TFTKO	CrankSensorTFTKO	P0335	P0336											
			GetEPSR_b_CamSnsr_FA	CamSensorFA	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391	
			GetEPSR_b_CamSnsr_TFTKO	CamSensorTFTKO	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391	
			GetEPSR_b_CkpToCamCorrInt_FA	CrankIntakeCamCorrelationFA	P0016	P0018											
			GetEPSR_b_CkpToCamCorrExh_FA	CrankExhaustCamCorrelationFA	P0017	P0019											
			GetEPSR_b_CamSnsrIntake_TFTKO	IntakeCamSensorTFTKO	P0016	P0018	P0340	P0341	P0345	P0346							
			GetEPSR_b_CamSnsrIntake_FA	IntakeCamSensorFA	P0016	P0018	P0340	P0341	P0345	P0346							
			GetEPSR_b_CamSnsrExhaust_TFTKO	ExhaustCamSensorTFTKO	P0017	P0019	P0365	P0366	P0390	P0391							
			GetEPSR_b_CamSnsrExhaust_FA	ExhaustCamSensorFA	P0017	P0019	P0365	P0366	P0390	P0391							
			GetEPSR_b_IntakeSnsrFaultActive	IntakeCamSensor_FA	P0016	P0018	P0340	P0341	P0345	P0346							
			GetEPSR_b_IntakeSnsrTestFailTKO	IntakeCamSensor_TFTKO	P0016	P0018	P0340	P0341	P0345	P0346							
			GetEPSR_b_ExhSnsrFaultActive	ExhaustCamSensor_FA	P0017	P0019	P0365	P0366	P0390	P0391							
			GetEPSR_b_ExhSnsrTestFailTKO	ExhaustCamSensor_TFTKO	P0017	P0019	P0365	P0366	P0390	P0391							
			GetEPSR_b_CkpToCamCorrInt	CrankIntakeCamCorrFA	P0016	P0018											
			GetEPSR_b_CkpToCamCorrExh	CrankExhaustCamCorrFA	P0017	P0019											
			GetEPSR_b_CrankSnsrFaultActive	CrankSensorFaultActive	P0335	P0336											
			GetEPSR_b_CrkSnsrFA	CrankSensor_FA	P0335	P0336											
			GetEPSR_b_CrankSnsrTestFailTKO	CrankSensorTestFailedTKO	P0335	P0336											
			GetEPSR_b_CrkSnsrTFTKO	CrankSensor_TFTKO	P0335	P0336											

			GetEPSR_b_CamSnsrFaultActive	CamSensor_FA	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391
			GetEPSR_b_CamSnsrLctnAnyFA	CamSensorAnyLocationFA	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391
			GetEPSR_b_CamSnsrTestFailTKO	CamSensor_TFTKO	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391
York	Dilution PDT	PHSR	GetPHSR_b_PhaserBndlFlagFA	AnyCamPhaser_FA	P0010	P0011	P0013	P0014	P0020	P0021	P0023	P0024				
York	Dilution PDT		GetPHSR_b_PhaserBndlFlagTFTKO	AnyCamPhaser_TFTKO	P0010	P0011	P0013	P0014	P0020	P0021	P0023	P0024				
York	Dilution PDT		GetPHSR_b_IcPhaserBndlFlagFA	IntkCamPhaser_FA	P0010	P0011	P0020	P0021								
York	Dilution PDT	EGRR	GetEGRR_b_EGR_ValvePerf_FA	EGRValvePerformance_FA	P0401	P042E										
York	Dilution PDT		GetEGRR_b_EGR_ValveCkt_FA	EGRValveCircuit_FA	P0403	P0404	P0405	P0406								
York	Dilution PDT		GetEGRR_b_EGR_ValveFP	EGRValve_FP	P0405	P0406	P042E									
York	Dilution PDT		GetEGRR_b_EGR_ValveCktTFTKO	EGRValveCircuit_TFTKO	P0403	P0404	P0405	P0406								
York	Dilution PDT		GetEGRR_b_EGR_ValvePerfTFTKO	EGRValvePerformance_TFTKO	P0401	P042E										
Miller	Open Loop	EMOR	GetEMOC_b_EngMetalOvertempActv true for calibrated time	EngineMetalOvertempActive	P1258											
Grenn		DFIR	GetDFIR_b_NumIncrementsDsbld		no codes?											
Harnack		ACCR	GetACCR_b_AC_FailedOn	A/C_FailedOn	P0645											
Jess	Oil Attributes PDT	If sensor application	GetEOTI_b_EngOilTempSnsrCktFA()	EngOilTempSensorCircuitFA	P0197	P0198										
Jess	Oil Attributes PDT	if modeled	GetEOTI_b_EngOilModelValid	EngOilModeledTempValid	ECT_Sensor_FA or IAT_SensorCircuitFA											
Jess	Oil Attributes PDT	EOPR	GetEOPR_b_ValidEngOil	EngOilPressureSensorCktFA	P0522	P0523										
Jess	Oil Attributes PDT		GetEOPR_b_EOP_SnsrFA	EngOilPressureSensorFA	P0521	P0522	P0523									
			VeTRGI_b_TransEngdStEmisFlt	see Trans Summary Tables												
Lou?			FSTA_b_DiagFaultAfterStart													
Kaiser	AFM PDT	CDAR	GetCDAR_b_AllDeacDriver_TFTKO	CylnderDeacDriverTFTKO	P3401	P3409	P3417	P3425	P3433	P3441	P3449					
Kaiser	AFM PDT	BTRR	GetBTRR_b_BrkBstrSnsrFlt	BrakeBoosterSensorFA	P0556	P0557	P0558									
		If sensor application	GetBBVR_b_BrkBoostVacVld	BrakeBoosterVacuumValid	P0556	P0557	P0558									
		if modeled	GetBBVR_b_BrkBoostVacVld	BrakeBoosterVacuumValid	VehicleSpeedSensorError or MAP_SensorFA											
Miller		FULR	GetFULR_b_FuelInjCkt_FA	FuelInjectorCircuit_FA	P0201	P0202	P0203	P0204	P0205	P0206	P0207	P0208				
			GetFULR_b_FuelInjCkt_TFTKO	FuelInjectorCircuit_TFTKO	P0201	P0202	P0203	P0204	P0205	P0206	P0207	P0208				
Kurnik		MEMR	GetMEMR_b_ECM_PCM_ProcPerf_FA	ControllerProcessorPerf_FA	P0606											
			GetMEMR_b_CM_RAM_ErrFA	ControllerRAM_Error_FA	P0604											
Bauerle		TPSR	GetTPSR_PerfFaultActive_TPS	TPS_Performance_FA	P0068	P0121	P1516	P2101								
			GetTPSR_EnginePowerLimited	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	TPS1_OutOfRange_Composite	P0120	P0122	P0123									
			TPS2_OutOfRange_Composite	TPS2_OutOfRange_Composite	P0220	P0222	P0223									
			GetTPSR_FaultActive_TPS	TPS_FA	P2135	(TPS1_OutOfRange_Composite and TPS2_OutOfRange_Composite)										
			GetTPSR_FaultPending_TPS	TPS_FaultPending	Always set to FALSE, As ETC diagnostics are set within 200 msec there is no real need for a pending flag											
			GetTPSR_ThrotAuthDefault	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)											
			GetTPSR_b_AccelEffPstnValid	AcceleratorEffectivePstnValid	Always set to TRUE, no P codes will set to FALSE											
Bauerle		VLTR	GetVLTR_b_V5A_FA	5VoltReferenceA_FA	P0641											
			GetVLTR_b_V5B_FA	5VoltReferenceB_FA	P0651											
Kar		IDLR	GetIDLR_b_IAC_SysRPM_FA	IAC_SystemRPM_FA	P0506	P0507										
Pellerito	Trans	TGRR	GetTGRR_TransGrDfltd	TransmissionGearDefaulted	P182E	P1915										
		TRGR	GetTRGR_b_TransEngdStEmisFlt	TransmissionEngagedState_FA	P182E	P1915										
Dholakia		FWDR	GetFWDR_b_FourWhlDrvLowStateVld	FourWheelDriveLowStateValid	P2771											
		ETQR	GetETQR_EngineTorqueInaccurate	EngineTorqureInaccurate	EngineMisfireDetected_FA or											
					FuelInjectorCircuit_FA or											
					FuelInjectorCircuit_TFTKO or											
					FuelTrimSystemB1_FA or											

					FuelTrimSystemB2_FA or											
					MAF_SensorTFTKO or											
					MAP_SensorTFTKO or											
					EGRValvePerformance_FA											
			Short Name:	**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											
			Other Definitions													
Hall	Evap	FLVD	GetFLVR_b_LowFuelConditionDiag	LowFuelConditionDiagnostic	Flag set to TRUE if the fuel level < 10 %											
					AND											
					No Active DTCs:	FuelLevelDataFault										
						P0462										
						P0463										
					for at least 30 seconds.											
		FLVD	GetFLVC_b_FuelPump2_StOn	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 < **TransferPumpOnTimeLimit** Table											
					AND											
					Transfer Pump had been Off for at least 0.0 seconds											
					AND											
					Evap Diagnostic (Purge Valve Leak Test, Large Leak Test, and Waiting for Purge) is not running											
					AND											
					Engine Running											