Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Intake Camshaft Actuator Solenoid Circuit – Bank 1	P0010	Detects a VVT system error by monitoring the circuit for electrical integrity	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		System supply voltage is within limits Output driver is commanded on, Ignition switch is in crank or run position	> 11 Volts, and < 32 Volts	20 failures out of 25 samples 250 ms /sample, continuous	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_CamPosErrorLimIc1 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 < 32 Volts Desired cam position cannot vary more than 5.5 Cam Deg for at least KtPHSD_t_StablePositionTimeIc1 seconds (see Supporting Table) 100 ms /sample	75 failures out of 150 samples	Type B 2 trips
Exhaust Camshaft Actuator Solenoid Circuit – Bank 1	P0013	Detects a VVT system error by monitoring the circuit for electrical integrity	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		System supply voltage is within limits Output driver is commanded on, Ignition switch is in crank or run position	> 11 Volts, and < 32 Volts	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.
Exhaust Camshaft System Performance – Bank 1	P0014	Detects a VVT system error by comparing the desired and actual cam positions when VVT is activated	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive	(Exhaust cam Bank 1)Cam Position Error > KtPHSD_phi_CamPosErrorLimEc1 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 < 32 Volts Desired cam position cannot vary more than 5.5 Cam Deg for at least KtPHSD_t_StablePositionTimeEc1 seconds (see Supporting Table)	100 failures out of 150 samples 100 ms /sample	Type B 2 trips
Crankshaft Position (CKP)-Camshaft Position (CMP) Correlation Bank 1 Sensor A	P0016	Detects cam to crank misalignment by monitoring if cam sensor pulse for bank 1 sensor A occurs during the incorrect crank position	4 cam sensor pulses more than 9 crank degrees before or 12 crank degrees after nominal position in one cam revolution.		Engine Speed Crankshaft and camshaft position signals are synchronized Cam phaser is in "parked" position No Active DTCs: No Pending DTCs:	< 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

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 B	P0017	Detects cam to crank misalignment by monitoring if cam sensor pulse for bank 1 sensor B occurs during the incorrect crank position	4 cam sensor pulses more than 9 crank degrees before or 12 crank degrees after nominal position in one cam revolution.		Engine Speed Crankshaft and camshaft position signals are synchronized Cam phaser is in "parked" position No Active DTCs: No Pending DTCs:	< 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 Engine Speed	= Crank or Run position 11.0 volts < Ign Voltage < 32.0 volts > 400 RPM	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
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 < 32.0 volts > 400 RPM	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
HO2S Heater Resistance Bank 1 Sensor 1	P0053	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Learned Heater Resistance.	Calculated Heater Resistance < 3.7 ohms -OR- Calculated Heater Resistance > 8.7 ohms	No Active DTC's Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run Time	ECT_Sensor_FA P2610 IAT_SensorFA < 8.0 ºC > 28800 seconds -30.0 ºC ≤ Coolant ≤ 45.0 ºC < 32.0 volts >= 0.20 seconds	Once per valid cold start	2 trips Type B
HO2S Heater Resistance Bank 1 Sensor 2	P0054	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Learned Heater Resistance.	Calculated Heater Resistance < 3.6 ohms -OR- Calculated Heater Resistance > 10.3 ohms	No Active DTC's Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run Time	ECT_Sensor_FA P2610 IAT_SensorFA < 8.0 ºC > 28800 seconds -30.0 ºC ≤ Coolant ≤ 45.0 ºC < 32.0 volts >= 0.20 seconds	Once per valid cold start	2 trips Type B
MAP / MAF / Throttle Position Correlation	P0068	Detect when MAP and MAF do not match estimated engine airflow as established by the TPS	1) Difference between measured MAP and estimated MAP exceeds threshold (kPa), or P0651 (5 Volt Ref), or P0107 (MAP circuit low), or P0108 (MAP circuit high) have failed this key cycle, then MAP portion of diagnostic fails	Table, f(TPS). See supporting tables	Engine Speed	> 800 RPM Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	Continuously fail MAP and MAF portions of diagnostic for 0.1875 ms Continuous in primary processor	Type: A MIL: YES Trips: 1

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			2) Difference between measured MAF and estimated MAF exceed threshold (grams/sec), or P0102 (MAF circuit low), or P0103 (MAF circuit hi) have failed this key cycle, or battery voltage < 10.0 volts, then MAF portion of diagnostic fails	Table, f(TPS). 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	<= 250 kPa*(g/s) > 15 grams/sec > 20.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 400 RPM <= 6350 RPM > 70 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.50 Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Estimate MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM	Continuous Calculation are performed every 12.5 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						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	<= 300 Hertz (~ 0.5 gm/sec)	Engine Run Time Engine Speed Ignition Voltage Above criteria present for a period of time	> 1.0 seconds >= 300 RPM >= 11.0 Volts >= 1.0 seconds	200 failures out of 250 samples 1 sample every cylinder firing event	Type B 2 trips
Mass Air Flow Sensor Circuit High Frequency	P0103	Detects a high frequency output from the MAF sensor	MAF Output	>= 11000 Hertz (~ 200 gm/sec)	Engine Run Time Engine Speed Ignition Voltage Above criteria present for a period of time	> 1.0 seconds >= 300 RPM >= 11.0 Volts >= 1.0 seconds	200 failures out of 250 samples 1 sample every cylinder firing event	Type B 2 trips
Manifold Absolute Pressure Sensor Performance	P0106	Determines if the MAP sensor is stuck within the normal operating range	Filtered Throttle Model AND ABS(Measured MAP – MAP Model 1) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered	<= 250 kPa*(g/s) > 25.0 kPa > 20.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 400 RPM <= 6350 RPM > 70 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.50	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.
						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 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 (0.15 Volts = 3.8 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Manifold Absolute Pressure Sensor Circuit High	P0108	Detects an open sensor ground or continuous short to high in either the signal circuit or the MAP sensor.	MAP Voltage	> 90.0 % of 5 Volt Range (4.5 Volts = 115.0 kPa)	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	< 58 Ohms (~150 deg C)	Engine Run Time Coolant Temp Vehicle Speed No Active DTCs:	> 10.0 seconds < 150 deg C >= 0 MPH ECT_Sensor_Ckt_FA ECT_Sensor_Ckt_FP VehicleSpeedSensor_FA	50 failures out of 63 samples 1 sample every 100 msec	Type B 2 trips
Intake Air Temperature Sensor Circuit High (Low Temperature)	P0113	Detects a continuous open circuit in the IAT signal circuit or the IAT sensor	Raw IAT Input	> 163000 Ohms (~-60 deg C)	Engine Run Time Coolant Temp Vehicle Speed Engine Air Flow No Active DTCs:	> 10.0 seconds > -40 deg C <= 318 MPH <= 512 gm/sec ECT_Sensor_Ckt_FA ECT_Sensor_Ckt_FP VehicleSpeedSensor_FA MAF_SensorFA MAF_SensorFP MAF_SensorTFTKO	50 failures out of 63 samples 1 sample every 100 msec	Type B 2 trips
Engine Coolant Temperature (ECT) Sensor Performance	P0116	This DTC detects ECT temp sensor stuck in mid range.	A failure will be reported if any of the following occur: 1) ECT at power up > IAT at power up by an IAT based table lookup value after a minimum 25200 second soak (fast fail).	See "P0116: Fail if power up ECT exceeds IAT by these values" in the Supporting tables section	No Active DTC's Non-volatile memory initization Test complete this trip Test aborted this trip	VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA IgnitionOffTimeValid TimeSinceEngineRunningValid = Not occurred = False	1 failure 500 msec/sample Once per valid cold start	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			2) ECT at power up > IAT at power up by 15.8 C after a minimum 25200 second soak and a block heater has not been detected. 3) ECT at power up > IAT at power up by 15.8 C after a minimum 25200 seconds soak and the time spent cranking the engine without starting is greater than 10.0 seconds with the LowFuelConditionDiag	= False	IAT Low Fuel Condition Diag **Diagnostic is aborted when Block Heater is detected. Block Heater is detected when the following occurs:** 1) ECT at power up > IAT at power up by 2) Cranking time 3) Power up IAT 4a) Vehicle drive time 4b) Vehicle speed 4c) IAT drops from power up IAT	= False ≥ -7 ºC = False > 15.8 ºC < 10.0 Seconds > -7 ºC > 400 Seconds > 14.9 MPH ≥ 5.3 ºC		
Engine Coolant Temp Sensor Circuit Low	P0117	This DTC detects a short to ground in the ECT signal circuit or the ECT sensor.	ECT Resistance (@ 150ºC)	< 47 Ohms			5 failures out of 6 samples 1 sec/sample Continuous	2 trips Type B
Engine Coolant Temp Sensor Circuit High	P0118	Circuit Continuity This DTC detects a short to high or open in the ECT signal circuit or the ECT sensor.	ECT Resistance (@ -60ºC)	> 420000 Ohms	Engine run time Or IAT min	 > 10.0 seconds ≥ 0.0 °C	5 failures out of 6 samples 1 sec/sample Continuous	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
TPS1 Circuit	P0120	Detects a continuous or intermittent short or open in TPS1 circuit on the secondary processor but sensor is in range on the primary processor	Secondary TPS1 Voltage < or Secondary TPS1 Voltage >	0.325 4.75		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions No 5 V reference error No 5 V reference DTCs	19/39 counts or 14 counts continuous; 12.5 msec/count in the secondary processor	Type: 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	> 250 kPa*(g/s) > 15 grams/sec	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 400 RPM <= 6350 RPM > 70 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.50 Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Estimate See table "IFRD Residual Weighting Factors".	Continuous Calculation are performed every 12.5 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					No Active DTCs:	MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensorFA ECT_sensor_FA ECT_Sensor_FP 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: YES
			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	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: YES
			Secondary TPS1 Voltage >	4.75		No 5 V reference DTCs	19/39 counts or 14 counts	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
							continuous; 12.5 msec/count in the Secondary processor	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_ThrottleAuthority Defaulted IAT_SensorFA ECT_Sensor_Ckt_FA ECT_Sensor_Perf_FA VehicleSpeedSensor_FA	30 failures to set DTC 1 sec/sample Once per ignition cycle	2 trips Type B
			Range #1 (Primary) ECT reaches 71.0 °C when IAT min is ≤ 54.5°C and ≥ 10.0°C.					
			Range #2 (Alternate) ECT reaches 71.0 °C when IAT min is < 10.0°C and ≥ -7.0°C.		Engine run time Fuel Condition	30 ≤ seconds ≤ 1800 Ethanol ≤ 87%		
					Range #1 (Primary) Test ECT at start run Average Airflow Vehicle speed	 ≤ 66.0 °C ≥ 1.0 gps > 5 mph for at least 0.8 miles		
					Range #2 (Alternate) Test ECT at start run Average Airflow Vehicle speed	 ≤ 66.0 °C ≥ 1.0 gps > 5 mph for at least 0.8 miles		
					Accumulated Airflow Adjustments			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					1) Max. airflow amount added when accumulating airflow is 2) Zero Airflow accumulated when airflow is 3) With AFM active Airflow added to acculmulated is multiplied by 4) With Decel Fuel Cut Off active, acculmulated airflow is reduced by multiplying actual airflow by	30.0 gps < 2.0 gps 50.00% 1.00 times		
O2S Circuit Low Voltage Bank 1 Sensor 1	P0131	This DTC determines if the O2 sensor circuit is shorted to low.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is < 50 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoid Circuit_FA EvapFlowDuringNon Purge_FA EvapVentSolenoid Circuit_FA EvapSmallLeak_FA EvapEmission System_FA FuelTankPressureSnsr Ckt_FA FuelInjectorCircuit_FA	380 failures out of 475 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					AIR intrusive test	= Not active
					Fuel intrusive test	= Not active
					Idle intrusive test	= Not active
					EGR intrusive test	= Not active
					System Voltage	10.0 volts < system voltage< 32.0 volts
					EGR Device Control	= Not active
					Idle Device Control	= Not active
					Fuel Device Control	= Not active
					AIR Device Control	= Not active
					Low Fuel Condition Diag	= False
					Equivalence Ratio	0.9912 ≤ equiv. ratio ≤ 1.0137
					Throttle Position	5 % <= Throttle <= 50 %
					Fuel Control State	= Closed Loop
					Closed Loop Active	= TRUE
					All Fuel Injectors for active Cylinders	Enabled (On)
					Fuel Condition	Ethanol <= 87%
					Fuel State	DFCO not active
					All of the above met for	
					Time	> 5.0 seconds
O2S Circuit High Voltage Bank 1 Sensor 1	P0132	This DTC determines if the O2 sensor circuit is shorted to high.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is > 1050 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted MAP_SensorFA AIR System FA EvapPurgeSolenoid Circuit_FA EvapFlowDuringNon Purge_FA EvapVentSolenoid Circuit_FA EvapSmallLeak_FA EvapEmission System_FA	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						FuelTankPressureSnsr Ckt_FA FuelInjectorCircuit_FA		
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Equivalence Ratio	0.9912 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	0.0 % <= Throttle <= 50.0 %		
					Fuel Control State	= Closed Loop		
					Fuel Control State	not = Power Enrichment		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel State	DFCO not active		
					Fuel Condition	Ethanol <= 87%		
					All of the above met for Time	> 5 seconds		
O2S Slow Response Bank 1 Sensor 1	P0133	This DTC determines if the O2 sensor response time is degraded.	The average response time is caluclated over the test time, and compared to the threshold. Refer to **"P0133 - O2S Slow Response Bank 1 Sensor 1"** Pass/Fail Threshold table in the Supporting Tables tab.		No Active DTC's	TPS_ThrottleAuthority Defaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoid Circuit_FA	Sample time is 60 seconds Frequency: Once per trip Green Sensor Delay Criteria	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						EvapFlowDuringNon Purge_FA		
						EvapVentSolenoid Circuit_FA EvapSmallLeak_FA EvapEmission System_FA FuelTankPressureSnsr Ckt_FA FuelInjectorCircuit_FA AIR System FA EthanolComposition Sensor_FA EngineMisfire Detected_FA	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	= P0131, P0132 or P0134		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Green O2S Condition	= Not Valid		
					O2 Heater on for	>= 40 seconds		
					Learned Htr resistance	= Valid		
					Engine Coolant	> 70 ºC		
					IAT	> -40 ºC		
					Engine Run Time	> 120 seconds		
					Time since any AFM status change	> 2.0 seconds		
					Time since Purge On to Off change	> 0.0 seconds		
					Time since Purge Off to			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					On change	> 1.5 seconds		
					Purge duty cycle	>= 0 % duty cycle		
					Engine airflow	15 gps <= engine airflow <= 35 gps		
					Engine speed	1000 <= RPM <= 3500		
					Fuel	< 87 % Ethanol		
					Baro	> 70 kpa		
					Throttle Position	>= 4 %		
					Low Fuel Condition Diag	= False		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					LTM fuel cell	= Enabled		
					Transient Fuel Mass	<= 100.0 mgrams		
					Baro	= Not Defaulted		
					Fuel Control State	not = Power Enrichment		
					Fuel State	DFCO not active		
					Commanded Proportional Gain	>= 0.0 %		
					All of the above met for Time	> 3.0 seconds		
O2S Circuit Insufficient Activity Bank 1 Sensor 1	P0134	This DTC determines if the O2 sensor circuit is open.	Measure Oxygen Sensor Signal.	400 mvolts < Oxygen Sensor signal < 500 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted MAF_SensorFA EthanolComposition Sensor_FA	400 failures out of 500 samples. Minimum of 0 delta TPS changes required to report fail. Delta TPS is incremented when the TPS % change >= 1.0 % Frequency: Continuous	2 trips Type B
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					AFM Status	= All Cylinders active		
					Heater Warm-up delay	= Complete		
					Predicted Exhaust Temp (by location)	= Wamed Up		
					Engine Run Time	> 200 seconds		
					Fuel	<= 87 % Ethanol		

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 1 Sensor 1	P0135	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	Measured Heater Current.	Measured Heater current < 0.3 amps -OR- Measured Heater current > 2.5 amps	No Active DTC's 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< 32.0 volts = Complete = Not active > zero > 120 seconds	8 failures out of 10 samples Frequency: 2 tests per trip 30 seconds delay between tests and 1 second execution rate	2 trips Type B
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 AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage	TPS_ThrottleAuthority Defaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoid Circuit_FA EvapFlowDuringNon Purge_FA EvapVentSolenoid Circuit_FA EvapSmallLeak_FA EvapEmission System_FA FuelTankPressureSnsr Ckt_FA FuelInjectorCircuit_FA = Not active = Not active = Not active = Not active 10.0 volts < system voltage< 32.0 volts	430 failures out of 540 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					EGR Device Control	= Not active
					Idle Device Control	= Not active
					Fuel Device Control	= Not active
					AIR Device Control	= Not active
					Low Fuel Condition Diag	= False
					Equivalence Ratio	0.9912 ≤ equiv. ratio ≤ 1.0137
					Throttle Position	5 % <= Throttle <= 50 %
					Fuel Control State	= Closed Loop
					Closed Loop Active	= TRUE
					All Fuel Injectors for active Cylinders	Enabled (On)
					Fuel Condition	Ethanol <= 87%
					Fuel State	DFCO not active
					All of the above met for Time	> 5.0 seconds
O2S Circuit High Voltage Bank 1 Sensor 2	P0138	This DTC determines if the O2 sensor circuit is shorted to high.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is > 1050 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted MAP_SensorFA AIR System FA EvapPurgeSolenoid Circuit_FA EvapFlowDuringNon Purge_FA EvapVentSolenoid Circuit_FA EvapSmallLeak_FA EvapEmission System_FA FuelTankPressureSnsr Ckt_FA FuelInjectorCircuit_FA	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B
					AIR intrusive test	= Not active
					Fuel intrusive test	= Not active
					Idle intrusive test	= Not active
					EGR intrusive test	= Not active
						10.0 volts < system

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					System Voltage	voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Equivalence Ratio	0.9912 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	5.2 % <= Throttle <= 50.0 %		
					Fuel Control State	= Closed Loop		
					Fuel Control State	not = Power Enrichment		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel State	DFCO not active		
					Fuel Condition	Ethanol <= 87%		
					All of the above met for			
					Time	> 5 seconds		
O2 Sensor 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 > 6.8 units OR 2) Accumulated air flow during slow rich to lean test > 15 grams (upper threshold is 450 mvolts and lower threshold is 150 mvolts)	No Active DTC's	TPS_ThrottleAuthority Defaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfire Detected_FA EthanolComposition Sensor_FA	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	1 trips Type A EWMA
					B1S2 Failed this key cycle	P013B, P013E, P013F, P2270 or P2271		
					System Voltage	10.0 volts < system voltage< 32.0 volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Learned heater resistance	= Valid	Green Sensor Delay Criteria The diagnostic will not be enabled until the next ignition cycle after the following has been met: Airflow greater than 22 gps for 120000 grams of accumulated flow non-continuously. (Note that all other enable criteria must be met on the next ignition cycle for the test to run on that ignition cycle). Note: This feature is only enabled when the vehicle is new and cannot be enabled in service	
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid		
					Low Fuel Condition Diag	= False		
					Post fuel cell	= enabled		
					DTC's Passed	= P2270 (and P2272 (if applicable))		
					DTC's Passed	= P013E (and P014A (if applicable))		
					After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
O2 Sensor Slow Response Lean to Rich Bank 1 Sensor 2	P013B	This DTC determines if the post catalyst O2 sensor has Slow Response in a predefined Lean to Rich voltages range during Lean to Rich transition. The diagnostic is an intrusive test which increases the delivered A/F ratio to achieve the required rich threshold.	The EWMA of the Post O2 sensor normalized integral value is greater than the threshold. OR The Accumulated mass air flow monitored during the Slow Response Test (between the lower and upper voltage thresholds) is greater than the airflow threshold.	1) B1S2 EWMA normalized integral value > 6.5 units OR 2) Accumulated air flow during slow lean to rich test > 270 grams (lower threshold is 300 mvolts and upper threshold is 600 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 EngineMisfire Detected_FA EthanolComposition Sensor_FA	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	1 trips Type A EWMA
					B1S2 Failed this key cycle	P013A, P013E, P013F, P2270 or P2271		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					Learned heater resistance	= Valid	Green Sensor Delay Criteria	
					ICAT MAT Burnoff delay	= Not Valid	The diagnostic will not be enabled until the next ignition cycle after the following has been met: Airflow greater than 22 gps for 120000 grams of accumulated flow non-continuously. (Note that all other enable criteria must be met on the next ignition cycle for the test to run on that ignition cycle). Note: This feature is only enabled when the vehicle is new	
					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.
							and cannot be enabled in service	
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 > 20 grams.	No Active DTC's	TPS_ThrottleAuthority Defaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfire Detected_FA EthanolComposition Sensor_FA	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	2 trips Type B
					B1S2 Failed this key cycle	P013A, P013B, P013F, P2270 or P2271		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					Learned heater resistance	= Valid	Green Sensor Delay Criteria	
					ICAT MAT Burnoff delay	= Not Valid	The diagnostic will not be enabled until the next ignition cycle after the following has been met: Airflow greater than 22 gps for 120000 grams of accumulated flow non-continuously. (Note that all other enable criteria must be met on the next	
					Green O2S Condition	= Not Valid		
					Low Fuel Condition Diag	= False		
					Post fuel cell	= enabled		
					DTC's Passed	= P2270 and P2272 (if applicable)		
					After above conditions are met: DFCO mode entered (wo driver initiated pedal input).			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
							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 < 300 mvolts AND 2) Accumulated air flow during lean to rich test > 536 grams.	No Active DTC's B1S2 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 EngineMisfire Detected_FA EthanolComposition Sensor_FA P013A, P013B, P013E, P2270 or P2271 10.0 volts < system voltage< 32.0 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	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 Post fuel cell DTC's Passed DTC's Passed DTC's Passed DTC's Passed	= False = enabled = P2270 (and P2272 (if applicable)) = P013E (and P014A (if applicable)) = P013A (and P013C (if applicable)) = P2271 (and P2273 (if applicable))	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	
					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.	400 mvolts < Oxygen Sensor signal < 500 mvolts	No Active DTC's System Voltage AFM Status Heater Warm-up delay Predicted Exhaust Temp (by location) Engine Run Time	TPS_ThrottleAuthority Defaulted MAF_SensorFA EthanolComposition Sensor_FA 10.0 volts < system voltage< 32.0 volts = All Cylinders active = Complete = Wamed Up > 200 seconds	1175 failures out of 1225 samples. Minimum of 3 delta TPS changes required to report fail. Delta TPS is incremented when the TPS % change >= 1.0 %	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Fuel	<= 87 % Ethanol	Frequency: Once per trip for post sensors 100msec loop	
O2S Heater Performance Bank 1 Sensor 2	P0141	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	Measured Heater Current.	Measured Heater current < 0.3 amps -OR- Measured Heater current > 2.5 amps	No Active DTC's 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< 32.0 volts = Complete = Not active > zero > 120 seconds	8 failures out of 10 samples Frequency: 2 tests per trip 30 seconds delay between tests and 1 second execution rate	2 trips Type B
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 Long Fuel Trim data accumulation: **Closed loop fueling Enabled**	400 <rpm< 6350 > 70 kPa -38 <°C< 130 15 <kPa< 256 -20 <°C< 150 1.0 <g/s< 512.0 < 318 mph > 10 % or if fuel sender is faulty > 44 seconds of data must accumulate on each trip, with at least 30 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 70.7 % of the EPAIII drive cycle. This is also typical of real-world driving, however values will vary (higher	Type B 2 Trip(s)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Long Fuel Trim enabled	Closed Loop Enabled and coolant temp > 40 and < 120 and > 0.2 liters of fuel consumed after a fuel fill event (Flex Fuel Only)	or lower) based on the actual conditions present during the drive cycle.	
				disable	Engine speed	rpm< 400 or rpm> 6350		
				conditions:	Fuel Level	< 10 % for at least 30 seconds		
					EGR Flow Diag. Intrusive Test Active			
					Catalyst Monitor Diag. Intrusive Test Active			
					Post O2 Diag. Intrusive Test Active			
					Device Control Active			
					EVAP Diag. “tank pull down” portion of the test Active			
					fuel trim metric updated during decels? 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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Fuel System Too Rich Bank 1	P0172	Determines if the fuel control system is in a rich condition, based on the filtered long-term fuel trim metric. There are two different, yet related tests that are used to determine a Rich fault, they are Passive and Intrusive and are described below:			BARO Coolant Temp MAP IAT MAF VSS Fuel Level Long Fuel Trim data accumulation:	> 70 kPa -38 <°C< 130 15 <kPa< 256 -20 <°C< 150 1.0 <g/s< 512.0 < 318 mph < 10 % for at least 30 seconds > 44 seconds of data must accumulate on each trip, with at least 30 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			
					Long Fuel Trim enabled	Closed Loop Enabled and coolant temp > 40 and < 120 and > 0.2 liters of fuel consumed after a fuel fill event (Flex Fuel Only)		
		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 condition. If the filtered Purge-on	If the Purge Long Term Fuel Trim metric AND The filtered Non-Purge Long Term Fuel Trim metric	≤ **Purge Rich Limit** Table ≤ **Non Purge Rich Limit** Table		Passive Test decision cannot be made. A passive decision cannot be made when Purge is enabled.	Fail determinations require that the Malfunction Criteria be satisfied for 2 out of 3 intrusive segments.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		Long Term fuel trim > **Purge Rich Limit Table** the test passes without checking the Non-Purge Long Term fuel trim metric.	Segment Definition - Segments can last up to 35, and are separated by the lesser of 30 seconds of purge-on time or enough time to purge 18 grams of vapor. A maximum of 3 completed segments or 30 intrusive attempts are allowed for each intrusive test. After an intrusive test report is completed, another intrusive test cannot occur for 300 seconds to allow sufficient time to purge excess vapors from the canister. During this period, fuel trim will pass if the filtered Purge-on Long Term fuel trim > Purge Rich Limit Table for at least 60 seconds, indicating that the canister has been purged. Performing intrusive tests too frequently may also affect EVAP and EPAIII emissions, and the execution frequency of other diagnostics.					
			disable conditions:		Engine speed	rpm< 400 or rpm> 6350	Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during **70.7** % of the EPAIII drive cycle. This is also typical of real-world driving, however values will vary (higher or lower) based on the actual conditions present during the drive cycle.	
					EGR Flow Diag. Intrusive Test Not Active			
					Fuel Level	< 10 % for at least 30 seconds		
					Catalyst Monitor Diag. Intrusive Test Not Active			
					Post O2 Diag. Intrusive Test Not Active			
					Device Control Not Active			
					EVAP Diag. “tank pull down” portion of the test Active			
					fuel trim metric updated during decels? No			
					No active DTCs:	IAC_SystemRPM_FA MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR System FA EvapPurgeSolenoid Circuit_FA EvapFlowDuringNon Purge_FA EvapVentSolenoid Circuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressure SensorCircuit_FA		

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 EngineMisfire Detected_FA EGRValve Performance_FA EGRValveCircuit_FA MAP_EngineVacuum Status AmbientAirDefault_NA		
Injector 1	P0201	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 1 seconds	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips
Injector 2	P0202	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 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 ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 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 ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 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 <	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	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 TPS2 Voltage >	4.59		No 5 V reference error No 5 V reference DTCs		A 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 MIL: YES Trips: 1
			Secondary TPS2 Voltage <	0.25		No 5 V reference error No 5 V reference DTCs	19/39 counts or 14 counts continuous; 12.5 msec/count in the Secondary processor	
TPS2 Circuit High	P0223	Detects a continuous or intermittent short or open in TPS2 circuit on both processors or just the primary processor	Primary TPS2 Voltage >	4.59		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	79/159 counts; 57 counts continuous; 3.125 msec /count in the Primary processor	Type: A MIL: YES Trips: 1
			Secondary TPS2 Voltage >	4.59		No 5 V reference error No 5 V reference DTCs	19/39 counts or 14 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.
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 ≤ 32 volts ≥ 0 RPM	8 failures out of 10 samples 250 ms /sample Continuous	2 trips Type B
Random Misfire Detected Cylinder 1 Misfire Detected Cylinder 2 Misfire Detected Cylinder 3 Misfire Detected Cylinder 4 Misfire Detected	P0300 P0301 P0302 P0303 P0304	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. Misfire Percent Emission Failure Threshold Misfire Percent Catalyst Damage	**(>**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) ≥ 1.00% P0300 ≥ 1.00% emission >"Catalyst Damaging Misfire Percentage"	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<32.00 < 95.00% per 25 ms < 95.00% per 25 ms	Emission Exceedence = (5) failed 200 rev blocks of 16. Failure reported with (1) Exceedence in 1st (16) 200 rev block, or (4) Exceedences thereafter. 1st Catalyst Exceedence = (1) 200 rev block as data supports for catalyst damage. 2nd and 3rd Catalyst Exceedence = (1) 200 rev block with catalyst damage. Failure reported with (3) Exceedences in FTP, or (1) Exceedence outside FTP.	2 Trips Type B (Mil Flashes with Catalyst Damaging Misfire)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
							Continuous	
					Engine Speed	450 < rpm < 6350 (typical) Engine speed limit is a function of inputs like Gear and temperature typical Engine Speed Limit = 6750 rpm		
				disable conditions:	No active DTCs:	TPS_FA EnginePowerLimited MAF_SensorTFTKO n IAT_SensorTFTKO ECT_Sensor_Ckt_TFTKO 5VoltReferenceB_FA CrankSensorTestFailedTKO CrankSensorFaultActive CrankIntakeCamCorrelationFA CrankExhaustCamCorrelationFA CrankCamCorrelationTFTKO AnyCamPhaser_FA AnyCamPhaser_TFTKO	4 cycle delay	
					P0315 & engine speed	> 1000 rpm		
					Fuel Level Low	LowFuelCondition Diagnostic	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	0 cycle delay	
					Undetectable engine speed and engine load region	invalid speed load range in **decel index** tables	4 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Abusive Engine Over Speed	> 8192 rpm	0 cycle delay	
					Below zero torque (except CARB approved 3000 rpm to redline triangle.)	<" Zero torque engine load" in Supporting Tables tab	4 cycle delay	
					Below zero torque: TPS (area) Veh Speed	 ≤ 0% > 318 MPH	4 cycle delay	
					EGR Intrusive test	Active	12 cycle delay	
					Manual Trans	Clutch shift	4 cycle delay	
					Throttle Position AND Automatic transmission shift	> 200.00%	0 cycle delay	
					Driveline Ring Filter active			
					After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.			
					Filter Driveline ring: Stop filter early:	 7 engine cycles after misfire 3 Engine cycles after misfire		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Abnormal engine speed oscillations: (Rough road etc) Off Idle, number of consecutive decelerating cylinders after accelerating,: (Number of decels can vary with misfire detection equation) TPS Engine Speed Veh Speed SCD Cyl Mode Rev Mode	 > 3 % > 1000 rpm > 3 mph = 2 consecutive cyls = 2 consecutive cyls = 2 consecutive cyls		
Crankshaft Position System Variation Not Learned	P0315	Monitor for valid crankshaft error compensation factors	Sum of Compensation factors	≥ 2.0040 OR ≤ 1.9960	OBD Manufacturer Enable Counter	0	0.50 seconds Frequency Continuous 100 msec	1 Trips Type A
Knock Sensor (KS) Circuit Bank 1	P0325	This diagnostic checks for an open in the knock sensor circuit	Gated FFT Output	< OpenCircuitThresh See Supporting Tables for OpenCircuitThresh	Diagnostic Enabled (1 = Enabled) Engine Speed ECT Enginer Run Time No Active DTC's Power Take-Off	= 1 ≥ 1500 RPM ≥ -40 deg. C ≥ 1 seconds KS_Ckt_Perf_B1B2_FA Disabled	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.
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_FastRtdDiag Thrsh	> (FastRtdMax + 4.0 degrees - 1.0) degrees spark See Supporting Tables for FastRtdMax	Diagnostic Enabled (1 = Enabled) Knock Detection Enabled Engine Speed MAP No Active DTC's Power Take-Off Disabled	= 1 > 0 **Knock Detection Enabled** is calculated by multiplying the following three factors: FastAttackRate FastAttackCoolGain FastAttackBaroGain (see Supporting Tables) ≥ 600 RPM ≥ 25 kPa TPS_ThrottleAuthorityDefaulted Disabled	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
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	< ShortLowThresh * (5 / 65,472) Volts < 0.706 * [ShortLowThresh * (5 / 65,472)] Volts See Supporting Tables for ShortLowThresh	ECT Enginer Run Time Valid Oil Temp Required? (1= Yes, 0 = No) If Yes: Engine Oil Temp and ValidOilTempModel or No OilTempSensor DTC's	≥ -40 deg. C ≥ 1 seconds = 1 < 150 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 1	P0328	This diagnostic checks for an out of range high knock sensor signal	Sensor Input Signal Line **or** Sensor Return Signal Line	> ShortHiThresh * (5 / 65,535) Volts > 2 * [ShortLowThresh * (5 / 65,535) - 2.5] Volts See Supporting Tables for ShortHiThresh	ECT Enginer Run Time Valid Oil Temp Required? (1= Yes, 0 = No) If Yes: Engine Oil Temp and ValidOilTempModel or No OilTempSensor DTC's If No: No Eng Oil Temp enable criteria	≥ -40 deg. C ≥ 1 seconds = 1 < 150 deg. C EngOilModeledTemp Valid EngOilTempSensor CircuitFA	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	<u>Engine-Cranking Crankshaft Test:</u> Time since last crankshaft position sensor pulse received	>= 4.0 seconds	<u>Engine-Cranking Crankshaft Test:</u> Starter engaged AND (cam pulses being received		<u>Engine-Cranking Crankshaft Test:</u> Continuous every 100 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow	 = FALSE = FALSE = FALSE > 3.0 grams/second))		
			Time-Based Crankshaft Test: No crankshaft pulses received	>= 1.0 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 P0365 P0366	Event-Based Crankshaft Test: 2 failures out of 10 samples One sample per engine revolution	
Crankshaft Position (CKP) Sensor A Performance	P0336	Determines if a performance fault exists with the crank position sensor signal	Crank Re-synchronization Test: Time in which 20 or more crank re-synchronizations occur	< 25.0 seconds	Crank Re-synchronization Test: Engine Air Flow Cam-based engine speed No DTC Active:	 >= 3.0 grams/second > 450 RPM 5VoltReferenceB_FA P0335	Crank Re-synchronization Test: Continuous every 250 msec	Type B 2 trips
			Time-Based Crankshaft Test: No crankshaft synchronization gap found	>= 0.4 seconds	Time-Based Crankshaft Test: Engine is Running Starter is not engaged		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.
					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	>= 1.5 seconds	Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow	= FALSE = FALSE = FALSE > 3.0 grams/second))	Continuous every 100 msec	
			Event-Based Crankshaft Test:		Event-Based Crankshaft Test:		Event-Based Crankshaft Test:	
			Crank Pulses received in one engine revolution OR	< 51	Engine is Running OR Starter is engaged		8 failures out of 10 samples	
			Crank Pulses received in one engine revolution	> 65	No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA P0365 P0366	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 OR Time that starter has been engaged without a camshaft sensor pulse	>= 5.5 seconds >= 4.0 seconds	Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102	= FALSE = FALSE	Continuous every 100 msec	

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 Camshaft Test: Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Time-Based Camshaft Test: Engine is Running Starter is not engaged No DTC Active:	5VoltReferenceA_FA	Time-Based Camshaft Test: Continuous every 100 msec	
			Fast Event-Based Camshaft Test: No camshaft pulses received during first 12 MEDRES events (There are 12 MEDRES events per engine cycle)		Fast Event-Based Camshaft Test: Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Fast Event-Based Camshaft Test: Continuous every MEDRES event	
			Slow Event-Based Camshaft Test: The number of camshaft pulses received during 100 engine cycles	= 0	Slow Event-Based Camshaft Test: Crankshaft is synchronized No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Slow Event-Based Camshaft Test: 8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor A	P0341	Determines if a performance fault exists with the cam position bank 1 sensor A signal	Fast Event-Based Camshaft Test:		Fast Event-Based Camshaft Test:		Fast Event-Based Camshaft Test:	Type B 2 trips
			The number of camshaft pulses received during first 12 MEDRES events is less than 4 or greater than 10		Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged		Continuous every MEDRES event	
			(There are 12 MEDRES events per engine cycle)					
					No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA		
			Slow Event-Based Camshaft Test:		Slow Event-Based Camshaft Test:		Slow Event-Based Camshaft Test:	
			The number of camshaft pulses received during 100 engine cycles		Crankshaft is synchronized		8 failures out of 10 samples	
					No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA		
			AND	< 398 > 402			Continuous every engine cycle	
IGNITION CONTROL #1 CIRCUIT	P0351	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 1 (Cylinders 1 and 4 for V6 with waste spark)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running		50 Failures out of 63 Samples	Type: B MIL: YES Trips: 2
					Ignition Voltage	> 6.00 Volts		
							100 msec rate	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
IGNITION CONTROL #2 CIRCUIT	P0352	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 2 (Cylinders 2 and 5 for V6 with waste spark)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	 > 6.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #3 CIRCUIT	P0353	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 3 (Cylinders 3 and 6 for V6 with waste spark)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	 > 6.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #4 CIRCUIT	P0354	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 4 (if applicable)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	 > 6.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor B	P0365	Determines if a fault exists with the cam position bank 1 sensor B signal	<u>Engine Cranking Camshaft Test:</u> Time since last camshaft position sensor pulse received OR Time that starter has been engaged without a camshaft sensor pulse	 >= 5.5 seconds >= 4.0 seconds	<u>Engine Cranking Camshaft Test:</u> Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102	 = FALSE = FALSE	<u>Engine Cranking Camshaft Test:</u> Continuous every 100 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					AND DTC P0103 AND Engine Air Flow	= FALSE > 3.0 grams/second))		
			Time-Based Camshaft Test: Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Time-Based Camshaft Test: Engine is Running Starter is not engaged No DTC Active:	5VoltReferenceA_FA	Time-Based Camshaft Test: Continuous every 100 msec	
			Fast Event-Based Camshaft Test: No camshaft pulses received during first 12 MEDRES events (There are 12 MEDRES events per engine cycle)		Fast Event-Based Camshaft Test: Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Fast Event-Based Camshaft Test: Continuous every MEDRES event	
			Slow Event-Based Camshaft Test: The number of camshaft pulses received during 100 engine cycles	= 0	Slow Event-Based Camshaft Test: Crankshaft is synchronized No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Slow Event-Based Camshaft Test: 8 failures out of 10 samples Continuous every engine cycle	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor B	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 4 or greater than 10 (There are 12 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
Secondary AIR Incorrect Airflow Single Bank Systems	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 or	 > 4.0 kPa < -4.0 kPa	BARO Inlet Air Temp Coolant Temp Engine off time	> 60 kPa > -11.0 deg C. > -11.0 deg C. < 60.0 deg C. > 3600.0 seconds	Phase 1 Conditional test weight > 7.0 seconds	2 trip(s) Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			OR		System Voltage	> 10.0 OR < 32.0 Volts	Total 'String Length' accumulation time	
					SL Stability time	> 4.0 seconds		
			System Pressure Error	> 0.0 kPa	SL Range	rpm < 4700 and > 4900		
		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.	or	< 0.0 kPa				
			while the Average String Length	>**SL Threshold Bank 1** Table	**Conditional test weight is calculated by <u>multiplying the following Factors</u> 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**		> 10 seconds	
				disable	MAP	< 20 kPa for 2 seconds		
				conditions:	Engine Speed	> 5000 RPM		
					MAF	> 50 gm/s for 3 seconds	Frequency: Once per trip when AIR pump commanded On	
					No active DTCs:	AIRSystemPressure Sensor FA AIRValveControl Circuit FA AIRPumpControl Circuit FA MAF_SensorFA MAP_SensorFA IAT_SensorFA ECT_Sensor_FA EngineMisfireDetected_FA CatalystSysEfficiencyLoB1_FA CatalystSysEfficiencyLoB2_FA ControllerProcessorPerf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA IgnitionOutputDriver_FA FuelInjectorCircuit_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Secondary AIR Solenoid Control Circuit	P0412	This DTC checks the AIR solenoid circuit for electrical integrity	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		System Voltage	> 10.0 Volts < 32.0 Volts	20 failures out of 25 samples 250 ms loop Continuous	2 trip(s) Type B
Secondary AIR Pump Control Circuit	P0418	This DTC checks the AIR Pump circuit for electrical integrity	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		System Voltage	> 10.0 Volts < 32.0 Volts	20 failures out of 25 samples 250 ms loop Continuous	2 trip(s) Type B
Catalyst System Low Efficiency Bank 1	P0420	Oxygen Storage	Normalized Ratio OSC Value (EWMA filtered)	< 0.350	***Valid Idle Period Criteria***		1 test attempted per valid idle period Minimum of 1 test per trip Maximum of 8 tests per trip Frequency: Fueling Related : 12.5 ms OSC Measurements: 100 ms Temp Prediction: 1000ms	Type A 1 Trip(s)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and O2 during lean A/F excursions to store the excess oxygen (I.e. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H2 to release this stored oxygen (I.e. Cerium Reduction). This is referred to as the Oxygen Storage Capacity, or OSC. CatMon's strategy is to "measure" the OSC of the catalyst through forced Lean and Rich A/F excursions Normalized Ratio OSC Value Calculation Information and Definitions = 1. Raw OSC Calculation = (post cat O2 Resp time - pre cat O2 Resp time) 2. BestFailing OSC value from a calibration table (based on temp and exhaust gas flow) 3. WorstPassing OSC value (based on temp and exhaust gas flow) Normalized Ratio Calculation = (1-2) / (3-2) A Normalized Ratio of 1 essentially represents a good part and a ratio of 0 essentially represents a very bad part.			Throttle Position	< 2.00 %		
		The Catalyst Monitoring Test is done during idle. Several conditions must be meet in order to execute this test. These conditions and their related values are listed in the secondary parameters area of this document.			Vehicle Speed	*< 1.24 Mph*		
					Engine speed	> 1150 RPM for a minimum of 23 seconds since end of last idle period.		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Engine run time	≥ MinimumEngineRunTime, **This is a function of Coolant Temperture, 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):	Not Active		
					Fueltrim			
					Post O2			
					EVAP			
					EGR			
					RunCrank Voltage	> 10.90 Volts		
					Ethanol Estimation	NOT in Progress		
					ECT	*50 < ° C < 130*		
					Barometric Pressure	> 70 KPA		
					Idle Time before going intrusive is	< 50 Seconds		
					Idle time is incremented if Vehicle speed	< 1.2 Mph and the throttle position < 2.00 % as identified in the Valid Idle Period Criteria section.		
					Short Term Fuel Trim	*0.90 < ST FT < 1.10*		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Predicted catalyst temp > MinCatTemp table (degC) (refer to "Supporting Tables" tab) AND Engine Airflow > MinAirflowToWarmCatalyst table (g/s) (refer to "Supporting Tables" tab) (Based on engine coolant at the time the WarmedUpEvents counter resets to 0.) for at least 31 seconds with a closed throttle time < 180 seconds consecutively (closed throttle consideration involves having the TPS < the value as stated in the Valid Idle Period Criteria Section) . Also, in order to increment the WarmedUpEvents counter (counter must exceed 31 cal value), either the vehicle speed must exceed the vehicle speed cal or the TPS must exceed the TPS cal as stated in the Valid Idle Period Criteria section above. **Closed loop fueling Enabled** A Function of Coolant Temperature based on Start-up coolant temp. and a function of Time also based on Start-up coolant temp. **Please see "Supporting Tables" Tab** **PRNDL** is in Drive Range on an Auto Transmission vehicle. ***Idle Stable Criteria :: Must hold true from after Catalyst Idle Conditions Met to the end of test*** MAF Predicted catalyst temperature	*2.00 < g/s < 8.50* < 900 degC		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Engine Fueling Criteria at Beginning of Idle Period **The following fueling related must also be met from between 4 and 7 seconds after the Catalyst Idle Conditions Met Criteria has been met for at least 4 seconds prior to allowing intrusive control** Number of pre-O2 switches | > 2 Short Term Fuel Trim Avg | *0.960 < 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 > 0.510 and the current OSC Normalized Ratio value is < 0.260 Maximum of 24 RSR tests to detect failure when RSR is enabled. ***Green Converter Delay Criteria*** This is part of the check for the Catalyst Idle Conditions Met Criteria section The diagnostic will not be enabled until the following has been met: Predicted catalyst temperature > 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**			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					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			
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	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	10 % ≤ Percent ≤ 90 % ≥ 600 seconds ≥ 7.1 miles ≥ 70 °C ≥ 70 kPa ≥ 10.0 miles ≥ 17 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.
		creates enough flow to generate a measurable pressure differential relative to atmospheric.			OR Time since last complete test if normalized result or EWMA is failing	≥ 10 hours		
					Estimated ambient temperature at end of drive	0 °C ≤ Temperature ≤ 34 °C		
					Estimate of Ambient Air Temperature Valid			
			When EWMA is	> 0.65 (EWMA Fail Threshold)	**Conditions for Estimate of Ambient Air Temperature to be valid:**			
			, the DTC light is illuminated.					
		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	The DTC light can be turned off if the EWMA is	≤ 0.35 (EWMA Re-Pass Threshold)	**1. Cold Start** Startup delta deg C (ECT-IAT)	≤ 8 °C		
					OR **2. Short Soak and Previous EAT Valid**			
			and stays below the EWMA fail threshold for 2 additional consecutive trips.		Previous time since engine off	≤ 7200 seconds		
					OR **3. Not a Cold Start and Previous EAT Valid and between Short and Long Soak**			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		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.			Previous time since engine off AND Must expire Estimate of Ambient Temperature Valid Conditioning Time. **"P0442: Estimate of Ambient Temperature Valid Conditioning Time" in Supporting Tables Tab.** OR **4. Not a Cold Start and Previous EAT Not Valid and less than Long Soak** Previous time since engine off 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.**	7200 seconds < Time < 25200 seconds Vehicle Speed ≥ 19.9 mph AND Mass Air Flow ≥ 0 g/sec < 25200 seconds Vehicle Speed ≥ 19.9 mph AND Mass Air Flow ≥ 0 g/sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					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 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.	< -5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					OR **4. Vacuum Out of Range and No Refueling** See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for information on fuel level refueling. OR **5. 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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					OR **7. Key up during EONV test** No active DTCs:	 FuelLevelDataFault MAF_SensorFA ECT_Sensor_FA IAT_SensorFA VehicleSpeedSensor_FA IgnitionOffTimeValid AmbientAirDefault P0443 P0446 P0449 P0452 P0453 P0455 P0496		
Evaporative Emission (EVAP) Canister Purge Solenoid Valve Circuit (ODM)	P0443	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		PT Relay Voltage	11 volts ≤ Voltage ≤ 32 volts	20 failures out of 25 samples 250 ms / sample Continuous with solenoid operation	2 trips Type B
Evaporative Emission (EVAP) Vent System Performance	P0446	This DTC will determine if a restriction is present in the vent solenoid, vent filler, vent hose or EVAP canister. This test runs with normal purge and vent valve is open.	Vent Restriction Prep Test: Vented Vacuum OR Vented Vacuum for 60 seconds Vent Restriction Test:	 < -623 Pa > 1245 Pa	Fuel Level System Voltage Startup IAT Startup ECT BARO No active DTCs:	10% ≤ Percent ≤ 90% 11 volts ≤ Voltage ≤ 32 volts 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C ≥ 70 kPa MAP_SensorFA TPS_FA	Once per Cold Start Time is dependent on driving conditions	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Tank Vacuum for 5 seconds BEFORE Purge Volume After setting the DTC for the first time, 2 liters of fuel must be consumed before setting the DTC for the second time.	> 2989 Pa ≥ 10 liters		VehicleSpeedSensor_FA IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454	Maximum time before test abort is 1000 seconds	
Evaporative Emission (EVAP) Vent Solenoid Control Circuit (ODM)	P0449	This DTC checks the circuit for electrical integrity during operation. If the P0449 is active, an intrusive test is performed with the vent solenoid commanded closed for 15 seconds.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Run/Crank voltage goes to 0 volts at key off	11 volts ≤ Voltage ≤ 32 volts	20 failures out of 25 samples 250 ms / sample Continuous with solenoid operation	2 trips Type B
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)	0.2 volts	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.	1 trip Type A EWMA Average run length: 6

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Lower voltage threshold (voltage subtraction below the nominal voltage)	0.2 volts				Run length is 2 trips after code clear or non-volatile reset
			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).				The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete.	
			When EWMA is	> 0.73 (EWMA Fail Threshold)				
			, the DTC light is illuminated. The DTC light can be turned off if the EWMA is	≤ 0.40 (EWMA Re-Pass Threshold)				
			and stays below the EWMA fail threshold for 2 additional consecutive 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 Low Voltage	P0452	This DTC will detect a fuel tank pressure sensor signal that is too low out of range.	Fuel tank pressure sensor signal The normal operating range of the fuel tank pressure sensor is 0.5 volts (~1245 Pa) to 4.5 volts (~ -3736 Pa).	< 0.15 volts (3 % of Vref or ~ 1681 Pa)	Time delay after sensor power up for sensor warm-up ECM State ≠ crank Stops 6.0 seconds after key-off	is 0.10 seconds	80 failures out of 100 samples 100 ms / sample Continuous	2 trips Type B
Fuel Tank Pressure (FTP) Sensor Circuit High Voltage	P0453	This DTC will detect a fuel tank pressure sensor signal that is too high out of range.	Fuel tank pressure sensor signal The normal operating range of the fuel tank pressure sensor is 0.5 volts (~1245 Pa) to 4.5 volts (~ -3736 Pa).	> 4.85 volts (97% of Vref or ~ -4172 Pa)	Time delay after sensor power up for sensor warm-up ECM State ≠ crank Stops 6.0 seconds after key-off	is 0.10 seconds	80 failures out of 100 samples 100 ms / sample Continuous	2 trips Type B
Fuel Tank Pressure (FTP) Sensor Circuit Intermittent	P0454	This DTC will detect intermittent tank vacuum sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event.	If an abrupt change in tank vacuum is detected the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that a refueling event occurred. If a refueling is confirmed, then the test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem.		This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period. The length of the test is determined by the refueling rationality test, which can take	1 trips Type A

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
							up to 600 seconds to complete.	
			An abrupt change is defined as a change in vacuum: in the span of 1.0 seconds. But in 12.5 msec. A refueling event is confirmed if the fuel level has a persistent change for 30 seconds.	>112 Pa < 249 Pa of 10 %			The test will report a failure if 2 out of 3 samples are failures. 12.5 ms / sample Continuous when vent solenoid is closed.	
Evaporative Emission (EVAP) System Large Leak Detected	P0455	This DTC will detect a weak vacuum condition (large leak or purge blockage) in the EVAP system. Purge valve is controlled (to allow purge flow) and vent valve is commanded closed.	Purge volume BEFORE Tank vacuum 2 liters of fuel must be consumed after setting the DTC active the first time to set the DTC active the second time. <u>Weak Vacuum Follow-up Test</u> (fuel cap replacement test) Weak Vacuum Test failed. Passes if tank vacuum	> 30 liters ≤ 1993 Pa ≥ 1993 Pa	Fuel Level System Voltage BARO No active DTCs: P0443 P0449 P0452 P0453	10% ≤ Percent ≤ 90% 11 volts ≤ Voltage ≤ 32 volts ≥ 70 kPa MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited	Once per cold start Time is dependent on driving conditions Maximum time before test abort 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.
			Note: Weak Vacuum Follow-up Test can only report a pass.		<u>Cold Start Test</u> If ECT > IAT, Startup temperature delta (ECT-IAT): Cold Test Timer Startup IAT Temperature Startup ECT <u>Weak Vacuum Follow-up Test</u> This test can run following a weak vacuum failure or on a hot restart.	P0454 ≤ 8 °C ≤ 1000 seconds 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C	<u>Weak Vacuum Follow-up Test</u> With large leak detected, the follow-up test is limited to 1300 seconds. Once the MIL is on, the follow-up test runs indefinitely.	
Fuel Level Sensor 1 Performance	P0461	This DTC will detect a fuel sender stuck in range in the primary fuel tank.	Delta Fuel Volume change over an accumulated 203 miles.	< 3 liters	Engine Running No active DTCs:	 VehicleSpeedSensor_FA	250 ms / sample Continuous	2 trips Type B
Fuel Level Sensor 1 Circuit Low Voltage	P0462	This DTC will detect a fuel sender stuck out of range low in the primary fuel tank.	Fuel level Sender % of 5V range	< 10 %	Run/Crank Voltage Run/Crank voltage goes to 0 volts at key off	11 volts ≤ Voltage ≤ 32 volts	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 Run/Crank voltage goes to 0 volts at key off	11 volts ≤ Voltage ≤ 32 volts	180 failures out of 225 samples 100 ms / sample Continuous	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Fuel Level Sensor 1 Circuit Intermittent	P0464	This DTC will detect intermittent fuel level sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event.	If a change in fuel level is detected, the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that an actual refueling event occurred. If a refueling event is confirmed, then the test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem.		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 trips Type A
							The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete.	
			An intermintant change in fuel level is defined as:				The test will report a failure if 2 out of 3 samples are failures.	
			The fuel level changes	by 10 %				
			and does not remain	> 10 %				
			for 30 seconds during a 600 second refueling rationality test.				100 ms / sample	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
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 ≤ 32 volts ≥ 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous with fan operation	2 trips Type B
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 ≤ 32 volts ≥ 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous with fan operation	2 trips Type B
Evaporative Emission (EVAP) System Flow During Non-Purge	P0496	This DTC will determine if the purge solenoid is leaking to engine manifold vacuum. This test will run with the purge valve closed and the vent valve closed.	Tank Vacuum for 5 seconds BEFORE Test time	> 2491 Pa ≥ refer to "P0496: Purge Valve Leak Test Engine Vacuum Test Time (Cold Start) as a Function of Fuel Level table" in Supporting Tables Tab.	Fuel Level System Voltage BARO Startup IAT Temperature Startup ECT Engine Off Time No active DTCs:	10% ≤ Percent ≤ 90% 11 volts ≤ Voltage ≤ 32 volts ≥ 70 kPa 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C ≥ 28800.0 seconds MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault	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.
						EnginePowerLimited P0443 P0449 P0452 P0453 P0454		
Low Engine Speed Idle system	P0506	This DTC will determine if a low idle exists	Filtered Engine Speed Error filter coefficient	< 76.00 rpm 0.00175	Baro Coolant Temp Engine run time Ignition voltage Time since gear change Time since a TCC mode change IAT Vehicle speed Commanded RPM delta Idle time No active DTCs	 > 70 kPa > 60 °C ≥ 60 sec 32 ≥ volts ≥ 11 ≥ 3 sec > 3 sec > -20 °C ≤ 2 mph ≤ 25 rpm > 5 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 IAT_SensorCircuitFA EvapFlowDuringNonPurge_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA FuelInjectorCircuit_FA MAF_SensorFA EngineMisfireDetected_FA IgnitionOutputDriver_FA EnginePowerLimited TPS_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.
						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	> -152.00 rpm 0.00175	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 32 ≥ volts ≥ 11 ≥ 3 sec > 3 sec > -20 °C ≤ 2 mph ≤ 25 rpm > 5 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 IAT_SensorCircuitFA EvapFlowDuringNonPurge_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA FuelInjectorCircuit_FA MAF_SensorFA EngineMisfireDetected_FA IgnitionOutputDriver_FA EnginePowerLimited TPS_FA TPS_Performance_FA VehicleSpeedSensor_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.
						FuelLevelDataFault LowFuelConditionDiagnostic ClchPstnEmisFA ClchToT_TypedABC		
System Voltage Low	P0562	This DTC determines if the current system voltage is below the minimum required voltage for proper ECM operation.	System voltage	≤ 9 volts	Ignition is “ON” Engine Speed	 ≥ 400 RPM	5 failures out of 6 samples 1 second / sample Continuous	1 trip Type C
System Voltage High	P0563	This DTC determines if the current system voltage is above the maximum allowed voltage for proper ECM operation.	System voltage	≥ 18 volts	Ignition is “ON”		5 failures out of 6 samples 1 second / sample Continuous	1 trip Type C
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 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.	Type A 1 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
							Diagnostic reports a fault if 5 failures occur after the first pass is complete.	
Control Module Not Programmed	P0602	This DTC will be stored if the PCM is a service PCM that has not been programmed.	Output state invalid		PCM State	= crank or run	Diagnostic runs at powerup	Type A 1 trips
						PCM is identified through calibration as a Service PCM		
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up does not match checksum at power-down				Diagnostic runs at powerup	Type A 1 trips
							Diagnostic reports a fault if 1 failure occurs	
ECM RAM Failure	P0604	Indicates that the ECM 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:
			2. Secondary processor battery backed RAM failed checksum twice for original values at power up and the defaulted values				2. Completion at intilization, <500 ms	A
			3. Secondary processor copy of calibration area to RAM failed for a count >	2counts			3. Completion at intilization, <500 ms	MIL:

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			4. Secondary Processor data pattern written doesn't match the pattern read consecutive times				4. Will finish within 30 seconds at all engine conditions.	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
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	0.00%		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	
			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	1000.00%				
			Secondary processor detects Primary's calculated throttle position is greater > than Secondary's calculated Throttle Position when reduce engine power is active by	4462.00%				

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.	0.0625sec continuous		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	2. 0.0625sec continuous	
			Software tasks on the Primary Processor in the 25 ms loop were not executed or were not executed in the correct order.	0.1250sec continuous			0.1250sec continuous	
			Software tasks on the Primary Processor in the 50 ms loop were not executed or were not executed in the correct order.	0.2500sec continuous			0.2500sec continuous	
			Software tasks on the Primary Processor in the 100 ms loop were not executed or were not executed in the correct order.	0.5000sec continuous			0.5000sec continuous	
			Software tasks on the Primary Processor in the 250 ms loop were not executed or were not executed in the correct order.	1.2500sec continuous			1.2500sec continuous	
			The first completion of the RAM diagnostic on the Primary Processor was completed > the amount of time	360.0000sec continuous			360.0000sec continuous	
			The first completion of the ROM diagnostic on the Primary Processor was completed > the amount of time	360.0000sec continuous			360.0000sec continuous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			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 recieved by the Primary Processor Loss or invalid message of SPI communication from the Primary Processor at initialization detected by the Secondary Processor or loss or invalid message of SPI communication from the Primary Processor after a valid message was recieved by the Secondary Processor			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	In the primary processor, 159/400 counts intermittent or 15 counts continuous; 39 counts continuous @ initialization In the secondary processor 0.4750sec at initialization, 0.1750sec continuous or 20/200 intermittent.	
4. Processor Performance Check - Secondary Processor state of health (Main)			Primary processor check of the secondary processor by verifing the hardware line toggle between the two processors toggles within the threshold values	9.3750sec and 15.6250sec		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	

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
12. Processor Performance Check - Secondary Processor MAIN Processor Fault			Secondary processor check that the Primary processor hasen't set a select combination of internal processor faults			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	12.5ms continuous	
13. Processor Performance Check - Primary Processor ALU Fault			The primary processor check of the ALU failed to compute the expected result	Two Consecutive Times			12.5ms continuous	
14. Processor Performance Check - Primary Processor Register Configuration Fault			Primary processor failed configuration check of the registers.				12.5ms continuous	
Main & MHC state of health fault	P0607	Primary state of health (SOH) discrete line is not toggling between the two processors for a time >	0.4875sec			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	0.4875sec continuous	Type: C MIL: NO Trips: 1
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	Consecutive checks within 200ms or 2/2 counts; 175msec/count	Type: A

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 No Pedal related errors or diagnostic faults. Diagnostic is enabled (Only applicable for Legacy accelerator pedals)		MIL: YES Trips: 1
			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 Primary processor Pedal Sync Error is FALSE	44/40 counts or 39 counts continuous; 12.5 msec/count in the Secondary processor	
			3. Sensor Switch Enable Fault - The Secondary monitors the Primary Processor shorting the APP sensor to ground to test for shorts in the pedal position sensors. The secondary monitors the state of switch setting the fault if the switch does not occur after the diagnostic time.			3 .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 Diagnostic is enabled (Only applicable for Legacy accelerator pedals)	409.5938sec continuous, If the time required is equal to 409.5938sec, then #3 is not used.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Control Module EEPROM Error	P062F	Indicates that the NVM Error flag has not been cleared	Last EEPROM write did not complete		Ignition State	= unlock/accesory, run, or crank	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 th 5 volt reference circuit #1	Primary Processor Vref1 < Primary Processor Vref1 >	4.875 5.125		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
			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
Air Conditioning Clutch Relay Control Circuit	P0645	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 ≤ 32 volts ≥ 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous	1 trip Type C
Malfunction Indicator Lamp (MIL) Control Circuit (ODM)	P0650	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Remote Vehicle Start is not active	11 volts ≤ Voltage ≤ 32 volts	20 failures out of 25 samples 250 ms / sample Continuous	2 trip Type B NO MIL

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
5 Volt Reference #2 Circuit	P0651	Detects a continuous or intermittent short on th 5 volt reference circuit #2	Primary Processor Vref2 < or Primary Processor Vref2 >	4.875 5.125		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
			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 ≤ 32 volts	8 failures out of 10 samples 250 ms / sample Continuous	2 trips Type B
Powertrain Relay Feedback Circuit High	P0690	This DTC is a check to determine if the Powertrain relay is functioning properly.	PT Relay feedback voltage is Stuck Test: PT Relay feedback voltage is when commanded 'OFF'	≥ 18 volts > 2 volts	Powertrain relay commanded "ON" No active DTCs:	PowertrainRelayStateOn_Error	5 failures out of 6 samples 1second / sample Stuck Test: 100 ms/ sample Continous failures ≥ 2 seconds	2 trips Type B
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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Traction Control Torque Request Circuit	P0856	Determines if torque request from the EBTCM is valid	**With GMLAN:**		**With GMLAN:**		**With GMLAN:**	1 trip(s) Type C
			Serial Communication 2's complement message - ($140 for PPEI2 or $1C7/$1C9 for PPEI3 engine torque or $1CA for PPEI3 axle torque)		Serial communication to EBTCM (U0108)	No loss of communication	Count of 2's complement values not equal >= 20	
					Power Mode Engine Running	= Run = True		
				Message <> 2's complement of message				
			OR		Status of traction in GMLAN message ($380 for PPEI2 or $4E9 for PPEI3)		**OR**	
			Serial Communication message ($140 for PPEI2 or $1C7/$1C9 for PPEI3 engine torque or $1CA for PPEI3 axle torque) rolling count value	Message rolling count value <> previous message rolling count value plus one		= Traction Present	10 rolling count failures out of 10 samples	
			OR					
			Too many minimum limit torque request transitions occur from TRUE to FALSE to TRUE within a time period	Requested torque intervention type toggles from not increasing request to increasing request			>= 3 multi-transitions out of 5 samples	
			Torque request greater than allowed	> 250 Nm for engine based traction torque system, > 4000 Nm for axle based traction torque system			>= 4 out of 10 samples Performed every 12.5 msec	
							Performed every 25 msec	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Inlet Airflow System Performance	P1101	Determines if there are multiple air induction problems affecting airflow and/or manifold pressure.	Filtered Throttle Model	<= 250 kPa*(g/s)	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp	>= 400 RPM <= 6350 RPM > 70 Deg C < 125 Deg C > -20 Deg C < 125 Deg C	Continuous Calculation are performed every 12.5 msec	Type B 2 trips
			AND (ABS(Measured Flow – Modeled Air Flow) Filtered	> 15 grams/sec	Minimum total weight factor (all factors multiplied together)			
			OR ABS(Measured MAP – MAP Model 1) Filtered	> 25.0 kPa)		>= 0.50		
			AND ABS(Measured MAP – MAP Model 2) Filtered	> 20.0 kPa		Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Estimate MAP Model 1 multiplied by MAP1 Residual Weight Factor based on RPM 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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						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. OR If Slope Time L/R or R/L Switches are below the threshold.	H/C L/R switches < Threshold, or H/C R/L switches < Threshold, (refer to table named "P1133 - O2S HC L to R Switches Limit Bank 1 Sensor 1" Pass/Fail Threshold table & "P1133 - O2S HC R to L Switches Limit Bank 1 Sensor 1" Pass/Fail Threshold table in Supporting tables tab) OR S/T L/R switches < 5, or S/T R/L switches < 5	No Active DTC's Bank 1 Sensor 1 DTC's not active System Voltage EGR Device Control	TPS_ThrottleAuthority Defaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoid Circuit_FA EvapFlowDuringNon Purge_FA EvapVentSolenoid Circuit_FA EvapSmallLeak_FA EvapEmission System_FA FuelTankPressureSnsr Ckt_FA FuelInjectorCircuit_FA AIR System FA EthanolComposition Sensor_FA EngineMisfire Detected_FA = P0131, P0132 or P013 10.0 volts < system voltage< 32.0 volts = Not active	Sample time is 60 seconds Frequency: Once per trip <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 cycle for the test to run on that ignition cycle). Note: This feature is only	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Idle Device Control	= Not active	enabled when the vehicle is new and cannot be enabled in service	
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Green O2S Condition	= Not Valid		
					O2 Heater on for	>= 40 seconds		
					Learned Htr resistance	= Valid		
					Engine Coolant	> 70 ºC		
					IAT	> -40 ºC		
					Engine Run Time	> 120 seconds		
					Time since any AFM status change	> 2.0 seconds		
					Time since Purge On to Off change	> 0.0 seconds		
					Time since Purge Off to On change	> 1.5 seconds		
					Purge duty cycle	>= 0 % duty cycle		
					Engine airflow	15 gps <= engine airflow <= 35 gps		
					Engine speed	1000 <= RPM <= 3500		
					Fuel	< 87 % Ethanol		
					Baro	> 70 kpa		
					Throttle Position	>= 4 %		
					Low Fuel Condition Diag	= False		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					LTM fuel cell	= Enabled		
					Transient Fuel Mass	<= 100.0 mgrams		
					Baro	= Not Defaulted		
					Fuel Control State	not = Power Enrichment		
					Fuel State	DFCO not active		
					Commanded Proportional Gain	>= 0.0 %		
					All of the above met for Time	> 3.0 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Air Fuel Imbalance Bank 1	P1174	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	> 1.000	System Voltage	*10 < Volts < 32 for > 4 seconds*	Frequency: Continuous Monitoring of O2 voltage signal in 12.5ms loop	Type B 2 Trip(s)
					Engine Run Time	> 50 seconds	AFIM Filtered Length Ratio variable is updated after every 3 seconds of valid data.	
					ECT	> -20 oC		
					Engine speed	*500 < rpm < 4000*		
					Mass Airflow	*5 < g/s < 600*		
					PerCent Ethanol	< 87 %		
					Delta O2 voltage during previous 12.5ms	> 5mv and -5mv		
					O2 sensor switches	> 0 times during current 3 second sample period		
					Quality Factor	> 0 in the current operating region		
					For DoD equipped vehicles only	No DoD state change during current 3 second sample period.		
					The AFIM Filtered Length Ratio is determined by calculating the difference between the measured O2 voltage length (accumulated O2 voltage over a 3 second period) and an emissions-correlated threshold value, divided by the threshold value, and finally multiplied by a Quality Factor (the latter ranges between 0 and 1, based on robustness to false diagnosis in the current operating region). The resulting ratio is then filtered utilizing a first-order lag filter.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					The first report is delayed for 90 seconds to allow time for the AFIM Filtered Length Ratio variable to saturate. This minimizes the possibility of reporting a pass before a potential failure could be detected.			
					Closed Loop fueling enabled 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**		
					Intrusive Diagnostics	**Not Active**		
					Engine OverSpeed Protection	**Not Active**		
					Reduced Power Mode (ETC DTC)	**Not Active**		
					PTO	**Not Active**		
					Traction Control	**Not Active**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Cold Start Emissions Reduction System Fault	P1400	Model based test computes power from exhaust flow and thermal energy resulting from elevated idle speed and retarded spark advance. Detects if the cold start emission reduction system has failed resulting in the delivered power being out of range.	Average desired accumulated exhaust power - Average estimated accumulated exhaust power OR Average desired accumulated exhaust power - Average estimated accumulated exhaust power (EWMA filtered)	< -5.50 KJ/s (high RPM failure mode) > 0.60 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) <= 2.00 degrees of Spark** **Idle CLO is considered active if the desired RPM exceeds a base RPM value (function of coolant) plus an RPM offset. The amount of RPM offset to be considered catalyst light off is also a function of coolant temperature. Refer to "Supporting Tables" for details.**		Runs once per trip when the cold start emission reduction strategy is active Frequency: 100ms Loop Test completes after 14 seconds of accumulated qualified data.	Type A 1 Trip(s)
					Vehicle Speed	< 1.2 Mph		
					Throttle Position	< 1.00 percent		
					A change in throttle position (tip-in/tip-out) will initiate a delay in the calculation of the average qualified residual value. When the delay timer > 5.00 seconds the diagnostic will continue the calculation.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					For Manual Transmission vehicles, the clutch must be fully engaged. Clutch Pedal Position < 5.00 OR The clutch must be fully disengaged. Clutch Pedal Position > 5.00			
					General Enable			
					DTC's Not Set			
					MAF_SensorFA			
					MAP_SensorFA			
					IAT_SensorCircuitFA			
					IAT2_SensorCircuitFA			
					ECT_Sensor_FA			
					CrankSensorFaultActive			
					IAC_SystemRPM_FA			
					TPS_FA			
					VehicleSpeedSensor_FA			
					EngineMisfireDetected_FA			
					IgnitionOutputDriver_FA			
					ControllerProcessorPerf_FA			
					5VoltReferenceA_FA			
					5VoltReferenceB_FA			
					FuelInjectorCircuit_FA			
					Clutch Sensor FA			
Transmission Engine Speed Request Circuit	P150C	Determines if engine speed request from the TCM is valid	Serial Communication rolling count value	+ 1 from previous $19D message D2306(PTEI3)	Diagnostic enable bit	1	Diagnostic runs in 25 ms loop	2 trips Type B
			Transmission engine speed protection	not equal to 2's complement of transmission engine speed request + Transmission alive rolling count	Engine run time	0.5		
					# of Protect Errors	10		
					# of Alive Rolling Errors	6		
					No idle diagnostic 506/507 code	IAC_SystemRPM_FA		
					No Serial communication loss to TCM	(U0101)		
					Engine Running	= TRUE		
					Power mode	Run Crank Active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Throttle Actuator Control - Position Performance	P1516	1) Detect a throttle positioning error	The throttle model and actual Throttle position differ by >	10.001%.		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	0.1875sec in the Secondary processor	Type: A
			or The throttle model and actual Throttle position differ by <	10.001%.				MIL: YES
					Engine Running or Ignition Voltage >	11.4		
					and Ignition Voltage >	5.4		Trips: 1
					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)			
		2) Detect throttle control is driving the throttle in the incorrect direction	Thottle Position >	45.120%.		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	
					(Throttle is being Controlled and TPS minimum learn is active) or Reduce Engine Power is Active			

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 >	11.4	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)			
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:
					Powertrain commanded on and			A
					Run/crank voltage >	Table, f(IAT). See supporting tables		MIL:
					and Run/crank voltage >	5.5		YES
								Trips: 1
Control Module Throttle Actuator Position Performance	P2101	1) Detect a throttle positioning error	Difference between measured throttle position and modeled throttle position >	10.00%.		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:
					TPS minimum learn is not active and			A
					Throttle is being Controlled and			MIL:

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Difference between measured throttle position and modeled throttle position <	10.00%.	(Engine Running or Ignition Voltage > or Ignition Voltage >) Ignition voltage failure is false (P1682)	11 5.5		YES Trips: 1
		2) Detect throttle control is driving the throttle in the incorrect direction or exceed the reduced power limit	Thottle Position >	44.62%.	TPS minimum learn is active		2. 11counts; 12.5 msec/count in the primary processor	
			Thottle Position >	44.42%.	Reduced Power is True			
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				A
					No 5 V reference 2 error No 5 V reference 2 fault (P0651)			MIL: YES Trips: 1

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Accelerator Pedal Position (APP) Sensor 1 Lo	P2122	Detects a continuous or intermittent short or open in APP1 circuit on both processors or just the primary processor	1. Primary APP1 Voltage <	0.463		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
			2. Secondary APP1 Voltage <	0.463	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	MIL: YES Trips: 1
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
			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	MIL: YES Trips: 1

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Accelerator Pedal Position (APP) Sensor 2	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	Seondary APP2 Voltage < or Secondary APP2 Voltage >	0.325 2.6	No 5 V reference 1 error No 5 V reference 1 fault (P0641)	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
Accelerator Pedal Position (APP) Sensor 2 Lo	P2127	Detects a continuous or intermittent short or open in APP2 circuit on both processors or just the primary processor	1. Primary APP2 Voltage <	0.325		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	1. 19/39counts or 14counts continuous; 12.5 msec/count in the primary processor	Type: A MIL: YES Trips: 1
			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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Accelerator Pedal Position (APP) Sensor 2 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		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 error 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 >	7.266% offset at min. throttle position with it linearly increasing to 10% at max. throttle position	No TPS Sensor Faults No 5 V reference DTCs	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	79/159 counts or 58 counts continuous; 3.125 msec/count in the primary processor	Type: A MIL: YES Trips: 1
			On the Secondary processor, the difference between TPS1 displaced and TPS2 displaced >	7.27% offset at min. throttle position with it linearly increasing to 10% at max. throttle position				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			2. On the primary processor, the difference between (raw min TPS1) and (raw_min TPS2) >	4.999%.	No TPS Sensor Faults No 5 V reference DTCs	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	19/39 counts or 15 counts continuous; 12.5 msec/count in the secondary processor	
			On the secodary 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 >	10.001% 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
			On the secondary processor, the difference between APP 1 displaced and APP 2 displaced is >	10.00% offset at min. throttle position with it linearly increasing to 10% at max pedal position				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			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	Trips: 1
			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 minmum learn window after multiple attempts to learn the minimum.	During TPS min learn on the Primary processor, TPS Voltage >	17.200%.		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	2.0secs continuous	Type: A
			or During TPS min learn on the Secondary processor, TPS Voltage >	17.200%.	No TPS circuit errors No TPS circuit faults Ignition voltage failure is false (P1682) Minimum TPS learn active			MIL: YES Trips: 1
			and Number of learn attempts >	10 counts				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Throttle return to default	P2119	Throttle unable to return to default throttle position after de-energizing ETC motor.	TPS1 Voltage >	1.94		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	0.5000sec continuous	Type: C
			AND TPS2 Voltage > On the Primary processor	1.94	Throttle de-energized No TPS circuit faults PT Relay Voltage >	5.5		MIL: NO
			OR					Trips: 1
			TPS1 Voltage > AND TPS2 Voltage > On the Secondary processor	1.94 1.94				
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 < 740 mvolts AND 2) Accumulated air flow during stuck lean test > 60 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 EngineMisfire Detected_FA EthanolComposition Sensor_FA P013A, P013B, P013E, P013F, P2270 or P2271 10.0 volts < system voltage< 32.0 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	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Green O2S Condition	= Not Valid	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	
					Low Fuel Condition Diag	= False		
					Engine Speed to enable test	1250 <= RPM <= 2300		
					Engine Speed to disable test	1100 <= RPM <= 2450		
					Engine Airflow	3 gps <= Airflow <= 12 gps		
					Vehicle Speed to enable test	34.2 mph <= Veh Speed <= 74.6 mph		
					Vehicle Speed to disable test	31.7 mph <= Veh Speed <= 79.5 mph		
					Closed loop integral	0.90 <= C/L Int <= 1.07		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					Power Take Off	= not active		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater on Time	>= 120.0 sec		
					Predicted Catalyst temp	600 ºC <= Cat Temp <= 900 ºC		
					Fuel State	= DFCO possible		
					All of the above met for at least 1.0 seconds, and then the Force Cat Rich intrusive stage is requested.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
O2 Sensor Signal Stuck Rich Bank 1 Sensor 2	P2271	This DTC determines if the post catalyst O2 sensor is stuck in a normal rich voltage range and thereby can no longer be used for post oxygen sensor fuel control or for catalyst monitoring. The diagnostic is an intrusive test which requests the DFCO mode to achieve the required lean threshold.	Post O2 sensor 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 > 22 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 Engine Airflow Vehicle Speed Closed loop integral Closed Loop Active Evap Ethanol Post fuel cell Power Take Off EGR Intrusive diagnostic All post sensor heater delays	TPS_ThrottleAuthority Defaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfire Detected_FA EthanolComposition Sensor_FA P013A, P013B, P013E, P013F or P2270 10.0 volts < system voltage< 32.0 volts = Valid = Not Valid = Not Valid = False 1250 <= RPM <= 2300 3 gps <= Airflow <= 12 gp 34.2 mph <= Veh Speed <= 74.6 mph 0.90 <= C/L Int <= 1.07 = TRUE not in control of purge not in estimate mode = enabled = not active = not active = not active	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	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					O2S Heater on Time	>= 120.0 sec	and cannot be enabled in service	
					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	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 > -11.0 deg C. > -11.0 deg C. < 60.0 deg C. > 3600.0 seconds > 10.0 OR < 32.0 Volts	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 AIRValveControl Circuit FA AIRPumpControl Circuit FA AIRSysPressSnsrB1 CktLoFA AIRSysPressSnsrB1 CktHiFA	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.
						ControllerProcessor Perf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA		
Secondary AIR System Pressure Sensor Performance Bank 1	P2431	This DTC detects a skewed pressure sensor signal via a comparison of the AIR pressure sensor signal and estimated BARO, as well as an evaluation of the quality of the comparison.	Difference between AIR pressure sensor and BARO (Pump Commanded Off)	> 14.0 kPa < -10.0 kPa	BARO Inlet Air Temp Coolant Temp	> 60 kPa > -11.0 deg C. > -11.0 deg C. < 60.0 deg C.	Skewed sensor cumulative test weight > 5.0 seconds	2 trip(s) Type B
			OR		Engine off time	> 3600.0 seconds		
			Difference between AIR pressure sensor and BARO (Pump Commanded On)		System Voltage	> 10.0 OR < 32.0 Volts	Continuous 6.25ms loop	
				> 50.0 kPa	**Skewed sensor cumulatative test weight is based <u>on distance from the last Baro update</u>** **Baro Skewed Sensor Weight Factor**			
				disable conditions:	MAP Engine Speed MAF	< 20 kPa for 2 seconds > 5000 RPM > 50 gm/s for 3 seconds		
					No active DTCs:	Transfer Case not in 4WD Low AIRValveControlCircuit FA AIRPumpControlCircuit FA AIRSysPressSnsrB1 CktLoFA AIRSysPressSnsrB1 CktHiFA MAF_SensorFA ControllerProcessorPerf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Secondary AIR System Pressure Sensor Circuit Low Voltage Bank 1	P2432	This DTC detects an out of range low AIR pressure sensor signal	AIR Pressure Sensor signal	< 5 % of 5Vref			800 failures out of 1000 samples	2 trip(s)
				disable conditions:	No active DTCs:	ControllerProcessor Perf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA	6.25 ms loop Continuous	Type B
Secondary AIR System Pressure Sensor Circuit Hi Voltage Bank 1	P2433	This DTC detects an out of range high AIR pressure sensor signal	AIR Pressure Sensor signal	> 94 % of 5Vref			800 failures out of 1000 samples	2 trip(s)
				disable conditions:	No active DTCs:	ControllerProcessor Perf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA	6.25 ms loop Continuous	Type B
Secondary AIR System Shut-off Valve Stuck Open Single Bank System	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 > -11.0 deg C. > -11.0 deg C. < 60.0 deg C. > 3600.0 seconds > 10.0 OR < 32.0 Volts > 0.5 seconds AIR diagnostic Phase 1 passed	Phase 2 Conditional test weight > 1.5 seconds	2 trip(s) Type B
					Conditional test weight is calculated by multiplying the following Factors **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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						AIRValveControlCircuit FA AIRPumpControlCircuit FA MAF_SensorFA MAP_SensorFA IAT_SensorFA ECT_Sensor_FA EngineMisfireDetected_FA CatalystSysEfficiencyLoB1_FA CatalystSysEfficiencyLoB2_FA ControllerProcessorPerf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA IgnitionOutputDriver_FA FuelInjectorCircuit_FA		
Secondary AIR System Pump Stuck On Single Bank System	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 > -11.0 deg C. > -11.0 deg C. < 60.0 deg C. > 3600.0 seconds > 10.0 OR < 32.0 Volts > 2.0 seconds AIR diagnostic Phase 1 passed AIR diagnostic Phase 2 passed	Phase 3 Cumlatative test weight > 2.0 seconds Frequency: Once per trip when AIR pump commanded On	1 trip(s) Type A
					Phase 3 cumulatative test weight is based on <u>distance from the last Baro update</u> 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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						MAP_SensorFA IAT_SensorFA ECT_Sensor_FA EngineMisfireDetected_FA CatalystSysEfficiencyLoB1_FA CatalystSysEfficiencyLoB2_FA 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	Enabled = Run	>= 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 <>	Engine Running Run/Crank Active	= True > 0.50 Sec	>= 3 RAM errors during key cycle	
			OR					
			Range Error - TCM Requested Torque Increase message $199	> 8192 Nm			>= 3 out of 10 samples	
			OR					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			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	
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
O2Sensor Circuit Range/ Performance Bank 1 Sensor 1	P2A00	This DTC determines if the O2 sensor voltage is not meeting the voltage criteria to enable closed loop fueling.	Closed Loop O2S ready flag A) O2S signal must be 1) O2S signal OR 2) O2S signal To set Closed Loop ready flag	= False > 550 mvolts < 350 mvolts = True	No Active DTC's System Voltage	TPS_ThrottleAuthority Defaulted MAP_SensorFA ECT_Sensor_FA FuelInjectorCircuit_FA P0131, P0151 P0132, P0152 10.0 volts < system voltage< 32.0 volts	200 failures out of 250 samples. Frequency: Continuous 100ms loop	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Closed Loop O2S ready flag	= True	Engine Speed	500 RPM <= Engine speed <= 3400 RPM		
			B) Once set to ready O2S cannot be		Engine Airflow	3.2 gps <= Engine Airflow<= 30.0 gps		
			1) O2S signal	> 350 mvolts	Engine Coolant	>= 70.0 ºC		
			AND 2) O2S signal	< 550 mvolts	Engine Metal Overtemp Active	= False		
			for time	> 5.0 seconds	Converter Overtemp Active	= False		
			Then set Closed Loop ready flag	= False	Fuel State	DFCO not active		
					AFM Status	= All Cylinders active		
					Predicted Exhaust Temp (B1S1)	>= 0.0 ºC		
					Engine run time	> 100 seconds		
					Fuel Enrichment	= Not Active		
					All of the above met for Time	> 5 seconds		
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures out of these samples	≥ 5 counts ≥ 5 counts	CAN hardware is bus OFF for	≥ 0.0375 seconds	Diagnostic runs in 1000 ms loop	Type B 2 trips
Lost Communication With TCM	U0101	This DTC monitors for a loss of communication with the transmission control module	Message is not received from controller for this many counts out of these samples	12 counts 12 counts	Run/Crank Voltage Power mode is RUN Communication bus is not OFF or is typed as a C code Normal Communication is enabled Normal Transmit capability is TRUE The diagnostic system is not disabled The bus has been on for	11 volts ≤ Voltage ≤ 32 volts > 3.0000 seconds	The diagnostic runs in the 1000 ms loop	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					A message has been selected to monitor.			

The following codes apply to the LY7 engine application. These diagnostic do not apply to the cert pick.

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 2 Sensor A	P0018	Detects cam to crank misalignment by monitoring if cam sensor pulse for bank 2 sensor A occurs during the incorrect crank position	2 cam sensor pulses more than 0 crank degrees before or 0 crank degrees after nominal position in one cam revolution.		Engine Speed Crankshaft and camshaft position signals are synchronized Cam phaser is in "parked" position No Active DTCs: No Pending DTCs:	< 1200 P0335, P0336 P0345, P0346 5VoltReferenceA_FA 5VoltReferenceB_FA P0346	4 failures out of 5 samples if the engine is being assisted by the starter 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 2 Sensor B	P0019	Detects cam to crank misalignment by monitoring if cam sensor pulse for bank 2 sensor B occurs during the incorrect crank position	2 cam sensor pulses more than 0 crank degrees before or 0 crank degrees after nominal position in one cam revolution.		Engine Speed Crankshaft and camshaft position signals are synchronized Cam phaser is in "parked" position	< 1200	4 failures out of 5 samples if the engine is being assisted by the starter	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					No Active DTCs: No Pending DTCs:	P0335, P0336 P0390, P0391 5VoltReferenceA_FA 5VoltReferenceB_FA P0391	24 failures out of 30 samples if the engine is running without assistance from the starter One sample per cam rotation	
Intake Camshaft Actuator Solenoid Circuit – Bank 2	P0020	Detects a VVT system error by monitoring the circuit for electrical integrity	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		System supply voltage is within limits Output driver is commanded on, Ignition switch is in crank or run position	> 11 Volts, and < 32 Volts	90 failures out of 100 samples 250 ms /sample, continuous	Trips 2 B Type
Intake Camshaft System Performance – Bank 2	P0021	Detects a VVT system error by comparing the desired and actual cam positions when VVT is activated	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive	(Intake cam Bank 2)Cam Position Error > KtPHSD_phi_CamPosErrorLimIc2 Deg (see Supporting Table)	The following DTC's are NOT active: P0020 IntkCMP B2 Circuit P0345, P0346, Intake B2 Cam sensors P0335, P0336, Crank sensors P0016, P0017, P0018, P0019 Cam to crank rationality Engine is running VVT is enabled Desired camshaft position > 0 Power Take Off (PTO) not active	System Voltage > 11 Volts, and System Voltage < 32 Volts Desired cam position cannot vary more than 4.5 Cam Deg for at least KtPHSD_t_StablePositionTimeIc2 seconds (see Supporting Table)	100 failures out of 300 samples 100 ms /sample	Trips 2 B Type

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Exhaust Camshaft Actuator Solenoid Circuit – Bank 2	P0023	Detects a VVT system error by monitoring the circuit for electrical integrity	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		System supply voltage is within limits Output driver is commanded on, Ignition switch is in crank or run position	> 11 Volts, and < 32 Volts	90 failures out of 100 samples 250 ms /sample, continuous	Trips 2 B Type
Exhaust Camshaft System Performance – Bank 2	P0024	Detects a VVT system error by comparing the desired and actual cam positions when VVT is activated	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive	(Exhaust cam Bank 2)Cam Position Error > KtPHSD_phi_CamPosErrorLimEc2 Deg (see Supporting Table)	The following DTC's are NOT active: P0023 ExhCMP B2 Circuit P0390, P0391, Exh B2 Cam sensors P0335, P0336, Crank sensors P0016, P0017, P0018, P0019 Cam to crank rationality Engine is running VVT is enabled Desired camshaft position > 0 Power Take Off (PTO) not active	System Voltage > 11 Volts, and System Voltage < 32 Volts Desired cam position cannot vary more than 4.5 Cam Deg for at least KtPHSD_t_StablePositionTimeEc2 seconds (see Supporting Table) 100 ms /sample	100 failures out of 300 samples	Trips 2 B Type
O2S Heater Control Circuit Bank 2 Sensor 1	P0050	This DTC checks the Heater Output Driver circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit) or voltage high during driver closed state (indicates short to voltage).		Ign Switch position Ignition Voltage Engine Speed	= Crank or Run position 11.0 volts < Ign Voltage < 32.0 volts > 400 RPM	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
O2S Heater Control Circuit Bank 2 Sensor 2	P0056	This DTC checks the Heater Output Driver circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit) or voltage high during driver closed state (indicates short to voltage).		Ign Switch position Ignition Voltage Engine Speed	= Crank or Run position 11.0 volts < Ign Voltage < 32.0 volts > 400 RPM	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
HO2S Heater Resistance Bank 2 Sensor 1	P0059	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Learned Heater Resistance.	Calculated Heater Resistance < 3.1 ohms -OR- Calculated Heater Resistance > 9.3 ohms	No Active DTC's Coolant – IAT Coolant Temp Ignition Voltage Engine Soak Time Engine Run Time	ECT_Sensor_FA P2610 IAT_SensorFA < 8.0 ºC -30.0 ºC ≤ Coolant ≤ 45.0 ºC < 32.0 volts > 28800 seconds < 0.17 seconds	Once per valid cold start	2 trips Type B
HO2S Heater Resistance Bank 2 Sensor 2	P0060	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Learned Heater Resistance.	Calculated Heater Resistance < 3.1 ohms -OR- Calculated Heater Resistance > 9.3 ohms	No Active DTC's Coolant – IAT Coolant Temp Ignition Voltage Engine Soak Time Engine Run Time	ECT_Sensor_FA P2610 IAT_SensorFA < 8.0 ºC -30.0 ºC ≤ Coolant ≤ 45.0 ºC < 32.0 volts > 28800 seconds < 0.17 seconds	Once per valid cold start	2 trips Type B
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	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	1) B1S2 EWMA normalized integral value > 8.0 units OR 2) Accumulated air flow during slow rich to lean test > 74 grams (upper	No Active DTC's	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR	1 trips Type A EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		runs in a DFCO mode to achieve the required response.	(between the upper and lower voltage thresholds) is greater than the airflow threshold.	threshold is 450 mvolts and lower threshold is 150 mvolts)			NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	
						MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA		
					B2S2 Failed this key cycle	P013D, P014A, P014B, P2272 or P2273		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **Green Sensor Delay Criteria (B2S2)** in Supporting Tables tab.		
					Low Fuel Condition Diag	= False		
					Post fuel cell	= enabled		
					DTC's Passed	= P2270 (and P2272 (if applicable))		
					DTC's Passed	= P013E (and P014A (if applicable))		
					After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
O2 Sensor Slow Response Lean to Rich Bank 2 Sensor 2	P013D	This DTC determines if the post catalyst O2 sensor has Slow Response in a predefined Lean to Rich voltages range during Lean to Rich transition. The diagnostic is an intrusive test which increases the delivered A/F ratio to achieve the required rich threshold.	The EWMA of the Post O2 sensor normalized integral value is greater than the threshold. OR The Accumulated mass air flow monitored during the Slow Response Test (between the lower and upper voltage thresholds) is greater than the airflow threshold.	1) B1S2 EWMA normalized integral value > 8.0 units OR 2) Accumulated air flow during slow lean to rich test > 75 grams (lower threshold is 350 mvolts and upper threshold is 600 mvolts)	No Active DTC's	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	1 trips Type A EWMA
					B2S2 Failed this key cycle	P013C, P014A, P014B, P2272 or P2273		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **Green Sensor Delay Criteria (B2S2)** in Supporting Tables tab.		
					Low Fuel Condition Diag	= False		
					Post fuel cell	= enabled		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					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.			
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 > 33 grams.	No Active DTC's	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	2 trips Type B
					B2S2 Failed this key cycle	P013C, P013D, P014B, P2272 or P2273		

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< 32.0 volts		
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **Green Sensor Delay Criteria (B2S2)** in Supporting Tables tab.		
					Low Fuel Condition Diag	= False		
					Post fuel cell	= enabled		
					DTC's Passed	= P2270 and P2272 (if applicable)		
					After above conditions are met: DFCO mode is entered (wo driver initiated pedal input).			
O2 Sensor Delayed Response Lean to Rich Bank 2 Sensor 2	P014B	This DTC determines if the post catalyst O2 sensor has an initial delayed response to an A/F change from Lean to Rich. The diagnostic is an intrusive test which increases the delivered A/F ratio to achieve the required rich threshold.	Post O2 sensor cannot go above the threshold voltage. AND The Accumulated mass air flow monitored during the Delayed Response Test is greater than the threshold.	1) Post O2S signal < 350 mvolts AND 2) Accumulated air flow during lean to rich test > 110 grams.	No Active DTC's	TPS_ThrottleAuthorityDefaulted 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_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						EngineMisfireDetected_FA EthanolCompositionSensor_FA		
					B2S2 Failed this key cycle	P013C, P013D, P014A, P2272 or P2273		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **Green Sensor Delay Criteria (B2S2)** in Supporting Tables tab.		
					Low Fuel Condition Diag	= False		
					Post fuel cell	= enabled		
					DTC's Passed	= P2270 (and P2272 (if applicable))		
					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 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_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA	350 failures out of 435 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA		
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Equivalence Ratio	0.8799 ≤ equiv. ratio ≤ 1.0801		
					Throttle Position	2 % <= Throttle <= 45 %		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel Condition	Ethanol <= 87%		
					Fuel State	DFCO not active		
					All of the above met for			
					Time	> 3.0 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_ThrottleAuthorityDefaulted MAP_SensorFA MAF_SensorFA	100 failures out of 125 samples Frequency:	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
							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< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Equivalence Ratio	0.8799 ≤ equiv. ratio ≤ 1.0801		
					Throttle Position	2.5 % <= Throttle <= 45.0 %		
					Fuel Control State	= Closed Loop		
					Fuel Control State	not = Power Enrichment		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel State	DFCO not active		
					Fuel Condition	Ethanol <= 87%		
					All of the above met for			
					Time	> 3 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
O2S Slow Response Bank 2 Sensor 1	P0153	This DTC determines if the O2 sensor response time is degraded.	The average response time is caluclated over the test time, and compared to the threshold. Refer to **"P0153 - O2S Slow Response Bank 2 Sensor 1"** Pass/Fail Threshold table in the Supporting Tables tab.		No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA EthanolCompositionSensor_FA EngineMisfireDetected_FA	Sample time is 70 seconds Frequency: Once per trip	2 trips Type B
					Bank 2 Sensor 1 DTC's not active	= P0151, P0152 or P0154		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Green O2S Condition	= Not Valid, See definition of **Green Sensor Delay Criteria (B2S1)** in Supporting Tables tab.		
					O2 Heater on for	>= 40 seconds		
					Learned Htr resistance	= Valid		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Engine Coolant	> 65 ºC		
					IAT	> -40 ºC		
					Engine Run Time	> 60 seconds		
					Time since any AFM status change	> 0.0 seconds		
					Time since Purge On to Off change	> 4.0 seconds		
					Time since Purge Off to On change	> 4.0 seconds		
					Purge duty cycle	>= 0 % duty cycle		
					Engine airflow	15 gps <= engine airflow <= 43 gps		
					Engine speed	1000 <= RPM <= 2550		
					Fuel	< 87 % Ethanol		
					Baro	> 70 kpa		
					Throttle Position	>= 3 %		
					Low Fuel Condition Diag	= False		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					LTM fuel cell	= Enabled		
					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	> 2.5 seconds		
O2S Circuit Insufficient Activity Bank 2 Sensor 1	P0154	This DTC determines if the O2 sensor circuit is open.	Measure Oxygen Sensor Signal.	380 mvolts < Oxygen Sensor signal < 525 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted	350 failures out of 435 samples.	2 trips Type B
						MAF_SensorFA	Minimum of 0 delta TPS changes required to report fail.	
						EthanolCompositionSensor_FA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
							Delta TPS is incremented when the TPS % change >= 0.0 %	
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					AFM Status	= All Cylinders active	Frequency: Continuous	
					Heater Warm-up delay	= Complete		
					Predicted Exhaust Temp (by location)	= Wamed Up		
					Engine Run Time	> 124 seconds	100msec loop	
					Fuel	<= 87 % Ethanol		
O2S Heater Performance Bank 2 Sensor 1	P0155	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	Measured Heater Current.	Measured Heater current < 0.3 amps -OR- Measured Heater current > 3.1 amps	No Active DTC's	ECT_Sensor_FA	8 failures out of 10 samples	2 trips Type B
					System Voltage	10.0 volts < system voltage< 32.0 volts	Frequency: 2 tests per trip 30 seconds delay between tests and 1 second execution rate	
					Heater Warm-up delay	= Complete		
					B2S1 O2S Heater Duty Cycle	> zero		
					O2S Heater device control	= Not active		
					All of the above met for			
					Time	> 120 seconds		
O2S Circuit Low Voltage Bank 2 Sensor 2	P0157	This DTC determines if the O2 sensor circuit is shorted to low.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is < 50 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA	350 failures out of 435 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA		
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Equivalence Ratio	0.8799 ≤ equiv. ratio ≤ 1.0801		
					Throttle Position	2 % <= Throttle <= 45 %		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel Condition	Ethanol <= 87%		
					Fuel State	DFCO not active		
					All of the above met for			
					Time	> 3.0 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_ThrottleAuthorityDefaulted MAP_SensorFA MAF_SensorFA EvapPurgeSolenoidCircuit_FA	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA		
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Equivalence Ratio	0.8799 ≤ equiv. ratio ≤ 1.0801		
					Throttle Position	2.5 % <= Throttle <= 45.0 %		
					Fuel Control State	= Closed Loop		
					Fuel Control State	not = Power Enrichment		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel State	DFCO not active		
					Fuel Condition	Ethanol <= 87%		
					All of the above met for			
					Time	> 3 seconds		
O2S Circuit Insufficient Activity Bank 2 Sensor 2	P0160	This DTC determines if the O2 sensor circuit is open.	Measure Oxygen Sensor Signal.	380 mvolts < Oxygen Sensor signal < 525 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAF_SensorFA	590 failures out of 740 samples.	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
							Minimum of 6 delta TPS changes required to report fail. Delta TPS is incremented when the TPS % change >= 0.5 %	
						EthanolCompositionSensor_FA		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					AFM Status	= All Cylinders active		
					Heater Warm-up delay	= Complete	100msec loop	
					Predicted Exhaust Temp (by location)	= Wamed Up		
							Frequency: Once per trip for post sensors	
					Engine Run Time	> 124 seconds		
					Fuel	<= 87 % Ethanol		
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 > 3.1 amps	No Active DTC's	ECT_Sensor_FA	8 failures out of 10 samples	2 trips Type B
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					Heater Warm-up delay	= Complete	Frequency: 2 tests per trip 30 seconds delay between tests and 1 second execution rate	
					B2S2 O2S Heater Duty Cycle	> zero		
					O2S Heater device control	= Not active		
					All of the above met for			
					Time	> 120 seconds		
Fuel System Too Lean Bank 2	P0174	Determines if the fuel control system is in a lean condition, based on the filtered long-term fuel trim.	The filtered long-term fuel trim metric	>= **Long Term Trim Lean** Table	Engine speed	400 <rpm< 6600	Frequency: 100 ms Continuous Loop	2 Trip(s) Type B
					BARO	> 70 kPa		
					Coolant Temp	-20 <°C< 150		
					MAP	5 <kPa< 255		
					Inlet Air Temp	-20 <°C< 150		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					MAF Fuel Level	0.5 <g/s< 510.0 > 10 % or if fuel sender is faulty	Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during **89** % of the EPAIII drive cycle. This is also typical of real-world driving, however values will vary (higher or lower) based on the actual conditions present during the drive cycle.	
					Long Term Fuel Trim data accumulation:	> 45.0 seconds of data must accumulate on each trip, with at least 35.0 seconds of data in the current fuel trim cell before a pass or fail decision can be made.		
					fuel trim diagnosed during decels? Yes			
					Long-Term Fuel Trim Cell Usage			
					Sometimes, certain Long-Term Fuel Trim Cells are not utilized for control or diagnosis. **Please see "Supporting Tables" Tab for a list of cells utilized for diagnosis.**			
					Fuel Control Status			
					Closed Loop Long Term FT	Enabled Enabled **Please see "Closed Loop Enable Criteria" and "Long Term FT Enable Criteria" in Supporting Tables.**		
					Fuel Consumed	> 0.0 liters of fuel consumed after a fuel fill event ("Virtual Flex Fuel Sensor applications only)		
					EGR Flow Diag. Intrusive Test Not Active Catalyst Monitor Intrusive Test Not Active Post O2 Diag. Intrusive Test Not Active Device Control Not Active EVAP Diag. “tank pull down” Not Active			
					No active DTCs:			
					IAC_SystemRPM_FA MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					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 O2S_Bank_2_Sensor_1_FA			
Fuel System Too Rich Bank 2	P0175	Determines if the fuel control system is in a rich condition, based on the filtered long-term fuel trim metric. There are two methods to determine a Rich fault. They are Passive and Intrusive. The Intrusive test is described below:	**Passive Test:** The filtered Non-Purge Long Term Fuel Trim metric (a Passive Test decision cannot be made when Purge is enabled)	<= **Non Purge Rich Limit** Table		Secondary Parameters and Enable Conditions are identical to those for P0174, with the exception that fuel level is not considered.	Frequency: 100 ms Continuous Loop Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during 89% of the EPAIII drive cycle. This is also typical of real-world driving, however values will vary (higher or lower) based on the actual conditions present during the drive cycle.	2 Trip(s) Type B
			Intrusive Test: The filtered Purge Long Term Fuel Trim metric	<= **Purge Rich Limit** Table				
			AND					
			The filtered Non-Purge Long Term Fuel Trim metric	<= **Non Purge Rich Limit** Table for 3 out of 5 intrusive segments				
		Intrusive Test: When the filtered Purge Long Term fuel trim metric is <= **Purge Rich Limit** Table,	Segment Def'n: Segments can last up to 20 seconds and are separated by the lesser of 15 seconds of purge-on					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		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 filtered Non-Purge Long Term fuel trim metric. Performing intrusive tests too frequently may also affect EVAP and EPAIII emissions, and the execution frequency of other diagnostics.	time or enough time to purge 10 grams of vapor. A maximum of 5 completed segments or 20 attempts are allowed for each intrusive test. After an intrusive test report is completed, another intrusive test cannot occur for 300 seconds to allow sufficient time to purge excess vapors from the canister. During this period, fuel trim will pass if the filtered Purge-on Long Term fuel trim > Purge Rich Limit Table for at least 200 seconds, indicating that the canister has been purged.					
Injector 5	P0205	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	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 6	P0206	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips
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 Raw Signals	> 4.50 Volts ≤ 0.20 Volts	Engine Speed Cylinder Air Mass No Active DTC's Engine Speed Cylinder Air Mass No Active DTC's	≥ 450 RPM > 60 milligrams KS_Ckt_Perf_B1B2_FA ≥ 450 RPM > 60 milligrams KS_Ckt_Perf_B1B2_FA	50 Failures out of 63 Samples 100 msec rate	Type: A MIL: YES Trips: 1
Knock Sensor (KS) Circuit Bank 1 E67 controllers	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 Enginer Run Time No Active DTC's Power Take Off	= 1 ≥ 0 RPM ≥ -40 deg. C ≥ 2 seconds KS_Ckt_Perf_B1B2_FA = Not Active	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
Knock Sensor (KS) Circuit Bank 2 E67 controllers	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 Enginer Run Time No Active DTC's Power Take Off	= 1 ≥ 0 RPM ≥ -40 deg. C ≥ 2 seconds KS_Ckt_Perf_B1B2_FA = Not Active	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**	> 2.86 Volts	ECT Enginer Run Time	≥ -40 deg. C ≥ 2 seconds	50 Failures out of 63 Samples	Type: B MIL: YES

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
E67 controllers			Sensor Return Signal Line	< 1.48 Volts	Valid Oil Temp Required? If Yes: Engine Oil Temp and ValidOilTemp Model or No OilTempSensor DTC's If No: No Eng Oil Temp enable criteria	= 0 < 160 deg. C EngOilModeledTemp Valid EngOilTempSensor CircuitFA	100 msec rate	Trips: 2
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? If Yes: Engine Oil Temp and ValidOilTemp Model or No OilTempSensor DTC's If No: No Eng Oil Temp enable criteria	≥ -40 deg. C ≥ 2 seconds = 0 < 160 deg. C EngOilModeledTemp Valid EngOilTempSensor CircuitFA	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
Camshaft Position (CMP) Sensor Circuit Bank 2 Sensor A	P0345	Determines if a fault exists with the cam position bank 2 sensor A signal	Engine Cranking Camshaft Test: Time since last camshaft position sensor pulse received	>= 10.0 seconds	Engine Cranking Camshaft Test: Starter engaged AND (cam pulses being		Engine Cranking Camshaft Test: Continuous every 100 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			OR Time that starter has been engaged without a camshaft sensor pulse	>= 4.0 seconds	received OR (DTC P0101 AND DTC P0102 = FALSE AND DTC P0103 = FALSE AND Engine Air Flow	= FALSE = FALSE > 3.0 grams/second))		
			Time-Based Camshaft Test: Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Time-Based Camshaft Test: Engine is Running Starter is not engaged No DTC Active:	 5VoltReferenceA_FA	Time-Based Camshaft Test: Continuous every 100 msec	
			Fast Event-Based Camshaft Test: No camshaft pulses received during first 12 MEDRES events (There are 12 MEDRES events per engine cycle)		Fast Event-Based Camshaft Test: Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	 5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Fast Event-Based Camshaft Test: Continuous every MEDRES event	
			Slow Event-Based Camshaft Test:		Slow Event-Based Camshaft Test:		Slow Event-Based Camshaft Test:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			The number of camshaft pulses received during 100 engine cycles	= 0	Crankshaft is synchronized No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	
Camshaft Position (CMP) Sensor Performance Bank 2 Sensor A	P0346	Determines if a performance fault exists with the cam position bank 2 sensor A signal	Fast Event-Based Camshaft Test: The number of camshaft pulses received during first 12 MEDRES events is less than 4 or greater than 6 (There are 12 MEDRES events per engine cycle) Slow Event-Based Camshaft Test: The number of camshaft pulses received during 100 engine cycles OR	< 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 #5 CIRCUIT	P0355	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 5 (if applicable)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	> 6.00 Volts	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 #6 CIRCUIT	P0356	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 6 (if applicable)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	 > 6.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
Camshaft Position (CMP) Sensor Circuit Bank 2 Sensor B	P0390	Determines if a fault exists with the cam position bank 2 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 <u>Fast Event-Based Camshaft Test:</u> No camshaft pulses received during first 12 MEDRES events	 >= 10.0 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: <u>Fast Event-Based Camshaft Test:</u> Crankshaft is synchronized Starter must be	 = 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 <u>Fast Event-Based Camshaft Test:</u> 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.
			(There are 12 MEDRES events per engine cycle)		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		
			Slow Event-Based Camshaft Test: The number of camshaft pulses received during 100 engine cycles	= 0	Slow Event-Based Camshaft Test: Crankshaft is synchronized No DTC Active:	 5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Slow Event-Based Camshaft Test: 8 failures out of 10 samples Continuous every engine cycle	
Camshaft Position (CMP) Sensor Performance Bank 2 Sensor B	P0391	Determines if a performance fault exists with the cam position bank 2 sensor B signal	Fast Event-Based Camshaft Test: The number of camshaft pulses received during first 12 MEDRES events is less than 4 or greater than 6 (There are 12 MEDRES events per engine cycle)		Fast Event-Based Camshaft Test: Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	 5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Fast Event-Based Camshaft Test: Continuous every MEDRES event	Type B 2 trips
			Slow Event-Based Camshaft Test:		Slow Event-Based Camshaft Test:		Slow Event-Based Camshaft Test:	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			The number of camshaft pulses received during 100 engine cycles OR	< 398 > 402	Crankshaft is synchronized No DTC Active:	 5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	8 failures out of 10 samples Continuous every engine cycle	
Catalyst System Low Efficiency Bank 2	P0430	Oxygen Storage	Normalized Ratio OSC Value (EWMA filtered)	< 0.350	***Valid Idle Period Criteria***		1 test attempted per valid idle period Minimum of 1 test per trip Maximum of 6 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 %		
					Vehicle Speed	*< 1.24 MPH*		
					Engine speed	> 1000 RPM for a minimum of 10 seconds since end of last idle period.		
					Engine run time	≥ MinimumEngineRunTime, **This is a function of Coolant Temperture, 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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					RunCrank Voltage	> 10.90 Volts		
					Ethanol Estimation	NOT in Progress		
		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.			ECT	*50 < ° C < 127*		
					Barometric Pressure	> 70 KPA		
					Idle Time before going intrusive is	< 50 Seconds		
					Idle time is incremented if Vehicle speed	< 1.24 MPH 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 35 seconds with a closed throttle time < 60 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 35 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 **Please see "Closed Loop Enable Criteria" section of the "Supporting Tables" tab for details.**			
					PRNDL is in Drive Range on an Auto Transmission vehicle.			
					Idle Stable Criteria :: Must hold true from after Catalyst Idle Conditions Met to the end of test			
					MAF	*3.50 < g/s < 14.00*		
					Predicted catalyst temperature	< 750 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 > 0.450 and the current OSC Normalized Ratio value is < 0.250			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Maximum of 18 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 > 500 ° 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			
					AmbPresDfltdStatus			
					IAT_SensorCircuitFA			
					ECT_Sensor_FA			
					O2S_Bank_1_Sensor_1_FA			
					O2S_Bank_1_Sensor_2_FA			
					O2S_Bank_2_Sensor_1_FA			
					O2S_Bank_2_Sensor_2_FA			
					FuelTrimSystemB1_FA			
					FuelTrimSystemB2_FA			
					EngineMisfireDetected_FA			
					EvapPurgeSolenoidCircuit_FA			
					IAC_SystemRPM_FA			
					EGRValvePerformance_FA			
					EGRValveCircuit_FA			
					CamSensor_FA			
					CrankSensorFaultActive			
					TPS_Performance_FA			
					EnginePowerLimited			
					VehicleSpeedSensor_FA			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
O2S Insufficient Switching Bank 2 Sensor 1	P1153	This DTC determines if the O2 sensor is no longer sufficiently switching.	Fault condition present if Half Cycle L/R or R/L Switches are below the threshold. OR If Slope Time L/R or R/L Switches are below the threshold.	H/C L/R switches < Threshold, or H/C R/L switches < Threshold, (refer to table named "P1153 - O2S HC L to R Switches Limit Bank 2 Sensor 1" Pass/Fail Threshold table & "P1153 - O2S HC R to L Switches Limit Bank 2 Sensor 1" Pass/Fail Threshold table in Supporting tables tab) OR S/T L/R switches < 3, or S/T R/L switches < 3	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA EthanolCompositionSensor_FA EngineMisfireDetected_FA	Sample time is 70 seconds Frequency: Once per trip	2 trips Type B
					Bank 2 Sensor 1 DTC's not active	= P0151, P0152 or P0154		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Green O2S Condition	= Not Valid, See definition of **Green Sensor Delay Criteria (B2S1)** in Supporting Tables tab.		
					O2 Heater on for	>= 40 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Learned Htr resistance	= Valid		
					Engine Coolant	> 65 ºC		
					IAT	> -40 ºC		
					Engine Run Time	> 60 seconds		
					Time since any AFM status change	> 0.0 seconds		
					Time since Purge On to Off change	> 4.0 seconds		
					Time since Purge Off to On change	> 4.0 seconds		
					Purge duty cycle	>= 0 % duty cycle		
					Engine airflow	15 gps <= engine airflow <= 43 gps		
					Engine speed	1000 <= RPM <= 2550		
					Fuel	< 87 % Ethanol		
					Baro	> 70 kpa		
					Throttle Position	>= 3 %		
					Low Fuel Condition Diag	= False		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					LTM fuel cell	= Enabled		
					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	> 2.5 seconds		
Air Fuel Imbalance Bank 2	P1175	Determines if the air-fuel delivery system is imbalanced by monitoring the pre-catalyst O2 sensor voltage characteristics	The Bank 2 AFIM Filtered Length Ratio variable exceeds a value of	> 1.000	System Voltage	*10 < V < 32 for > 4 seconds*	Frequency: Continuous Monitoring of O2 voltage signal in 12.5ms loop	Type B 2 Trip(s)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Engine Run Time	> 50 seconds	AFIM Filtered Length Ratio variable is updated after every 3 seconds of valid data.	
					ECT	> 10 oC		
					Engine speed	*1250 < rpm < 3500*		
					Mass Airflow	*9 < g/s < 400*		
					PerCent Ethanol	< 87 %		
					Delta O2 voltage during previous 12.5ms	> 5mv and -5mv		
					O2 sensor switches	> 0 times during current 3 second sample period		
					Quality Factor	> 0 in the current operating region		
					For DoD equipped vehicles only	No DoD state change during current 3 second sample period.		
					The AFIM Filtered Length Ratio is determined by calculating the difference between the measured O2 voltage length (accumulated O2 voltage over a 3 second period) and an emissions-correlated threshold value, divided by the threshold value, and finally multiplied by a Quality Factor (the latter ranges between 0 and 1, based on robustness to false diagnosis in the current operating region). The resulting ratio is then filtered utilizing a first-order lag filter.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					The first report is delayed for 100 seconds to allow time for the AFIM Filtered Length Ratio variable to saturate. This minimizes the possibility of reporting a pass before a potential failure could be detected.			
					Closed Loop fueling enabled A Function of Coolant Temperature based on Start-up coolant temp. and a function of Time also based on Start-up coolant temp. **Please see "Supporting Tables" Tab**			
					Fuel System Status	***LONG FT Enabled***		
					Disable Conditions: **MIL not illuminated for DTC's**			
					EngineMisfireDetected_FA MAP_SensorFA MAF_SensorFA ECT_Sensor_FA Ethanol Composition Sensor FA TPS_ThrottleAuthorityDefaulted FuelInjectorCircuit_FA AIR System FA O2S_Bank_1_Sensor_1_FA O2S_Bank_2_Sensor_1_FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSensorCircuit_FA Device Control	**Not Active**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Intrusive Diagnostics	**Not Active**		
					Engine OverSpeed Protection	**Not Active**		
					Reduced Power Mode (ETC DTC)	**Not Active**		
					PTO	**Not Active**		
					Traction Control	**Not Active**		
EngineMetal OvertempActive	P1258	The objective of the algorithm is to protect the engine in the event of engine metal overtemperature, mainly due to loss of coolant	The ECM detects that the engine coolant has exceeded a threshold for certain amount of time.	Engine Coolant > 131°C for 2 seconds	If feature was active and it set the coolant sensor fault then feature will be enabled on coolant sensor fault pending on the next trip.	KeEMOG_b_DisableOvertempProtect = 0 Feature is enabled only if KeEMOG_b_DisableOvertempProtect = 0 and Engine Run time > 2	Time that EMOP active must be true for P1258 to be set is 0 seconds	Type A 1 trips
O2 Sensor Signal Stuck Lean Bank 2 Sensor	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 < 800 mvolts AND 2) Accumulated air flow during stuck lean test > 62 grams.	No Active DTC's	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	2 trips Type B
					B2S2 Failed this key cycle	P013C, P013D, P014A, P014B, P2272 or P2273		

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< 32.0 volts		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **Green Sensor Delay Criteria (B2S2)** in Supporting Tables tab.		
					Low Fuel Condition Diag	= False		
					Engine Speed to initially enable test	1225 <= RPM <= 2100		
					Engine Speed range to keep test enabled (after initially enabled)	1100 <= RPM <= 2225		
					Engine Airflow	4 gps <= Airflow <= 13 gps		
					Vehicle Speed to initially enable test	40.4 mph <= Veh Speed <= 77.7 mph		
					Vehicle Speed range to keep test enabled (after initially enabled)	37.3 mph <= Veh Speed <= 81.4 mph		
					Closed loop integral	0.82 <= C/L Int <= 1.07		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					Power Take Off	= not active		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater on Time	>= 180.0 sec		
					Predicted Catalyst temp	615 ºC <= Cat Temp <= 980 ºC		
					Fuel State	= DFCO possible		
					All of the above met for at least 2.5 seconds, and then the Force Cat Rich intrusive stage is requested.			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
O2 Sensor Signal Stuck Rich Bank 2 Sensor 2	P2273	This DTC determines if the post catalyst O2 sensor is stuck in a normal rich voltage range and thereby can no longer be used for post oxygen sensor fuel control or for catalyst monitoring. The diagnostic is an intrusive test which requests the DFCO mode to achieve the required lean threshold.	Post O2 sensor 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 > 36 grams.	No Active DTC's	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	2 trips Type B
					B2S2 Failed this key cycle	P013C, P013D, P014A, P014B or P2272		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **Green Sensor Delay Criteria (B2S2)** in Supporting Tables tab.		
					Low Fuel Condition Diag	= False		
					Engine Speed	1225 <= RPM <= 2100		
					Engine Airflow	4 gps <= Airflow <= 13 gps		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Vehicle Speed	40.4 mph <= Veh Speed <= 77.7 mph		
					Closed loop integral	0.82 <= C/L Int <= 1.07		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					Power Take Off	= not active		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater on Time	>= 180.0 sec		
					Predicted Catalyst temp	615 ºC <= Cat Temp <= 980 ºC		
					Fuel State	= DFCO possible		
					DTC's Passed	= P2270 (and P2272 (if applicable))		
					DTC's Passed	= P013E (and P014A (if applicable))		
					DTC's Passed	= P013A (and P013C (if applicable))		
					After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).			
O2Sensor Circuit Range/ Performance Bank 2 Sensor 1	P2A03	This DTC determines if the O2 sensor voltage is not meeting the voltage criteria to enable closed loop fueling.	Closed Loop O2S ready flag	= False	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA ECT_Sensor_FA FuelInjectorCircuit_FA	200 failures out of 250 samples.	2 trips Type B
			A) O2S signal must be 1) O2S signal	> 550 mvolts			Frequency: Continuous	
			OR 2) O2S signal	< 350 mvolts		P0131, P0151		
			To set Closed Loop ready flag	= True		P0132, P0152		
					System Voltage	10.0 volts < system voltage< 32.0 volts	100msec loop	
			Closed Loop O2S ready flag	= True	Engine Speed	500 RPM <= Engine speed <= 3000 RPM		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			B) Once set to ready O2S cannot be		Engine Airflow	5.0 gps <= Engine Airflow<= 30.0 gps		
			1) O2S signal	> 350 mvolts	Engine Coolant	>= 65.0 ºC		
			AND 2) O2S signal	< 550 mvolts	Engine Metal Overtemp Active	= False		
			for time	> 10.0 seconds				
			Then set Closed Loop ready flag	= False	Converter Overtemp Active	= False		
					Fuel State	DFCO not active		
					AFM Status	= All Cylinders active		
					Predicted Exhaust Temp (B1S1)	>= 0.0 ºC		
					Engine run time	> 100 seconds		
					Fuel Enrichment	= Not Active		
					All of the above met for			
					Time	> 5 seconds		

P0442: EONV Pressure Threshold Table (in Pascals)

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

	0.0000	6.2499	12.4998	18.7497	24.9996	31.2495	37.4994	43.7493	49.9992	56.2491	62.4990	68.7490	74.9989	81.2488	87.4987	93.7486	99.9985
-10.0000	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
-4.3750	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
1.2500	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
6.8750	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
12.5000	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
18.1250	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
23.7500	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
29.3750	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
35.0000	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
40.6250	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
46.2500	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
51.8750	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
57.5000	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
63.1250	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
68.7500	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
74.3750	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
80.0000	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-249.0905	-228.4141	-207.4944	-186.8179	-166.1414	-145.2217	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453

P0442: Estimate of Ambient Temperature Valid Conditioning Time

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

Axis	Curve
0	400
600	400
1200	450
1800	500
2400	600
3000	550
3600	500
4200	400
4800	380
5400	350
6000	340
6600	320
7200	300
7800	200
8400	200
9000	200
9600	200
10200	200
10800	200
11700	200
12600	200
13500	100
14400	100
15300	100
16200	100
17100	100
18000	100
19200	100
20400	100
21600	100
22800	100
24000	100
25200	100

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	87
6	87
12	86
19	86
25	85
31	85
37	84
44	83
50	82
56	81
62	80
69	76
75	71
81	67
87	63
94	59
100	55

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

Engine Support Tables

CATD Section

MinimumEngineRunTime

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

MinCatTemp		X_AXIS_PTS
)_ExhaustWarmMin_Loc_0	550	0
)_ExhaustWarmMin_Loc_1	550	1
)_ExhaustWarmMin_Loc_2	550	2
)_ExhaustWarmMin_Loc_3	550	3
)_ExhaustWarmMin_Loc_4	550	4
)_ExhaustWarmMin_Loc_5	550	5
)_ExhaustWarmMin_Loc_6	550	6
)_ExhaustWarmMin_Loc_7	550	7

MinAirflowToWarmCatalyst

Engine Coolant	0	45	90
MinAirFlowToWrmCat	11	9	9

P0326 Knock Detection Enabled Factors:

FastRtdMax:

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

	0	**512**	**1024**	**1536**	**2048**	**2560**	**3072**	**3584**	**4096**	**4608**	**5120**	**5632**	**6144**	**6656**	**7168**	**7680**	**8192**
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	0.0	2.0	3.0	2.0	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60	0.0	2.0	2.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
70	0.0	2.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
80	0.0	4.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
90	0.0	6.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
100	0.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
110	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
120	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
130	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
140	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
150	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
160	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
170	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
180	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0

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:	0.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00

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

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

P0325/P0330 OpenCircuitThresh

E37 controller

Engine Speed (RPM):	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000
OpenCircuitThresh:	0	25	50	50	50	50	50	63	75	77	80	82	85	85	85	85

P0327/P0332 ShortLowThresh

E37 controller

Engine Oil Temperature (deg C):	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
ShortLowThresh:	34000	34000	34000	34000	34000	34000	34000	34000	34000	33500	33400	33400	33400	31100	31100

Engine Support Tables

P0328P0333 ShortHiThresh

E37 controller

Engine Oil Temperature (deg C):	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
ShortHiThresh:	63000	63000	63000	63000	63000	63000	63000	63000	63000	63000	63000	63000	63000	63000	63000

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	45008	45008	45008	45008	45008	45008	45008	45008	45008	45008	45008	45008	45008	45008	45008	45008	45008
80	45008	11712	11712	17568	17936	16000	16336	19984	16640	16608	17136	18128	17392	16288	16288	45008	45008
120	45008	11712	11712	17568	17936	16000	16336	19984	16640	16608	17136	18128	17392	16288	16288	45008	45008
160	45008	12096	12096	15648	16592	17632	16320	17616	16512	16880	19072	17008	15424	18544	18544	45008	45008
200	45008	12704	12704	15648	16544	17856	23440	24288	18752	17136	21584	16640	15392	17216	17216	45008	45008
240	45008	12704	12704	16736	16736	17760	19888	23008	20896	21504	22400	25728	16768	16832	16832	45008	45008
280	45008	45008	45008	17152	17152	19328	22928	24048	23168	23248	26528	28592	16544	17296	17296	45008	45008
320	45008	45008	45008	18960	18960	18144	19920	20320	21536	23312	29824	30208	17808	16048	16048	45008	45008
360	45008	45008	45008	19968	19968	19056	24880	20800	23280	24288	28464	26400	16544	16976	16976	45008	45008
400	45008	45008	45008	21200	21200	19824	24512	21952	22128	22944	26704	28704	16992	19376	19376	45008	45008
440	45008	45008	45008	22224	22224	19616	26256	21488	19520	21728	24496	20816	19536	19536	19376	45008	45008
480	45008	45008	45008	22224	22224	20256	26768	21056	19344	21840	22880	23072	20960	20960	45008	45008	45008
520	45008	45008	45008	45008	20160	20160	24992	22816	20208	20320	23328	23520	23520	20960	45008	45008	45008
560	45008	45008	45008	45008	18912	18912	22704	24832	21536	19520	20528	21136	21136	45008	45008	45008	45008
640	45008	45008	45008	45008	18912	18912	22704	24832	21536	19520	20528	21136	21136	45008	45008	45008	45008
720	45008	45008	45008	45008	45008	45008	45008	45008	45008	45008	45008	45008	45008	45008	45008	45008	45008
800	45008	45008	45008	45008	45008	45008	45008	45008	45008	45008	45008	45008	45008	45008	45008	45008	45008

KtOXYD_cmp_AFIM_LngthThrsh1_DoD

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

KtOXYD_cmp_AFIM_LngthThrsh2

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

Engine Support Tables

KtOXYD_cmp_AFIM_LngthThrsh2_DoD

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

KtOXYD_K_AFIM_QualFactor1

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
160	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
200	0	0	1	0	1	1	1	1	1	1	1	1	1	1	0	0	0
240	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0
280	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0
320	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0
360	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0
400	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0
440	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0
480	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0
520	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0
560	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0
640	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
720	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

KtOXYD_K_AFIM_QualFactor1_DoD

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
80	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
120	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
160	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
200	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
240	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
280	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
320	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
360	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
400	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
440	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
480	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
520	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
560	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
640	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
720	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
800	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Engine Support Tables

KtOXYD_K_AFIM_QualFactor2

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
80	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
120	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
160	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
200	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
240	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
280	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
320	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
360	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
400	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
440	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
480	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
520	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
560	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
640	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
720	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
800	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

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

Define Close Loop

KtFSTA_T_ClosedLoopTemp

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

KtFSTA_t_ClosedLoopTime

Start-Up Coolant	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Close Loop Enable Time	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0

P0411

Include only if duel bank system
SL Threshold Bank 2 Table (duel Bank systems only) — **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	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0

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

Engine Support Tables

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

P02431

P02436 P02440 Include P02436 only if duel bank system

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

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	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0

P02440

Include only if duel bank system

Bank 2 Valve Pressure Error — **axis weighted time in seconds**

Axis	0	1	2	3	4	5	6	7	8
Curve	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0

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	0.0	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	0.5	0.0	0.0	0.0	0.0	0.0

P02440

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

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

P02444

Include only if duel bank system

Bank 2 Pump Pressure Error — **axis weighted time in seconds**

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

FASD Section

P0171 & P0174 (LONG TE Long Term Trim Lean

% Ethanol	0.00	6.25	12.50	18.75	25.00	31.25	37.50	43.75	50.00	56.25	62.50	68.75	75.00	81.25	87.50	93.75	100.00
Long Term Fuel Trim Lean Threshold	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29

P0172 & P0175 (LONG TE Non Purge Rich Limit

% Ethanol	0.00	6.25	12.50	18.75	25.00	31.25	37.50	43.75	50.00	56.25	62.50	68.75	75.00	81.25	87.50	93.75	100.00
Long Term Fuel Non-Purge Rich Threshold	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80

P0172 & P0175 (LONG TE Purge Rich Limit

% Ethanol	0.00	6.25	12.50	18.75	25.00	31.25	37.50	43.75	50.00	56.25	62.50	68.75	75.00	81.25	87.50	93.75	100.00
Long Term Fuel Purge Rich Threshold	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81

Engine Support Tables

P0171 & P0174 (COMB TE Combined Fuel Trim Lean Threshold

% Ethanol	0.00	6.25	12.50	18.75	25.00	31.25	37.50	43.75	50.00	56.25	62.50	68.75	75.00	81.25	87.50	93.75	100.00
Comb Fuel Trim Lean Threshold	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29	2.29

P0172 & P0175 (COMB TE Combined Non Purge Rich Limit

% Ethanol	0.00	6.25	12.50	18.75	25.00	31.25	37.50	43.75	50.00	56.25	62.50	68.75	75.00	81.25	87.50	93.75	100.00
Comb Fuel Trim Non-Purge RichThreshold	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8

P0172 & P0175 (COMB TE Combined Purge Rich Limit

% Ethanol	0.00	6.25	12.50	18.75	25.00	31.25	37.50	43.75	50.00	56.25	62.50	68.75	75.00	81.25	87.50	93.75	100.00
Comb Fuel Trim Purge Rich Threshold	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81

The following tables define when the engine goes closed loop

P0171, P0172, P0174 & P(Closed Loop Enable Temp vrs Coolant Temp

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

P0171, P0172, P0174 & P(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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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

TPS Residual Weight Factor based on RPM

RPM	0	1500	2200	2500	2800	3100	3200	3300	3500	3700	4000	4200	4500	5000	5500	6500	8000
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.000

MAF Residual Weight Factor based on RPM

RPM	0	1500	2200	2500	2800	3100	3200	3300	3500	3700	4000	4200	4500	5000	5500	6500	8000
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.946	1.000	0.858	0.943	0.000	0.000

MAF Residual Weight Factor Based on MAF Estimate

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

MAP1 Residual Weight Factor based on RPM

RPM	0	1500	2200	2500	2800	3100	3200	3300	3500	3700	4000	4200	4500	5000	5500	6500	8000
	1.000	0.943	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.000

MAP2 Residual Weight Factor based on RPM

RPM	0	1500	2200	2500	2800	3100	3200	3300	3500	3700	4000	4200	4500	5000	5500	6500	8000
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.000

SCIAP1 Residual Weight Factor based on RPM

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

SCIAP2 Residual Weight Factor based on RPM

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

Boost Residual Weight Factor based on % of Boost

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

P0108, P012D: MAP/SCIAP Cold Run Time Threshold

X axis is Engine Coolant Temperature in Deg C

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

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

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

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

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

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

	IAT Range Low	Hi	-40	-28	-16	-4	8	20	32	44	56	68	80
Primary	10.0 ° C	54.5 ° C	6009	6009	6009	6009	6009	5121	4233	3345	2457	1569	681
Alternate	-7.0 ° C	10.0 ° C	8872	8872	8872	7864	6856	5848	4840	3832	2952	2124	1296

Engine Support Tables

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

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

P0300-P0308: Idle SCD ddt

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

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

load / Load	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
0	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
6	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
31	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
44	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
50	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
56	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
63	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
69	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
75	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
81	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
88	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
94	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
100	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

Engine Support Tables

P0300-P0308: SCD Delta ddt

load	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
0	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
6	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
31	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
44	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
50	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
56	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
63	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
69	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
75	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
81	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
88	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
94	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
100	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

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

load	400	500	600	700	800	900	1000	1100	1200
0	2400	2400	2400	2400	2400	2000	1000	500	475
Load **6**	2400	2400	2400	2400	2400	2000	1000	500	475
13	2400	2400	2400	2400	2400	2000	1000	500	475
19	3000	3000	3000	3000	2500	1900	1400	1200	900
25	4000	4000	4000	4000	3000	2500	2000	1400	1200
31	4500	4500	4500	4500	3500	3000	2300	1700	1300
38	5500	5500	5500	5500	5000	3500	2500	2000	2000
44	6000	6000	6000	6000	5500	4000	3200	2200	2000
50	7500	7500	7500	7500	6000	4500	3500	2700	2200
56	8000	8000	8000	8000	7000	5000	4000	3500	2500
63	9000	9000	9000	9000	8000	5000	5000	3500	3000
69	9000	9000	9000	9000	9000	6000	5000	3500	3500
75	9000	9000	9000	9000	9000	7000	5500	4000	3500
81	9000	9000	9000	9000	9000	8000	8000	7000	4000
88	10000	10000	10000	10000	9000	9000	8000	8000	7000
94	10000	10000	10000	10000	10000	9000	9000	8000	7000
100	10000	10000	10000	10000	10000	9000	9000	8000	7000

P0300-P0308: Idle Cyl Mode ddt

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

Engine Support Tables

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

load
Load

	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2600
0	2400	2400	2400	2400	2400	2000	1000	500	475	400	450	300	300	200	150	125
6	2400	2400	2400	2400	2400	2000	1000	500	475	400	450	300	300	200	150	125
13	2400	2400	2400	2400	2400	2000	1000	500	475	400	450	300	300	200	150	125
19	3000	3000	3000	3000	2500	1900	1400	1200	900	600	450	250	250	200	150	125
25	4000	4000	4000	4000	3000	2500	2000	1400	1200	800	550	420	325	200	175	130
31	4500	4500	4500	4500	3500	3000	2300	1700	1300	800	550	425	350	250	200	175
38	5500	5500	5500	5500	5000	3500	2500	2000	2000	1100	700	550	425	300	250	200
44	6000	6000	6000	6000	5500	4000	3200	2200	2000	1300	900	600	480	400	275	250
50	7500	7500	7500	7500	6000	4500	3500	2700	2200	1700	1000	800	550	450	300	275
56	8000	8000	8000	8000	7000	5000	4000	3500	2500	1800	1300	900	600	500	400	300
63	9000	9000	9000	9000	8000	5000	5000	3500	3000	1800	1500	1000	700	600	450	375
69	9000	9000	9000	9000	9000	6000	5000	3500	3500	2000	1500	1000	800	600	500	425
75	9000	9000	9000	9000	9000	7000	5500	4000	3500	2500	1600	1100	800	650	550	500
81	9000	9000	9000	9000	9000	8000	8000	7000	4000	3500	1600	1200	900	700	600	500
88	10000	10000	10000	10000	9000	9000	8000	8000	7000	4500	1800	1400	1000	800	650	500
94	10000	10000	10000	10000	10000	9000	9000	8000	7000	5500	2000	1500	1300	1100	650	600
100	10000	10000	10000	10000	10000	9000	9000	8000	7000	6500	2500	1600	1500	1500	800	700

	2800	3000	3500	4000	4500	5000	5500	6000	6500	7000
0	100	90	50	40	35	30	22	20	20	20
6	100	90	50	40	35	30	22	20	20	20
13	100	90	50	40	35	30	22	20	20	20
19	100	90	45	40	35	30	22	20	20	20
25	100	90	60	45	35	30	25	25	20	20
31	125	100	70	50	40	30	29	25	25	20
38	150	150	90	60	45	35	29	25	25	23
44	200	150	100	70	50	40	35	25	27	23
50	200	200	125	80	65	45	40	30	27	23
56	250	200	150	90	75	55	40	32	28	28
63	250	250	150	100	80	60	45	35	30	28
69	300	300	175	125	80	65	50	40	30	28
75	400	325	200	130	100	75	50	40	30	30
81	400	350	200	140	100	80	60	45	40	40
88	450	400	250	150	100	90	60	50	50	45
94	500	500	250	175	100	100	65	60	50	45
100	700	600	300	250	140	120	70	70	60	55

Engine Support Tables

P0300-P0308: Cyl Mode ddt

load

	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2600
0	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
6	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
31	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
44	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
50	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
56	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
63	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
69	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
75	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
81	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
88	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
94	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
100	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

	2800	3000	3500	4000	4500	5000	5500	6000	6500	7000
0	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
6	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
31	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
44	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
50	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
56	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
63	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
69	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
75	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
81	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
88	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
94	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
100	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

Engine Support Tables

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
0	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
6	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
31	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
44	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
50	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
56	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
63	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
69	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
75	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
81	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
88	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
94	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
100	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

	2800	3000	3500	4000	4500	5000	5500	6000	6500	7000
0	32767	32767	32767	32767	40	20	20	18	15	15
6	32767	32767	32767	32767	40	20	20	18	15	15
13	32767	32767	32767	32767	40	20	20	18	15	15
19	32767	32767	32767	32767	40	25	20	18	15	15
25	32767	32767	32767	32767	45	35	28	22	20	15
31	32767	32767	32767	32767	55	40	30	25	20	15
38	32767	32767	32767	32767	65	45	35	30	25	20
44	32767	32767	32767	32767	75	55	40	32	25	20
50	32767	32767	32767	32767	75	55	50	35	30	25
56	32767	32767	32767	32767	80	65	50	40	32	30
63	32767	32767	32767	32767	80	75	55	45	35	35
69	32767	32767	32767	32767	100	90	65	50	40	40
75	32767	32767	32767	32767	100	100	70	55	40	45
81	32767	32767	32767	32767	125	100	80	55	50	45
88	32767	32767	32767	32767	130	100	80	65	60	50
94	32767	32767	32767	32767	140	110	90	75	70	60
100	32767	32767	32767	32767	250	130	140	100	90	70

Engine Support Tables

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

load
Load

	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2600
0	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
6	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
31	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
44	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
50	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
56	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
63	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
69	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
75	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
81	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
88	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
94	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
100	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

	2800	3000	3500	4000	4500	5000	5500	6000	6500	7000
0	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
6	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
31	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
44	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
50	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
56	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
63	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
69	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
75	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
81	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
88	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
94	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
100	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: Zero torque engine load

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

Baro KPa	Multiplier
65	1.00
70	1.00
75	1.00
80	1.00
85	1.00
90	1.00
95	1.00
100	1.00
105	1.00

(Series 8.9) Note: Zero torque is adjusted for Baro. Misfire thresholds are relative to (maximum air density PID $1188 SAE xxx) and do not shift appreciably with altitude compared to (current density as defined PID $04 SAE1979)

KcMISF_OneCylNoCatDamLvl

Catalyst Damaging Misfire Percentage

load
Load

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

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	0.020	0.030	0.040	0.050	0.060	0.070	0.080	0.090	0.100	0.110	0.120	0.130	0.140	0.150	0.200	1.000
0.000	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
0.020	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
0.030	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
0.040	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.050	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
0.060	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
0.070	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
0.080	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
0.090	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
0.100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.110	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.120	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.130	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.140	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.150	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0
0.180	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0
1.000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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	0.020	0.030	0.040	0.050	0.060	0.070	0.080	0.090	0.100	0.110	0.120	0.130	0.140	0.150	0.160	1.000
0.000	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.020	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
0.030	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
0.040	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
0.050	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
0.060	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
0.070	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
0.080	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
0.090	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
0.100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
0.110	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
0.120	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
0.130	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
0.140	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0
0.150	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0
0.160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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

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

	0.0	10.0	20.0	50.0	80.0
0.0	30	30	30	30	30
6.3	30	30	30	30	30
12.5	30	30	30	30	30
18.8	30	30	30	30	30
25.0	30	30	30	30	30
31.3	30	30	30	30	30
37.5	30	30	30	30	30
43.8	30	30	30	30	30
50.0	30	30	30	30	30
56.3	30	30	30	30	30
62.5	30	30	30	30	30
68.8	30	30	30	30	30
75.0	30	30	30	30	30
81.3	30	30	30	30	30
87.5	30	30	30	30	30
93.8	30	30	30	30	30
100.0	30	30	30	30	30

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

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

	0.0	10.0	20.0	50.0	80.0
0.0	30	30	30	30	30
6.3	30	30	30	30	30
12.5	30	30	30	30	30
18.8	30	30	30	30	30
25.0	30	30	30	30	30
31.3	30	30	30	30	30
37.5	30	30	30	30	30
43.8	30	30	30	30	30
50.0	30	30	30	30	30
56.3	30	30	30	30	30
62.5	30	30	30	30	30
68.8	30	30	30	30	30
75.0	30	30	30	30	30
81.3	30	30	30	30	30
87.5	30	30	30	30	30
93.8	30	30	30	30	30
100.0	30	30	30	30	30

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

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

	0.0	10.0	20.0	50.0	80.0
0.0	30	30	30	30	30
6.3	30	30	30	30	30
12.5	30	30	30	30	30
18.8	30	30	30	30	30
25.0	30	30	30	30	30
31.3	30	30	30	30	30
37.5	30	30	30	30	30
43.8	30	30	30	30	30
50.0	30	30	30	30	30
56.3	30	30	30	30	30
62.5	30	30	30	30	30
68.8	30	30	30	30	30
75.0	30	30	30	30	30
81.3	30	30	30	30	30
87.5	30	30	30	30	30
93.8	30	30	30	30	30
100.0	30	30	30	30	30

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

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

	0.0	10.0	20.0	50.0	80.0
0.0	30	30	30	30	30
6.3	30	30	30	30	30
12.5	30	30	30	30	30
18.8	30	30	30	30	30
25.0	30	30	30	30	30
31.3	30	30	30	30	30
37.5	30	30	30	30	30
43.8	30	30	30	30	30
50.0	30	30	30	30	30
56.3	30	30	30	30	30
62.5	30	30	30	30	30
68.8	30	30	30	30	30
75.0	30	30	30	30	30
81.3	30	30	30	30	30
87.5	30	30	30	30	30
93.8	30	30	30	30	30
100.0	30	30	30	30	30

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	1.180176	1.180176	1.180176	1.180176	1.180176
25.0	1.180176	1.180176	1.165039	1.160156	1.149902
50.0	1.180176	1.180176	1.160156	1.149902	1.140137
75.0	1.180176	1.169922	1.160156	1.149902	1.140137
100.0	1.180176	1.169922	1.149902	1.140137	1.140137

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

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

	0.0	500.0	1000.0	1500.0	2000.0
0.0	0.919922	0.919922	0.919922	0.919922	0.919922
25.0	0.919922	0.910156	0.907227	0.904785	0.899902
50.0	0.919922	0.908203	0.904785	0.899902	0.895020
75.0	0.919922	0.904785	0.899902	0.895020	0.890137
100.0	0.919922	0.899902	0.895020	0.890137	0.879883

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

CSED Section

KtlDLC_n_CLO_ThrshOfst

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

KalDLC_n_EngDsrdBase[CilDLR_PN]

Coolant Temperature	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Base RPM	950	950	950	950	950	950	950	900	850	800	700	700	700	700	700	700	700

KalDLC_n_EngDsrdBase[CilDLR_DR]

Coolant Temperature	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Base RPM	950	950	950	950	950	950	950	900	850	800	700	700	700	700	700	700	700

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

KtPHSD_phi_CamPosErrorLimEc1

X axis is Deg C
Y axis is RPM

	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
800	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
1200	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
1600	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
2000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
2400	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
2800	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
3200	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
3600	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
4000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
4400	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
4800	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
5200	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
5600	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
6000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
6400	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
6800	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000

KtPHSD_phi_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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
800	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1600	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2400	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2800	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3600	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4400	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4800	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5600	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6400	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6800	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Engine Support Tables

KtPHSD_phi_CamPosErrorLimEc2

X axis is Deg C
Y axis is RPM

	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
800	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1600	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2400	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2800	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3600	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4400	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4800	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5600	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6400	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6800	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

KtPHSD_t_StablePositionTimeIc1

X axis is Deg C
Y axis is RPM

	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
800	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
1200	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
1600	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
2000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
2400	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
2800	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
3200	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
3600	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
4000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
4400	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
4800	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
5200	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
5600	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
6000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
6400	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
6800	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000

KtPHSD_t_StablePositionTimeEc1

X axis is Deg C
Y axis is RPM

	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
800	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
1200	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
1600	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
2000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
2400	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
2800	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
3200	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
3600	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
4000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
4400	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
4800	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
5200	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
5600	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
6000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
6400	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
6800	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000

Engine Support Tables

KtPHSD_t_StablePositionTimeIc2

X axis is Deg C
Y axis is RPM

	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

KtPHSD_t_StablePositionTimeEc2

X axis is Deg C
Y axis is RPM

	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

P0068: MAP / MAF / TPS Correleation

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

X-axis	10.0006	14.9994	19.9997	25.0000	30.0003	35.0006	39.9994	44.9997	99.9985
Data	26.2578	24.1172	21.1719	16.7734	11.6406	100.0000	100.0000	100.0000	100.0000

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

X-axis	10.0006	14.9994	19.9997	25.0000	30.0003	35.0006	39.9994	44.9997	99.9985
Data	8.6875	12.1484	13.5938	15.7422	12.9609	255.0000	255.0000	255.0000	255.0000

P1682: Ignition Voltage Correleation

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

Green Sensor Delay Criteria:

The specific diagnostic (from summary table) will not be enabled until the next ignition cycle after the airflow criteria below (by sensor location) has been met:

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

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

Engine Fault Bundles

Cert Doc Bundle Name	Pcodes							
CatalystSysEfficiencyLoB1_FA	P0420							
CatalystSysEfficiencyLoB2_FA	P0430							
EvapPurgeSolenoidCircuit_FA	P0443							
EvapFlowDuringNonPurge_FA	P0496							
EvapVentSolenoidCircuit_FA	P0449							
EvapSmallLeak_FA	P0442							
EvapEmissionSystem_FA	P0455	P0446						
FuelTankPressureSnsrCkt_FA	P0452	P0453						
CoolingFanSpeedTooHigh_FA	P0495							
FuelLevelDataFault	P0461	P0462	P0463	P2066	P2067	P2068		
PowertrainRelayFault	P1682							
PowertrainRelayStateOn_FA	P0685							
PowertrainRelayStateOn_Error	P0685							
IgnitionOffTimer_FA	P2610							
IgnitionOffTimeValid	P2610							
TimeSinceEngineRunningValid	P2610							
VehicleSpeedSensor_FA	P0502	P0503	P0722	P0723				
VehicleSpeedSensorError	P0502	P0503	P0722	P0723				
FuelTrimSystemB1_FA	P0171	P0172						
FuelTrimSystemB2_FA	P0174	P0175						
A/F Imbalance Bank1	P1174							
A/F Imbalance Bank2	P1175							
AIRSystemPressureSensor FA	P2430	P2431	P2432	P2433	P2435	P2436	P2437	P2438
AIR System FA	P0411	P2440	P2444					
AIRValveControlCircuit FA	P0412							
AIRPumpControlCircuit FA	P0418							
Clutch Sensor FA	P0806	P0807	P0808					

Engine Fault Bundles

Cert Doc Bundle Name	Pcodes										
ClutchPositionSensorCktLo FA	P0807										
ClutchPositionSensorCktHi FA	P0808										
EthanolCompositionSensor_FA	P0178	P0179									
EngineMisfireDetected_TFTKO	P0300	P0301	P0302	P0303	P0304	P0305	P0306	P0307	P0308		
EngineMisfireDetected_FA	P0300	P0301	P0302	P0303	P0304	P0305	P0306	P0307	P0308		
KS_Ckt_Perf_B1B2_FA	P0324	P0325	P0326	P0327	P0328	P0330	P0332	P0333			
IgnitionOutputDriver_FA	P0351	P0352	P0353	P0354	P0355	P0356	P0357	P0358			
O2S_Bank_ 1_TFTKO	P0131	P0132	P0134	P2A00							
O2S_Bank_ 2_TFTKO	P0151	P0152	P0154	P2A03							
O2S_Bank_1_Sensor_1_FA	P2A00	P0131	P0132	P0133	P0134	P0135	P0053	P1133			
O2S_Bank_1_Sensor_2_FA	P013A	P013B	P013E	P013F	P2270	P2271	P0137	P0138	P0140	P0141	P0054
O2S_Bank_2_Sensor_1_FA	P2A03	P0151	P0152	P0153	P0154	P0155	P0059	P1153			
O2S_Bank_2_Sensor_2_FA	P013C	P013D	P014A	P014B	P2272	P2273	P0157	P0158	P0160	P0161	P0060
ECT_Sensor_Ckt_FA	P0117	P0118									
ECT_Sensor_Ckt_TPTKO	P0117	P0118									
ECT_Sensor_Ckt_TFTKO	P0117	P0118									
ECT_Sensor_DefaultDetected	P0117	P0118	P0116	P0125							
ECT_Sensor_FA	P0117	P0118	P0116	P0125	P0128						
ECT_Sensor_TFTKO	P0117	P0118	P0116	P0125							
ECT_Sensor_Perf_FA	P0116										
ECT_Sensor_Ckt_FP	P0117	P0118									
ECT_Sensor_Ckt_High_FP	P0118										
ECT_Sensor_Ckt_Low_FP	P0117										
AmbientAirPressCktFA	P2228	P2229									
AmbientAirPressCktFA_NoSnsr	P0106	P0107	P0108								
AmbientAirDefault_NA	P0106	P0107	P0108	P2227	P2228	P2229					
AmbientAirDefault_SC	P012B	P012C	P012D	P2227	P2228	P2229					
AmbientAirDefault_NoSnsr	P0106	P0107	P0108								
AmbientAirDefault	NA is has Baro Sensor and Normally Aspirated, SC if suprecharged, NoSnsr is Normally Aspirated with no Baro Sensor										

Engine Fault Bundles	
Cert Doc Bundle Name	**Pcodes**
IAT_SensorCircuitTFTKO	P0112 P0113
IAT_SensorCircuitFA	P0112 P0113
IAT_SensorCircuitFP	P0112 P0113
IAT_SensorTFTKO	P0111 P0112 P0113
IAT_SensorFA	P0111 P0112 P0113
IAT2_SensorCktTFTKO	P0097 P0098
IAT2_SensorCktTFTKO_NoSnsr	P0112 P0113
IAT2_SensorCircuitFA	P0097 P0098
IAT2_SensorCircuitFA_NoSnsr	P0112 P0113
IAT2_SensorcircuitFP	P0097 P0098
IAT2_SensorcircuitFP_NoSnsr	P0112 P0113
IAT2_SensorTFTKO	P0096 P0097 P0098
IAT2_SensorTFTKO_NoSnsr	P0111 P0112 P0113
IAT2_SensorFA	P0096 P0097 P0098
IAT2_SensorFA_NoSnsr	P0111 P0112 P0113
SuperchargerBypassValveFA	P2261
CylDeacSystemTFTKO	P3400
MAF_SensorPerfFA	P0101
MAF_SensorPerfTFTKO	P0101
MAP_SensorPerfFA	P0106
MAP_SensorPerfTFTKO	P0106
SCIAP_SensorPerfFA	P012B
SCIAP_SensorPerfTFTKO	P012B
ThrottlePositionSnsrPerfFA	P0121
ThrottlePositionSnsrPerfTFTKO	P0121
MAF_SensorFA	P0101 P0102 P0103
MAF_SensorTFTKO	P0101 P0102 P0103
MAF_SensorFP	P0102 P0103
MAF_SensorCircuitFA	P0102 P0103
MAF_SensorCircuitTFTKO	P0102 P0103
MAP_SensorTFTKO	P0106 P0107 P0108
MAP_SensorFA	P0106 P0107 P0108
SCIAP_SensorFA	P012B P012C P012D
SCIAP_SensorTFTKO	P012B P012C P012D
SCIAP_SensorCircuitFP	P012C P012D
AfterThrottlePressureFA_NA	P0106 P0107 P0108

Engine Fault Bundles

Cert Doc Bundle Name	Pcodes
AfterThrottlePressureFA_SC	P012B P012C P012D
AfterThrottleVacuumTFTKO_NA	P0106 P0107 P0108
AfterThrottleVacuumTFTKO_SC	P012B P012C P012D
SCIAP_SensorCircuitFA	P012C P012D
AfterThrottlePressTFTKO_NA	P0106 P0107 P0108
AfterThrottlePressTFTKO_SC	P012B P012C P012D
MAP_SensorCircuitFA	P0107 P0108
MAP_EngineVacuumStatus	MAP_SensorFA OR P0107, P0108 Pending
CrankCamCorrelationTFTKO	P0016 P0017 P0018 P0019
CrankSensorFA	P0335 P0336
CrankSensorTFTKO	P0335 P0336
CamSensorFA	P0016 P0017 P0018 P0019 P0340 P0341 P0345 P0346 P0365 P0366 P0390 P0391
CamSensorTFTKO	P0016 P0017 P0018 P0019 P0340 P0341 P0345 P0346 P0365 P0366 P0390 P0391
CrankIntakeCamCorrelationFA	P0016 P0018
CrankExhaustCamCorrelationFA	P0017 P0019
IntakeCamSensorTFTKO	P0016 P0018 P0340 P0341 P0345 P0346
IntakeCamSensorFA	P0016 P0018 P0340 P0341 P0345 P0346
ExhaustCamSensorTFTKO	P0017 P0019 P0365 P0366 P0390 P0391
ExhaustCamSensorFA	P0017 P0019 P0365 P0366 P0390 P0391
IntakeCamSensor_FA	P0016 P0018 P0340 P0341 P0345 P0346
IntakeCamSensor_TFTKO	P0016 P0018 P0340 P0341 P0345 P0346
ExhaustCamSensor_FA	P0017 P0019 P0365 P0366 P0390 P0391
ExhaustCamSensor_TFTKO	P0017 P0019 P0365 P0366 P0390 P0391
CrankIntakeCamCorrFA	P0016 P0018
CrankExhaustCamCorrFA	P0017 P0019
CrankSensorFaultActive	P0335 P0336
CrankSensor_FA	P0335 P0336
CrankSensorTestFailedTKO	P0335 P0336
CrankSensor_TFTKO	P0335 P0336
CamSensor_FA	P0016 P0017 P0018 P0019 P0340 P0341 P0345 P0346 P0365 P0366 P0390 P0391
CamSensorAnyLocationFA	P0016 P0017 P0018 P0019 P0340 P0341 P0345 P0346 P0365 P0366 P0390 P0391
CamSensor_TFTKO	P0016 P0017 P0018 P0019 P0340 P0341 P0345 P0346 P0365 P0366 P0390 P0391
AnyCamPhaser_FA	P0010 P0011 P0013 P0014 P0020 P0021 P0023 P0024
AnyCamPhaser_TFTKO	P0010 P0011 P0013 P0014 P0020 P0021 P0023 P0024
IntkCamPhaser_FA	P0010 P0011 P0020 P0021
EGRValvePerformance_FA	P0401 P042E

Engine Fault Bundles

Cert Doc Bundle Name	Pcodes
EGRValveCircuit_FA	P0403 P0404 P0405 P0406
EGRValve_FP	P0405 P0406 P042E
EGRValveCircuit_TFTKO	P0403 P0404 P0405 P0406
EGRValvePerformance_TFTKO	P0401 P042E
EngineMetalOvertempActive	P1258
	no codes?
A/C_FailedOn	P0645
EngOilTempSensorCircuitFA	P0197 P0198
EngOilModeledTempValid	ECT_Sensor_FA or IAT_SensorCircuitFA
EngOilPressureSensorCktFA	P0522 P0523
EngOilPressureSensorFA	P0521 P0522 P0523
see Trans Summary Tables	
CylnderDeacDriverTFTKO	P3401 P3409 P3417 P3425 P3433 P3441 P3449
BrakeBoosterSensorFA	P0556 P0557 P0558
BrakeBoosterVacuumValid	P0556 P0557 P0558
BrakeBoosterVacuumValid	VehicleSpeedSensorError or MAP_SensorFA
FuelInjectorCircuit_FA	P0201 P0202 P0203 P0204 P0205 P0206 P0207 P0208
FuelInjectorCircuit_TFTKO	P0201 P0202 P0203 P0204 P0205 P0206 P0207 P0208
ControllerProcessorPerf_FA	P0606
ControllerRAM_Error_FA	P0604
TPS_Performance_FA	P0068 P0121 P1516 P2101
EnginePowerLimited	P0068 P0606 P0120 P0122 P0123 P0220 P0222 P0223 P0641 P0651
	P1516 P2101 P2120 P2122 P2123 P2125 P2127 P2128 P2135 P2138 P2176

Engine Fault Bundles	
Cert Doc Bundle Name	**Pcodes**
TPS1_OutOfRange_Composite	P0120 P0122 P0123
TPS2_OutOfRange_Composite	P0220 P0222 P0223
TPS_FA	P2135 (TPS1_OutOfRange_Composite and TPS2_OutOfRange_Composite)
TPS_FaultPending	Always set to FALSE, As ETC diagnostics are set within 200 msec there is no real need for a pending flag
TPS_ThrottleAuthorityDefaulted	P0068 P0606 P1516 P2101 P2135 P2176 V5B_OutOfRange_Composite (TPS1_OutOfRange_Composite and TPS2_OutOfRange_Composite) (MAP_OutOfRange_Composite and MAF_OutOfRange_Composite)
AcceleratorEffectivePstnValid	Always set to TRUE, no P codes will set to FALSE
5VoltReferenceA_FA	P0641
5VoltReferenceB_FA	P0651
IAC_SystemRPM_FA	P0506 P0507
TransmissionGearDefaulted	P182E P1915
TransmissionEngagedState_FA	P182E P1915
FourWheelDriveLowStateValid	P2771
EngineTorqureInaccurate	EngineMisfireDetected_FA or FuelInjectorCircuit_FA or FuelInjectorCircuit_TFTKO or FuelTrimSystemB1_FA or FuelTrimSystemB2_FA or MAF_SensorTFTKO or MAP_SensorTFTKO or EGRValvePerformance_FA

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

LowFuelConditionDiagnostic	Flag set to TRUE if the fuel level < 10 % AND No Active DTCs: FuelLevelDataFault P0462 P0463 for at least 30 seconds.
Transfer Pump is Commanded On	Fuel Volume in Primary Fuel Tank < 0.0 liters AND Fuel Volume in Secondary Fuel Tank ≥ 0.0 liters AND Transfer Pump on Time < **TransferPumpOnTimeLimit** Table AND Transfer Pump had been Off for at least 0.0 seconds AND Evap Diagnostic (Purge Valve Leak Test, Large AND Engine Running