Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Intake Camshaft Actuator Solenoid Circuit – Bank 1	P0010	Detects a VVT system error by monitoring the circuit for electrical integrity	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		System supply voltage is within limits Output driver is commanded on, Ignition switch is in crank or run position	> 11 Volts, and < 32 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Trips 2 B Type
Intake Camshaft System Performance – Bank 1	P0011	Detects a VVT system error by comparing the desired and actual cam positions when VVT is activated	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive	(Intake cam Bank 1)Cam Position Error > KtPHSD_phi_CamPosErrorLimIc1 Deg (see Supporting Table)	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	System Voltage > 11 Volts, and System Voltage < 32 Volts Desired cam position cannot vary more than 7.5 Cam Deg for at least KtPHSD_t_StablePositionTimeIc1 seconds (see Supporting Table)	200 failures out of 1000 samples	Trips 2 B Type

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Engine is running VVT is enabled Desired camshaft position > 0 Power Take Off (PTO) not active		100 ms /sample	
Crankshaft Position (CKP)-Camshaft Position (CMP) Correlation Bank 1 Sensor A	P0016	Detects cam to crank misalignment by monitoring if cam sensor pulse for bank 1 sensor A occurs during the incorrect crank position	4 cam sensor pulses more than 11 crank degrees before or 11 crank degrees after nominal position in one cam revolution.		Engine Speed Crankshaft and camshaft position signals are synchronized Cam phaser is in "parked" position No Active DTCs: No Pending DTCs:	< 1200 P0335, P0336 P0340, P0341 5VoltReferenceA_FA 5VoltReferenceB_FA P0341	4 failures out of 5 samples if the engine is being assisted by the starter 24 failures out of 30 samples if the engine is running without assistance from the starter One sample per cam rotation	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
O2S Heater Control Circuit Bank 1 Sensor 1	P0030	This DTC checks the Heater Output Driver circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit) or voltage high during driver closed state (indicates short to voltage).		Ign Switch position Ignition Voltage Engine Speed	= Crank or Run position 11.0 volts < Ign Voltage < 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
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.
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 < 3.1 ohms -OR- Calculated Heater Resistance > 9.8 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 < 3.00 seconds	Once per valid cold start	2 trips Type B
HO2S Heater Resistance Bank 1 Sensor 2	P0054	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Learned Heater Resistance.	Calculated Heater Resistance < 4.1 ohms -OR- Calculated Heater Resistance > 10.8 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 < 3.00 seconds	Once per valid cold start	2 trips Type B
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		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	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			voltage).				Continuous	
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 > 9.8 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 < 3.00 seconds	Once per valid cold start	2 trips Type B
HO2S Heater Resistance Bank 2 Sensor 2	P0060	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Learned Heater Resistance.	Calculated Heater Resistance < 4.1 ohms -OR- Calculated Heater Resistance > 10.8 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 < 3.00 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),	Table, f(TPS). See supporting tables	Engine Speed	> 800 RPM	Continuously fail MAP and MAF portions of diagnostic for 0.1875 sec	Trips: 1 Type: A MIL: YES

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			or P0107 (MAP circuit low), or P0108 (MAP circuit high) have failed this key cycle, then MAP portion of diagnostic fails			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	Continuous in primary processor	
			2) Absolute difference between MAF and estimated MAF exceed threshold (grams/sec), or P0102 (MAF circuit low), or P0103 (MAF circuit hi) have failed this key cycle, or maximum MAF versus RPM (Table) is greater than or equal to maximum MAF versus battery voltage, then MAF portion of diagnostic fails	Table, f(TPS). See supporting tables Table, f(RPM). See supporting tables Table, f(Volts). See supporting tables				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Radiator Coolant Temp Sensor Circuit Low Voltage	P00B3	This DTC detects a short to ground in the RCT signal circuit or the RCT sensor.	RCT Resistance (@ 150ºC)	< 55 Ohms	Engine run time Or IAT min	> 0.0 seconds ≤ 150.0 °C	5 failures out of 25 samples 1 sec /sample Continuous	2 trips Type B
Radiator Coolant Temp Sensor Circuit High Voltage	P00B4	Circuit Continuity This DTC detects a short to high or open in the RCT signal circuit or the RCT sensor.	RCT Resistance (@ -60ºC)	> 160500 Ohms	Engine run time Or IAT min	> 10.0 seconds ≥ -7.0 °C	5 failures out of 25 samples 1 sec /sample Continuous	2 trips Type B
Radiator Coolant Temp - Engine Coolant Temp (ECT) Correlation	P00B6	This DTC detects a difference between ECT and RCT after a soak condition.	A failure will be reported if any of the following occur:		No Active DTC's	VehicleSpeedSensor_FA IAT_SensorCircuitFA RCT_Sensor_Ckt_FA ECT_Sensor_Ckt_FA	1 failure 500 msec /sample	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			1) Absolute difference between ECT at power up & RCT at power up is ≥ an IAT based threshold table lookup value(fast fail).	See "P00B6: Fail if power up ECT exceeds RCT by these values" in the Supporting tables section		IgnitionOffTimeValid TimeSinceEngineRunningValid	Once per valid cold start	
			2) Absolute difference between ECT at power up & RCT at power up is > by 19.3 C and a block heater has not been detected.		Engine Off Soak Time Non-volatile memory initization	> 28800 seconds = Not occurred		
			3) ECT at power up > IAT at power up by 19.3 C and the time spent cranking the engine without starting is greater than 10.0 seconds with the LowFuelConditionDiag	= False	Test complete this trip	= False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Test aborted this trip	= False		
					IAT	≥ -7 ºC		
					LowFuelConditio n Diag	= False		
					Block Heater detection is enabled when either of the following occurs:			
					1) ECT at power up > IAT at power up by	> 19.3 ºC		
					2) Cranking time	< 10.0 Seconds		
					Block Heater is detected and diagnostic is aborted when 1)or 2) occurs. Diagnostic is aborted when 3) or 4) occurs:			
					1a) Vehicle drive time	> 400 Seconds with		
					1b) Vehicle speed	> 14.9 MPH and		
					1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is below 1b as follows:	0.00 times the seconds with vehicle speed below 1b		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					1d) IAT drops from power up IAT	≥ 3.3 ºC		
					2a) ECT drops from power up ECT	≥ 1 ºC Within		
					2b) Engine run time	< 30 Seconds		
					3) Engine run time with vehicle speed below 1b	> 1800 Seconds		
					4) Minimum IAT during test	> -7.0 ºC		
Mass Air Flow System Performance (naturally aspirated)	P0101	Determines if the MAF sensor is stuck within the normal operating range	Filtered Throttle Model Error AND ABS(Measured Flow – Modeled Air Flow) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered	<= 300 kPa*(g/s) > 12 grams/sec > 15.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 450 RPM <= 5200 RPM > -7 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.00 Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM	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.
						Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Estimate MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM See table "IFRD Residual Weighting Factors". 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	<= 1650 Hz (~ 1.03 gm/sec)	Engine Run Time Engine Speed Ignition Voltage Above criteria	> 1.0 seconds >= 300 RPM >= 8.0 Volts	400 failures out of 500 samples 1 sample	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					present for a period of time	>= 1.0 seconds	every cylinder firing event	
Mass Air Flow Sensor Circuit High Frequency	P0103	Detects a high frequency output from the MAF sensor	MAF Output	>= 14500 Hz (~ 342.75 gm/sec)	Engine Run Time Engine Speed Ignition Voltage Above criteria present for a period of time	> 1.0 seconds >= 300 RPM >= 8.0 Volts >= 1.0 seconds	400 failures out of 500 samples 1 sample every cylinder firing event	Type B 2 trips
Manifold Absolute Pressure Sensor Performance (naturally aspirated)	P0106	Determines if the MAP sensor is stuck within the normal operating range	Filtered Throttle Model Error AND ABS(Measured MAP – MAP Model 1) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered	<= 300 kPa*(g/s) > 15.0 kPa > 15.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 450 RPM <= 5200 RPM > -7 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.00 Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM MAP Model 1 multiplied by MAP1 Residual Weight Factor based on RPM	Continuous Calculations are performed every 12.5 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						MAP Model 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 (0.2 Volts = 3.5 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips
Manifold Absolute Pressure	P0108	Detects an open sensor ground or continuous short to	MAP Voltage	> 90.0 % of 5 Volt Range (4.5 Volts = 115.1	Continuous		320 failures out of 400 samples	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Sensor Circuit High		high in either the signal circuit or the MAP sensor.		kPa)			1 sample every 12.5 msec	
Intake Air Temperature Sensor Circuit Low (High Temperature)	P0112	Detects a continuous short to ground in the IAT signal circuit or the IAT sensor	Raw IAT Input	< 45 Ohms (~150 deg C)	Engine Run Time Coolant Temp Vehicle Speed No Active DTCs:	> 0.0 seconds < 150 deg C >= 0.00 MPH ECT_Sensor_Ckt_FA ECT_Sensor_Ckt_FP VehicleSpeedSensorError	50 failures out of 63 samples 1 sample every 100 msec	Type B 2 trips
Intake Air Temperature Sensor Circuit High (Low Temperature)	P0113	Detects a continuous open circuit in the IAT signal circuit or the IAT sensor	Raw IAT Input	> 420000 Ohms (~-60 deg C)	Engine Run Time Coolant Temp Vehicle Speed Engine Air Flow No Active DTCs:	> 0.0 seconds > -40 deg C <= 318.00 MPH <= 511 gm/sec ECT_Sensor_Ckt_FA ECT_Sensor_Ckt_FP VehicleSpeedSensorError MAF_SensorFA MAF_SensorFP MAF_SensorTFTKO	50 failures out of 63 samples 1 sample every 100 msec	Type B 2 trips
Engine Coolant Temperature	P0116	This DTC detects ECT temp sensor stuck in mid range.			No Active DTC's	VehicleSpeedSensor_FA IAT_SensorFA	1 failure	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
(ECT) Sensor Performance			A failure will be reported if any of the following occur: 1) ECT at power up > IAT at power up by an IAT based table lookup value after a minimum 28800 second soak (fast fail). 2) ECT at power up > IAT at power up by 19.3 C after a minimum 28800 second soak and a block heater has not been detected.	See "P0116: Fail if power up ECT exceeds IAT by these values" in the Supporting tables section.	Non-volatile memory initization Test complete this trip	ECT_Sensor_Ckt_FA IgnitionOffTimeValid TimeSinceEngineRunning Valid = Not occurred = False	500 msec /sample Once per valid cold start	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			3) ECT at power up > IAT at power up by 19.3 C after a minimum 28800 seconds soak and the time spent cranking the engine without starting is greater than 10.0 seconds with the LowFuelConditionDiag	= False	Test aborted this trip IAT LowFuelConditionDiag	= False ≥ -7 ºC = False		
					Block Heater detection is enabled when either of the following occurs:			
					1) ECT at power up > IAT at power up by	> 19.3 ºC		
					2) Cranking time	< 10.0 Seconds		
					Block Heater is detected and diagnostic is aborted when 1) or 2) occurs. Diagnostic is aborted when 3) or 4) occurs:			
					1a) Vehicle drive time	> 400 Seconds with		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					1b) Vehicle speed	> 14.9 MPH		
					1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is below 1b as follows:	0.00 times the seconds with vehicle speed below 1b		
					1d) IAT drops from power up IAT	≥ 3.3 ºC		
					2a) ECT drops from power up ECT	> 1 ºC Within		
					2b) Engine run time	≤ 30 Seconds		
					3) Engine run time with vehicle speed below 1b	> 1800 Seconds		
					4) Minimum IAT during test	≤ -7 ºC		
Engine Coolant Temp Sensor Circuit Low	P0117	This DTC detects a short to ground in the ECT signal circuit or the ECT sensor.	ECT Resistance (@ 150ºC)	< 45 Ohms			5 failures out of 6 samples 1 sec /sample	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
							Continuous	
Engine Coolant Temp Sensor Circuit High	P0118	Circuit Continuity This DTC detects a short to high or open in the ECT signal circuit or the ECT sensor.	ECT Resistance (@ -60ºC)	> 419000 Ohms	Engine run time Or IAT min	> 10.0 seconds ≥ -7.0 °C	5 failures out of 6 samples 1 sec /sample Continuous	2 trips Type B
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 #2 error No 5 V reference #2 DTC (P0651)	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the secondary processor	Trips: 1 Type: A MIL: YES
Throttle Position Sensor Performance (naturally aspirated)	P0121	Determines if the Throttle Position Sensor input is stuck within the normal operating range	Filtered Throttle Model Error AND ABS(Measured Flow – Modeled Air Flow) Filtered	> 300 kPa*(g/s) > 12 grams/sec	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total	>= 450 RPM <= 5200 RPM > -7 Deg C < 125 Deg C > -20 Deg C < 125 Deg C	Continuous Calculation are performed every 12.5 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					weight factor (all factors multiplied together)	>= 0.00 Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Estimate See table "IFRD Residual Weighting Factors".		
					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	P0122	Detects a	Primary TPS1			Run/crank voltage or	79 / 159	Trips:

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Low		continuous or intermittent short or open in TPS1 circuit on both processors or just the primary processor	Voltage <	0.325		Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	counts; 57 counts continuous; 3.125 ms /count in the primary processor	1 Type: A MIL: YES
			Secondary TPS1 Voltage <	0.325		No 5 V reference #2 error No 5 V reference #2 DTC (P0651)	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the secondary processor	
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 ms /count in the primary processor	Trips: 1 Type: A MIL: YES
			Secondary TPS1 Voltage >	4.75		No 5 V reference #2 error No 5 V reference #2 DTC (P0651)	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the secondary	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
							processor	
Engine Coolant Temperature Below Stat Regulating Temperature (For applications with a two coolant sensors)	P0128	This DTC detects if the engine coolant temperature rises too slowly due to an ECT or Cooling system fault	Engine run time is accumulated when airflow is ≥ 17 grams per sec during Range #1 or #2: Range #1 (Primary) ECT reaches target temperature of 75.0 °C when IAT min is < 54.5°C and ≥ 10.0°C. Range #2 (Alternate) ECT reaches target temperature of 65.0 °C when IAT min is < 10.0°C and ≥ -7.0°C.	See "P0128: Maximum Accumulated Time for IAT and Start-up ECT conditions" in the Supporting tables section.	No Active DTC's Engine not run time Engine run time Fuel Condition **Range #1 (Primary) Test** ECT at start run Average Airflow	MAF_SensorFA IAT_SensorFA THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA ≥ 1800 seconds 10 ≤ Eng Run Tme ≤ 1600 seconds Ethanol ≤ 87% -7.0 ≤ ECT ≤ 70.0 °C ≥ 17.0 gps	1 failure to set DTC 1 sec /sample Once per ignition key cycle	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Range #2 (Alternate) Test ECT at start run Average Airflow	-7.0 ≤ ECT ≤ 60.0 °C ≥ 17.0 gps		
O2S Circuit Low Voltage Bank 1 Sensor 1	P0131	This DTC determines if the O2 sensor circuit is shorted to low.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is < 50 mvolts	No Active DTC's AIR intrusive test Fuel intrusive test	TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA = Not active = Not active	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.
					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	0.9922 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	3 % <= Throttle <= 70 %		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel Condition	Ethanol <= 87%		
					Fuel State	DFCO not active		
					All of the above met for			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Time	> 2.0 seconds		
O2S Circuit High Voltage Bank 1 Sensor 1	P0132	This DTC determines if the O2 sensor circuit is shorted to high.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is > 1050 mvolts	No Active DTC's AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control	TPS_ThrottleAuthorityDefaulted MAP_SensorFA MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA = Not active = Not active = Not active = Not active 10.0 volts < system voltage< 32.0 volts = Not active	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.
					Idle Device Control	= Not active
					Fuel Device Control	= Not active
					AIR Device Control	= Not active
					Low Fuel Condition Diag	= False
					Equivalence Ratio	0.9922 ≤ equiv. ratio ≤ 1.0137
					Throttle Position	0.0 % <= Throttle <= 70.0 %
					Fuel Control State	= Closed Loop
					Fuel Control State	not = Power Enrichment
					Closed Loop Active	= TRUE
					All Fuel Injectors for active Cylinders	Enabled (On)
					Fuel State	DFCO not active
					Fuel Condition	Ethanol <= 87%
					All of the above met for	
					Time	> 2 seconds
O2S Slow Response Bank 1 Sensor 1	P0133	This DTC determines if the O2 sensor response time is	The average response time is caluclated over the test time, and	Refer to “P0133 - O2S Slow Response Bank 1 Sensor 1"	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA	Sample time is 60 seconds	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		degraded.	compared to the threshold. Or If Slope Time L/R or R/L Switches are below the threshold.	Pass/Fail Threshold table in the Supporting Tables tab. S/T L/R switches < 3, or S/T R/L switches < 3 The test averages the signal response time over 60.0 seconds when the signal is transitioning between 600 mvolts and 300 mvolts. An average rich to lean and lean to rich time are each calculated separately.	Bank 1 Sensor 1 DTC's not active System Voltage EGR Device Control Idle Device Control	IAT_SensorFA ECT_Sensor_FA AmbientAirPressCktFA_NoSnsr MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA EthanolCompositionSensor_FA EngineMisfireDetected_FA = P0131, P0132 or P0134 10.0 volts < system voltage< 32.0 volts = Not active = Not active	Frequency: Once per trip	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Green O2S Condition	= Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria** (B1S1, B2S1) in Supporting Tables tab.		
					O2 Heater on for	>= 40 seconds		
					Learned Htr resistance	= Valid		
					Engine Coolant	> 50 ºC		
					IAT	> -40 ºC		
					Engine Run Time	> 120 seconds		
					Time since any AFM status change	> 0.0 seconds		
					Time since Purge On to Off change	> 0.0 seconds		
					Time since Purge Off to On change	> 0.0 seconds		
					Purge duty cycle	>= 0 % duty cycle		
					Engine airflow	20 gps <= engine airflow <= 55 gps		
					Engine speed	1200 <= RPM <= 3000		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Fuel	< 87 % Ethanol		
					Baro	> 70 kpa		
					Throttle Position	>= 5 %		
					Low Fuel Condition Diag	= False		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					LTM fuel cell	= Enabled		
					Transient Fuel Mass	<= 100.0 mgrams		
					Baro	= Not Defaulted		
					Fuel Control State	not = Power Enrichment		
					Fuel State	DFCO not active		
					Commanded Proportional Gain	>= 0.0 %		
					All of the above met for			
					Time	> 3.5 seconds		
O2S Circuit Insufficient Activity Bank 1 Sensor 1	P0134	This DTC determines if the O2 sensor circuit is open.	Measure Oxygen Sensor Signal.	350 mvolts < Oxygen Sensor signal < 550 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAF_SensorFA	400 failures out of 500 samples.	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						EthanolCompositionSensor_FA	Minimum of 0 delta TPS changes required to report fail. Delta TPS is incremented when the TPS % change >= 0.0 %	
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					AFM Status	= All Cylinders active		
					Heater Warm-up delay	= Complete	Frequency: Continuous	
					Predicted Exhaust Temp (by location)	= Wamed Up		
					Engine Run Time	> 300 seconds	100msec loop	
					Fuel	<= 87 % Ethanol		
O2S Heater Performance Bank 1 Sensor 1	P0135	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	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: 1 tests per trip	
					Heater Warm-up delay	= Complete		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					B1S1 O2S Heater Duty Cycle O2S Heater device control	> zero = Not active	5 seconds delay between tests and 1 second execution rate	
					All of the above met for			
					Time	> 120 seconds		
O2S Circuit Low Voltage Bank 1 Sensor 2	P0137	This DTC determines if the O2 sensor circuit is shorted to low.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is < 50 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA	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.
						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	0.9922 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	3 % <= Throttle <= 70 %		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel Condition	Ethanol <= 87%		
					Fuel State	DFCO not active		
					All of the above met for			
					Time	> 2.0 seconds		
O2S Circuit High Voltage Bank 1 Sensor 2	P0138	This DTC determines if the O2 sensor circuit is shorted to high.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is > 1050 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					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	0.9922 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	3.0 % <= Throttle <= 70.0 %		
					Fuel Control State	= Closed Loop		
					Fuel Control State	not = Power Enrichment		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel State	DFCO not active		
					Fuel Condition	Ethanol <= 87%		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					All of the above met for			
					Time	> 2 seconds		
O2 Sensor Slow Response Rich to Lean Bank 1 Sensor 2	P013A	This DTC determines if the post catalyst O2 sensor has Slow Response in a predefined Rich to Lean voltages range during Rich to Lean transition. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	The EWMA of the Post O2 sensor normalized integral value is greater than the threshold. OR The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds) is greater than the airflow threshold.	1) B1S2 EWMA normalized integral value > 8.2 units OR 2) Accumulated air flow during slow rich to lean test > 75 grams (upper threshold is 500 mvolts and lower threshold is 200 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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					B1S2 Failed this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Post fuel cell DTC's Passed DTC's Passed	P013B, P013E, P013F, P2270 or P2271 10.0 volts < system voltage< 32.0 volts = Valid = Not Valid = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria** (B1S2, B2S2) in Supporting Tables tab. = False = enabled = P2270 (and P2272 (if applicable)) = P013E (and P014A (if applicable))		
					After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).			
O2 Sensor Slow Response	P013B	This DTC determines if the post catalyst O2	The EWMA of the Post O2 sensor normalized integral	1) B1S2 EWMA normalized integral value >	No Active DTC's	TPS_ThrottleAuthorityDefaulted	Frequency: Once per trip	1 trips Type A EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Lean to Rich Bank 1 Sensor 2		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.	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.	8.2 units OR 2) Accumulated air flow during slow lean to rich test > 567 grams (lower threshold is 350 mvolts and upper threshold is 650 mvolts)	B1S2 Failed this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay	ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013E, P013F, P2270 or P2271 10.0 volts < system voltage< 32.0 volts = Valid = Not Valid	Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Green O2S Condition	= Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria** (B1S2, B2S2) in Supporting Tables tab.		
					Green Cat System Condition	is Not Valid, System is not valid until accumulated airflow is greater than 720000.0 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C. (Note: This feature is only enabled when the vehicle is new and cannot be enabled in service.)		
					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))		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					After above conditions are met: Fuel Enrich mode continued.			
					During test: Fuel EQR must stay between:	0.95 <= EQR <= 1.10		
O2 Sensor Slow Response Rich to Lean Bank 2 Sensor 2	P013C	This DTC determines if the post catalyst O2 sensor has Slow Response in a predefined Rich to Lean voltages range during Rich to Lean transition. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	The EWMA of the Post O2 sensor normalized integral value is greater than the threshold. OR The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds) is greater than the airflow threshold.	1) B1S2 EWMA normalized integral value > 8.2 units OR 2) Accumulated air flow during slow rich to lean test > 75 grams (upper threshold is 500 mvolts and lower threshold is 200 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	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	1 trips Type A EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						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 **Multiple DTC Use_Green Sensor Delay Criteria** (B1S2, 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 > 8.2 units OR 2) Accumulated air flow during slow lean to rich test > 567 grams (lower threshold is 350 mvolts and upper threshold is 650 mvolts)	No Active DTC's B2S2 Failed this key cycle System Voltage	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013C, P014A, P014B, P2272 or P2273 10.0 volts < system voltage< 32.0 volts	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	1 trips Type A EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Learned heater resistance	= Valid
					ICAT MAT Burnoff delay	= Not Valid
					Green O2S Condition	= Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria** (B1S2, B2S2) in Supporting Tables tab.
					Green Cat System Condition	is Not Valid, System is not valid until accumulated airflow is greater than 720000.0 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C. (Note: This feature is only enabled when the vehicle is new and cannot be enabled in service.)
					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))

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					DTC's Passed DTC's Passed	= P2271 (and P2273 (if applicable)) = P013F (and P014B (if applicable))		
					After above conditions are met: Fuel Enrich mode continued.			
					During test: Fuel EQR must stay between:	0.95 <= EQR <= 1.10		
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 > 500 mvolts AND 2) Accumulated air flow during stuck rich test > 78 grams.	No Active DTC's	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						FuelTrimSystemB1_FA FuelTrimSystemB2_FA		
						EngineMisfireDetected_FA		
						EthanolCompositionSensor_FA		
					B1S2 Failed this key cycle	P013A, P013B, P013F, P2270 or P2271		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria** (B1S2, B2S2) in Supporting Tables tab.		
					Low Fuel Condition Diag	= False		
					Post fuel cell	= enabled		
					DTC's Passed	= P2270 and P2272 (if applicable)		
					Number of fueled cylinders	≤ 8 cylinders		
					After above conditions are met: DFCO mode is 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.
O2 Sensor Delayed Response Lean to Rich Bank 1 Sensor 2	P013F	This DTC determines if the post catalyst O2 sensor has an initial delayed response to an A/F change from Lean to Rich. The diagnostic is an intrusive test which increases the delivered A/F ratio to achieve the required rich threshold.	Post O2 sensor cannot go above the threshold voltage. AND The Accumulated mass air flow monitored during the Delayed Response Test is greater than the threshold.	1) Post O2S signal < 350 mvolts AND 2) Accumulated air flow during lean to rich test > 1100 grams.	No Active DTC's B1S2 Failed this key cycle System Voltage	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013B, P013E, P2270 or P2271 10.0 volts < system voltage< 32.0 volts	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Learned heater resistance	= Valid
					ICAT MAT Burnoff delay	= Not Valid
					Green O2S Condition	= Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria** (B1S2, B2S2) in Supporting Tables tab.
					Green Cat System Condition	is Not Valid, System is not valid until accumulated airflow is greater than 720000 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C. (Note: This feature is only enabled when the vehicle is new and cannot be enabled in service.)
					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))

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					DTC's Passed	= P2271 (and P2273 (if applicable))		
					Number of fueled cylinders	≥ 0 cylinders		
					After above conditions are met: Fuel Enrich mode entered.			
					During test: Fuel EQR must stay between:	0.95 <= EQR <= 1.10		
O2S Circuit Insufficient Activity Bank 1 Sensor 2	P0140	This DTC determines if the O2 sensor circuit is open.	Measure Oxygen Sensor Signal.	380 mvolts < Oxygen Sensor signal < 520 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted	590 failures out of 740 samples.	2 trips Type B
						MAF_SensorFA	Minimum of 0 delta TPS changes required to report fail. Delta TPS is incremented when the TPS % change >= 0.0 %	
						EthanolCompositionSensor_FA		
					System Voltage	10.0 volts < system voltage < 32.0 volts		
					AFM Status	= All Cylinders active		
					Heater Warm-up delay	= Complete	100msec loop	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Predicted Exhaust Temp (by location)	= Wamed Up	Frequency: Once per trip for post sensors	
					Engine Run Time	> 300 seconds		
					Fuel	<= 87 % Ethanol		
O2S Heater Performance Bank 1 Sensor 2	P0141	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	Measured Heater Current.	Measured Heater current < 0.3 amps -OR- Measured Heater current > 2.9 amps	No Active DTC's	ECT_Sensor_FA	8 failures out of 10 samples	2 trips Type B
					System Voltage	10.0 volts < system voltage< 32.0 volts	Frequency: 1 tests per trip 5 seconds delay between tests and 1 second execution rate	
					Heater Warm-up delay	= Complete		
					B1S2 O2S Heater Duty Cycle	> zero		
					O2S Heater device control	= Not active		
					All of the above met for			
					Time	> 120 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
O2 Sensor Delayed Response Rich to Lean Bank 2 Sensor 2	P014A	This DTC determines if the post catalyst O2 sensor has an initial delayed response to an A/F change from Rich to Lean. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	Post O2 sensor cannot go below the threshold voltage. AND The Accumulated mass air flow monitored during the Delayed Response Test is greater than the threshold.	1) Post O2S signal > 500 mvolts AND 2) Accumulated air flow during stuck rich test > 78 grams.	No Active DTC's B2S2 Failed this key cycle System Voltage	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013C, P013D, P014B, P2272 or P2273 10.0 volts < system voltage< 32.0 volts	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Post fuel cell DTC's Passed Number of fueled cylinders	= Valid = Not Valid = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria** (B1S2, B2S2) in Supporting Tables tab. = False = enabled = P2270 and P2272 (if applicable) ≤ 8 cylinders		
					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	Post O2 sensor cannot go above the threshold voltage. AND The Accumulated mass air flow monitored during	1) Post O2S signal < 350 mvolts AND 2) Accumulated air flow during lean to rich test > 1100 grams.	No Active DTC's	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		increases the delivered A/F ratio to achieve the required rich threshold.	the Delayed Response Test is greater than the threshold.			IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013C, P013D, P014A, P2272 or P2273 10.0 volts < system voltage< 32.0 volts = Valid = Not Valid = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria** (B1S2, B2S2) in Supporting Tables tab.	OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	
					B2S2 Failed this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						is Not Valid, System is not valid until accumulated airflow is greater than 720000.0 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C. (Note: This feature is only enabled when the vehicle is new and cannot be enabled in service.)		
					Green Cat System Condition			
					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))		
					Number of fueled cylinders	≥ 0 cylinders		
					After above conditions are met: Fuel Enrich mode entered.			
					During test: Fuel EQR must stay between:	0.95 <= EQR <= 1.10		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
O2S Circuit Low Voltage Bank 2 Sensor 1	P0151	This DTC determines if the O2 sensor circuit is shorted to low.	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 EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA	380 failures out of 475 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 32.0 volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					EGR Device Control	= Not active
					Idle Device Control	= Not active
					Fuel Device Control	= Not active
					AIR Device Control	= Not active
					Low Fuel Condition Diag	= False
					Equivalence Ratio	0.9922 ≤ equiv. ratio ≤ 1.0137
					Throttle Position	3 % <= Throttle <= 70 %
					Fuel Control State	= Closed Loop
					Closed Loop Active	= TRUE
					All Fuel Injectors for active Cylinders	Enabled (On)
					Fuel Condition	Ethanol <= 87%
					Fuel State	DFCO not active
					All of the above met for	
					Time	> 2.0 seconds
O2S Circuit High Voltage Bank 2 Sensor 1	P0152	This DTC determines if the O2 sensor circuit is shorted to high.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is > 1050 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA	100 failures out of 125 samples	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA	Frequency: Continuous in 100 milli - second loop	
					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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Low Fuel Condition Diag	= False
					Equivalence Ratio	0.9922 ≤ equiv. ratio ≤ 1.0137
					Throttle Position	0.0 % <= Throttle <= 70.0 %
					Fuel Control State	= Closed Loop
					Fuel Control State	not = Power Enrichment
					Closed Loop Active	= TRUE
					All Fuel Injectors for active Cylinders	Enabled (On)
					Fuel State	DFCO not active
					Fuel Condition	Ethanol <= 87%
					All of the above met for	
					Time	> 2 seconds
O2S Slow Response Bank 2 Sensor 1	P0153	This DTC determines if the O2 sensor response time is degraded.	The average response time is caluclated over the test time, and compared to the threshold. Or	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 AmbientAirPressCktFA_NoSnsr MAF_SensorFA	Sample time is 60 seconds Frequency: Once per trip	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			If Slope Time L/R or R/L Switches are below the threshold.	S/T L/R switches < 3, or S/T R/L switches < 3 The test averages the signal response time over 60.0 seconds when the signal is transitioning between 600 mvolts and 300 mvolts. An average rich to lean and lean to rich time are each calculated separately	Bank 2 Sensor 1 DTC's not active System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Diag	EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA EthanolCompositionSensor_FA EngineMisfireDetected_FA = P0151, P0152 or P0154 10.0 volts < system voltage< 32.0 volts = Not active = Not active = Not active = Not active = False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						= Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay**		
					Green O2S Condition	**Criteria** (B1S1, B2S1) in Supporting Tables tab.		
					O2 Heater on for	>= 40 seconds		
					Learned Htr resistance	= Valid		
					Engine Coolant	> 50 ºC		
					IAT	> -40 ºC		
					Engine Run Time	> 120 seconds		
					Time since any AFM status change	> 0.0 seconds		
					Time since Purge On to Off change	> 0.0 seconds		
					Time since Purge Off to On change	> 0.0 seconds		
					Purge duty cycle	>= 0 % duty cycle		
					Engine airflow	20 gps <= engine airflow <= 55 gps		
					Engine speed	1200 <= RPM <= 3000		
					Fuel	< 87 % Ethanol		
					Baro	> 70 kpa		
					Throttle Position	>= 5 %		
					Low Fuel Condition Diag	= False		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					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 Commanded	DFCO not active		
					Proportional Gain	>= 0.0 %		
					All of the above met for			
					Time	> 3.5 seconds		
O2S Circuit Insufficient Activity Bank 2 Sensor 1	P0154	This DTC determines if the O2 sensor circuit is open.	Measure Oxygen Sensor Signal.	350 mvolts < Oxygen Sensor signal < 550 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA	400 failures out of 500 samples. Minimum of 0 delta TPS changes required to report fail.	2 trips Type B

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 AFM Status Heater Warm-up delay Predicted Exhaust Temp (by location) Engine Run Time Fuel	10.0 volts < system voltage< 32.0 volts = All Cylinders active = Complete = Wamed Up > 300 seconds <= 87 % Ethanol	Frequency: Continuous 100msec loop	
O2S Heater Performance Bank 2 Sensor 1	P0155	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	Measured Heater Current.	Measured Heater current < 0.3 amps -OR- Measured Heater current > 3.1 amps	No Active DTC's System Voltage Heater Warm-up delay B2S1 O2S Heater Duty Cycle	ECT_Sensor_FA 10.0 volts < system voltage< 32.0 volts = Complete > zero	8 failures out of 10 samples Frequency: 1 tests per trip 5 seconds delay between tests and 1 second execution rate	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					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 EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA	430 failures out of 540 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					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	0.9922 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	3 % <= Throttle <= 70 %		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel Condition	Ethanol <= 87%		
					Fuel State	DFCO not active		
					All of the above met for			
					Time	> 2.0 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
O2S Circuit High Voltage Bank 2 Sensor 2	P0158	This DTC determines if the O2 sensor circuit is shorted to high.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is > 1050 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Equivalence Ratio	0.9922 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	3.0 % <= Throttle <= 70.0 %		
					Fuel Control State	= Closed Loop		
					Fuel Control State	not = Power Enrichment		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel State	DFCO not active		
					Fuel Condition	Ethanol <= 87%		
					All of the above met for			
					Time	> 2 seconds		
O2 Sensor Delayed Response Rich to Lean Bank 1	P015A	This DTC determines if the pre catalyst O2 sensor has an initial delayed	The EWMA of the Pre O2 sensor normalized R2L time delay value	> 0.45 EWMA (sec)	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA	Frequency: Once per trip Note: if NaESPD_b_FastInitRespl	1 trips Type A EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Sensor 1		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.	OR [The Accumulated time monitored during the R2L Delayed Response Test (Gross failure). AND Pre O2 sensor voltage is above]	 ≥ 1.80 Seconds > 550 mvolts		AmbientAirPressCktFA_NoSnsr MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131 P0132 P0134	sActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponseIsActive = TRUE, multiple tests per trip are allowed	
					System Voltage EGR Device Control Idle Device Control	10.0 < Volts < 32.0 = Not active = Not active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Green O2S Condition	= Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria** (B1S1, B2S1) in Supporting Tables tab.		
					O2 Heater (pre sensor) on for	≥ 40 seconds		
					Learned Htr resistance	= Valid		
					Engine Coolant	> 50 ºC		
					IAT	> -40 ºC		
					Engine run Accum	> 120 seconds		
					Engine Speed to initially enable	1100 ≤ RPM ≤ 2500		
					Engine Speed range to keep test enabled (after initially	1050 ≤ RPM ≤ 2650		
					Engine Airflow	3 ≤ gps ≤ 20		
					Vehicle Speed to initially enable	40.4 ≤ MPH ≤ 82.0		
					Vehicle Speed range to keep test enabled			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					(after initially Closed loop integral	36.0 ≤ MPH ≤ 87.0 mph 0.74 ≤ C/L Int ≤ 1.08		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater (post sensor) on Time	≥ 80.0 sec		
					Predicted Catalyst temp	550 ≤ ºC ≤ 900		
					Fuel State	= DFCO possible		
					All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested.			
					Pre O2S voltage B1S1 at end of Cat Rich stage	≥ 690 mvolts		
					Fuel State	= DFCO active		
					Number of fueled cylinders	≤ 6 cylinders		
					After above conditions are met: DFCO 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.
O2 Sensor Delayed Response Lean to Rich Bank 1 Sensor 1	P015B	This DTC determines if the pre catalyst O2 sensor has an initial delayed response to an A/F change from Lean to Rich. The diagnostic is an intrusive test which runs in an enriched fuel mode to achieve the required response.	The EWMA of the Pre O2 sensor normalized L2R time delay value OR [The Accumulated time monitored during the L2R Delayed Response Test (Gross failure). AND Pre O2 sensor voltage is below] OR At end of Cat Rich stage the Pre O2 sensor output is	> 0.48 EWMA (sec) ≥ 2.00 Seconds < 350 mvolts < 690 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirPressCktFA_NoSnsr MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131 P0132 P0134	Frequency: Once per trip Note: if NaESPD_b_FastInitResplsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponseIsActive = TRUE, multiple tests per trip are allowed	1 trips Type A EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					System Voltage	10.0 < Volts < 32.0		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Green O2S Condition	= Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria** (B1S1, B2S1) in Supporting Tables tab.		
					O2 Heater (pre sensor) on for	≥ 40 seconds		
					Learned Htr resistance	= Valid		
					Engine Coolant	> 50 ºC		
					IAT	> -40 ºC		
					Fuel State	= DFCO inhibit		
					Number of fueled cylinders	≥ 2 cylinders		
					When above conditions are met: Fuel Enrich mode entered (Test begins)			
					During test: Engine Airflow			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					must stay between: and the delta Engine Airflow over 12.5msec must be :	5 ≤ gps ≤ 20 <= 5.0 gps		
O2 Sensor Delayed Response Rich to Lean Bank 2 Sensor 1	P015C	This DTC determines if the pre 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.	The EWMA of the Pre O2 sensor normalized R2L time delay value OR [The Accumulated time monitored during the R2L Delayed Response Test (Gross failure). AND Pre O2 sensor voltage is above]	> 0.45 EWMA (sec) ≥ 1.80 Seconds > 550 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirPressCktFA_NoSnsr MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA	Frequency: Once per trip Note: if NaESPD_b_FastInitResplsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponseIsActive = TRUE, multiple tests per trip are allowed	1 trips Type A EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						EngineMisfireDetected_FA P0131 P0132 P0134		
					System Voltage	10.0 < Volts < 32.0		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Green O2S Condition	= Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria** (B1S1, B2S1) in Supporting Tables tab.		
					O2 Heater (pre sensor) on for	≥ 40 seconds		
					Learned Htr resistance	= Valid		
					Engine Coolant	> 50 ºC		
					IAT	> -40 ºC		
					Engine run Accum	> 120 seconds		
					Engine Speed to			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					initially enable Engine Speed range to keep test enabled	1100 ≤ RPM ≤ 2500		
					(after initially Engine Airflow	1050 ≤ RPM ≤ 2650 3 ≤ gps ≤ 20		
					Vehicle Speed to initially enable	40.4 ≤ MPH ≤ 82.0		
					Vehicle Speed range to keep test enabled (after initially	36.0 ≤ MPH ≤ 87.0 mph		
					Closed loop integral	0.74 ≤ C/L Int ≤ 1.08		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater (post sensor) on Time	≥ 80.0 sec		
					Predicted Catalyst temp	550 ≤ ºC ≤ 900		
					Fuel State	= DFCO possible		
					All of the above met for at least 2.0 seconds, and then the Force Cat Rich			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					intrusive stage is requested.			
					Pre O2S voltage B1S1 at end of Cat Rich stage Fuel State Number of fueled cylinders	≥ 690 mvolts = DFCO active ≤ 6 cylinders		
					After above conditions are met: DFCO entered (wo driver initiated pedal input).			
O2 Sensor Delayed Response Lean to Rich Bank 2 Sensor 1	P015D	This DTC determines if the pre catalyst O2 sensor has an initial delayed response to an A/F change from Lean to Rich. The diagnostic is an intrusive test which runs in an enriched fuel mode to achieve the required response.	The EWMA of the Pre O2 sensor normalized L2R time delay value OR [The Accumulated time monitored during the L2R Delayed Response Test (Gross failure). AND Pre O2 sensor voltage is below] OR	> 0.48 EWMA (sec) ≥ 2.00 Seconds < 350 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirPressCktFA_NoSnsr MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA	Frequency: Once per trip Note: if NaESPD_b_FastInitResplsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponseIsActive = TRUE, multiple tests per trip are allowed	1 trips Type A EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			OR At end of Cat Rich stage the Pre O2 sensor output is	< 690 mvolts		FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131 P0132 P0134		
					System Voltage	10.0 < Volts < 32.0		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Green O2S Condition	= Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria** (B1S1, B2S1) in Supporting Tables tab.		
					O2 Heater (pre sensor) 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	> 50 ºC		
					IAT	> -40 ºC		
					Fuel State	= DFCO inhibit		
					Number of fueled cylinders	≥ 2 cylinders		
					When above conditions are met: Fuel Enrich mode entered (Test begins)			
					During test: Engine Airflow must stay between:	5 ≤ gps ≤ 20		
					and the delta Engine Airflow over 12.5msec must be :	<= 5.0 gps		
O2S Circuit Insufficient Activity Bank 2 Sensor 2	P0160	This DTC determines if the O2 sensor circuit is open.	Measure Oxygen Sensor Signal.	380 mvolts < Oxygen Sensor signal < 520 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA	590 failures out of 740 samples. Minimum of 0 delta TPS changes required to report fail.	2 trips Type B

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		
					Heater Warm-up delay	= Complete	100msec loop	
					Predicted Exhaust Temp (by location)	= Wamed Up		
							Frequency: Once per trip for post sensors	
					Engine Run Time	> 300 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 > 2.9 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: 1 tests per trip	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					B2S2 O2S Heater Duty Cycle	> zero	5 seconds delay between tests and 1 second execution rate	
					O2S Heater device control	= Not active		
					All of the above met for			
					Time	> 120 seconds		
Fuel System Too Lean Bank 1	P0171	Determines if the fuel control system is in a lean condition, based on the filtered long-term and short-term fuel trim.	The filtered long-term fuel trim metric	>= **Long Term Trim Lean Table**	Engine speed	375 <rpm< 7000	Frequency: 100 ms Continuous Loop Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during **76** % of the EPAIII drive cycle. This is also	2 Trip(s) Type B
					BARO	> 70 kPa		
					Coolant Temp	-40 <°C< 150		
					MAP	10 <kPa< 255		
			AND		Inlet Air Temp	-7 <°C< 150		
			The filtered short-term fuel trim metric (NOTE: any value < 0.95 effectively nullifies the short-term fuel trim criteria)	>= 0.100	MAF	1.0 <g/s< 510.0		
					Fuel Level	> 10 % or if fuel sender is faulty the diagnostic will bypass the fuel level criteria.		
					Long Term Fuel Trim data accumulation:	> 27.5 seconds of data must accumulate on each trip, with at least 17.5 seconds of data in the current fuel trim cell before a pass or fail decision can be made.		
					Sometimes, certain Long-	**Please see "Long-Term Fuel Trim Cell Usage" in**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Term Fuel Trim Cells are not utilized for control and/or diagnosis	**Supporting Tables Tab for a list of cells utilized for diagnosis**	This is also typical of real-world driving, however values will vary (higher or lower) based on the actual conditions present during the drive cycle.	
					Closed Loop Long Term FT	Enabled Enabled **Please see "Closed Loop Enable Criteria" and "Long Term FT Enable Criteria" in Supporting Tables.**		
					Fuel Consumed ("Virtual Flex Fuel Sensor" applications only)	If > 0.3 liters of fuel are consumed after a refuel event then the Virtual Flex Fuel Sensor (VFFS) logic may disable Long Term FT for a few seconds while it "learns" the new ethanol concentration. (VFFS apps only)		
					EGR Diag. Catalyst Diag. Post O2 Diag. Device Control EVAP Diag.	Intrusive Test Not Active Intrusive Test Not Active Intrusive Test Not Active Not Active “tank pull down” Not Active		
					No active DTCs:			
					IAC SystemRPM FA			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR System FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSensorCircuit_FA Ethanol Composition Sensor FA FuelInjectorCircuit_FA EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit_FA MAP_EngineVacuumStatus AmbientAirDefault_NA O2S_Bank_1_Sensor_1_FA			
Fuel System Too Rich Bank 1	P0172	Determines if the fuel control system is in a rich condition, based on the filtered long-term fuel trim metric. There are two methods to determine a Rich fault. They are	Passive Test: The filtered Non-Purge Long Term Fuel Trim metric	<= **Non Purge Rich Limit** Table		Secondary Parameters and Enable Conditions are identical to those for P0171, with the exception that fuel level is not considered.	Frequency: 100 ms Continuous Loop Development data indicates that the Fuel Adjustment System Diagnostic	2 Trip(s) Type B
			AND					
			The filtered Short Term Fuel Trim metric (NOTE: any value > 1.05 effectively nullifies the short-	<= 2.000				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		Passive and Intrusive. A Passive Test decision cannot be made when Purge is enabled. The Intrusive test is described below:	term fuel trim criteria)				(FASD) is typically enabled during **76** % of the EPAIII drive cycle. This is also typical of real-world driving, however values will vary (higher or lower) based on the actual conditions present during the drive cycle.	
			Intrusive Test: The filtered Purge Long Term Fuel Trim metric	<= **Purge Rich Limit** Table				
			AND					
			The filtered Non-Purge Long Term Fuel Trim metric AND The filtered Short Term Fuel Trim metric (NOTE: value > 1.05 indicates cal-out)	<= **Non Purge Rich Limit** Table <= 2.000 All of above for 3 out of 5 intrusive segments				
		Intrusive Test: When the filtered Purge Long Term fuel trim metric is <= **Purge Rich Limit** Table, purge is ramped off to determine if excess purge vapor is the cause of the rich condition. If the filtered Purge-on Long Term fuel trim > **Purge Rich Limit** Table the	Segment Def'n: Segments can last up to 30 seconds and are separated by the lesser of 20 seconds of purge-on time or enough time to purge 16 grams of vapor. A maximum of 5 completed segments or 20 attempts are allowed for each					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		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.	allowed for each intrusive test. After an intrusive test report is completed, another intrusive test cannot occur for 300 seconds to allow sufficient time to purge excess vapors from the canister. During this period, fuel trim will pass if the filtered Purge-on Long Term fuel trim > Purge Rich Limit Table for at least 200 seconds, indicating that the canister has been purged.					
Fuel System Too Lean Bank 2	P0174	Determines if the fuel control system is in a lean condition, based on the filtered long-term and short-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 Fuel Level	375 <rpm< 7000 > 70 kPa -40 <°C< 150 10 <kPa< 255 -7 <°C< 150 1.0 <g/s< 510.0 > 10 % or if fuel sender is faulty the diagnostic will	Frequency: 100 ms Continuous Loop Development data indicates that	2 Trip(s) Type B
			AND					
			The filtered short-term fuel trim metric (NOTE: any value <	>= 0.100				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			0.95 effectively nullifies the short-term fuel trim criteria)			bypass the fuel level criteria.	the Fuel Adjustment System Diagnostic (FASD) is typically enabled during **76** % of the EPAIII drive cycle. This is also typical of real-world driving, however values will vary (higher or lower) based on the actual conditions present during the drive cycle.	
					Long Term Fuel Trim data accumulation:	> 27.5 seconds of data must accumulate on each trip, with at least 17.5 seconds of data in the current fuel trim cell before a pass or fail decision can be made.		
					Sometimes, certain Long-Term Fuel Trim Cells are not utilized for control and/or diagnosis	**Please see "Long-Term Fuel Trim Cell Usage" in Supporting Tables Tab for a list of cells utilized for diagnosis**		
					Closed Loop Long Term FT	Enabled Enabled **Please see "Closed Loop Enable Criteria" and "Long Term FT Enable Criteria" in Supporting Tables.**		
					Fuel Consumed ("Virtual Flex Fuel Sensor" applications only)	If > 0.3 liters of fuel are consumed after a refuel event then the Virtual Flex Fuel Sensor (VFFS) logic may disable Long Term FT for a few seconds while it "learns" the new ethanol concentration. (VFFS apps		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						only)		
					EGR Diag. Catalyst Diag. Post O2 Diag. Device Control EVAP Diag.	Intrusive Test Not Active Intrusive Test Not Active Intrusive Test Not Active Not Active “tank pull down” Not Active		
					No active DTCs:			
					IAC_SystemRPM_FA MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR System FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSensorCircuit_FA Ethanol Composition Sensor FA FuelInjectorCircuit_FA EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit_FA MAP_EngineVacuumStatus AmbientAirDefault_NA O2S_Bank_2_Sensor_1_FA			
Fuel System	P0175	Determines if the	Passive Test: The	<= **Non Purge**		Secondary Parameters	Frequency:	2

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Too Rich Bank 2		fuel control system is in a rich condition, based on the filtered long-term fuel trim metric. There are two methods to determine a Rich fault. They are Passive and Intrusive. A Passive Test decision cannot be made when Purge is enabled. The Intrusive test is described below:	filtered Non-Purge Long Term Fuel Trim metric	**Rich Limit** Table		and Enable Conditions are identical to those for P0174, with the exception that fuel level is not considered.	100 ms Continuous Loop Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during **76** % of the EPAIII drive cycle. This is also typical of real-world driving, however values will vary (higher or lower) based on the actual conditions present during the drive cycle.	Trip(s) Type B
			AND					
			The filtered Short Term Fuel Trim metric (NOTE: any value > 1.05 effectively nullifies the short-term fuel trim criteria)	<= 2.000				
			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				
			AND					
			The filtered Short Term Fuel Trim metric (NOTE: value > 1.05 indicates cal-out)	<= 2.000 All of above for 3 out of 5 intrusive segments				
		Intrusive Test: When the filtered Purge Long Term fuel trim metric is	Segment Def'n: Segments can last up to 30 seconds and are separated					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		<= **Purge Rich Limit** Table, purge is ramped off to determine if excess purge vapor is the cause of the rich condition. If the filtered Purge-on Long Term fuel trim > **Purge Rich Limit** Table the test passes without checking the 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.	by the lesser of 20 seconds of purge-on time or enough time to purge 16 grams of vapor. A maximum of 5 completed segments or 20 attempts are allowed for each intrusive test. After an intrusive test report is completed, another intrusive test cannot occur for 300 seconds to allow sufficient time to purge excess vapors from the canister. During this period, fuel trim will pass if the filtered Purge-on Long Term fuel trim > Purge Rich Limit Table for at least 200 seconds, indicating that the canister has been					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			canister has been purged.					
Fuel Composition Sensor Circuit Low	P0178	Detects Out of Range Low Frequency Signal The ethanol sensor is designed to measure ethanol concentrations from E0 (50Hz) to E100 (150Hz), with a specified accuracy of 5% ethanol (i.e. 5Hz). Therefore, values less than 45Hz or greater than 155Hz are considered as faults.	Flex Fuel Sensor Output Frequency	< 45 Hertz	Powertrain Relay	> 11.0 Volts < 32.0 Volts	50 failures out of 63 samples 100 ms loop Continuous	2 trip(s) Type B
Fuel Composition Sensor Circuit High	P0179	Detects Out of Range High Frequency Signal The ethanol sensor is designed to	Flex Fuel Sensor Output Frequency	> 155 Hertz <= 185 Hertz	Powertrain Relay	> 11.0 Volts < 32.0 Volts	50 failures out of 63 samples 100 ms loop Continuous	2 trip(s) Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		measure ethanol concentrations from E0 (50Hz) to E100 (150Hz), with a specified accuracy of 5% ethanol (i.e. 5Hz). Therefore, values less than 45Hz or greater than 155Hz are considered as faults.						
Injector 1	P0201	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	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.
Injector 2	P0202	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
Injector 3	P0203	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
Injector 4	P0204	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	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.
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	2 trips Type B
Injector 6	P0206	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
Injector 7	P0207	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	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.
Injector 8	P0208	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
TPS2 Circuit	P0220	Detects a continuous or intermittent short or open in TPS2 circuit on the secondary processor but sensor is in range on the primary processor	Secondary TPS2 Voltage < or Secondary TPS2 Voltage >	0.25 4.59		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions No 5 V reference #2 error No 5 V reference #2 DTC (P0651)	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the secondary processor	Trips: 1 Type: A MIL: YES
TPS2 Circuit Low	P0222	Detects a continuous or intermittent short or open 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 ms /count in the primary processor	Trips: 1 Type: A MIL: YES
			Secondary TPS2 Voltage <	0.25		No 5 V reference #2 error	19 / 39 counts or 14	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						No 5 V reference #2 DTC (P0651)	counts continuous; 12.5 ms/count in the secondary processor	
TPS2 Circuit High	P0223	Detects a continuous or intermittent short in TPS1 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 ms /count in the primary processor	Trips: 1 Type: A MIL: YES
			Secondary TPS2 Voltage >	4.59		No 5 V reference #2 error No 5 V reference #2 DTC (P0651)	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the secondary processor	
Fuel Pump Primary Circuit (ODM)	P0230	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Engine Speed	11 volts ≤ Voltage ≤ 32 volts ≥ 0 RPM	8 failures out of 10 samples 250 ms /sample	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
							Continuous	
Random Misfire Detected Cylinder 1 Misfire Detected Cylinder 2 Misfire Detected Cylinder 3 Misfire Detected Cylinder 4 Misfire Detected Cylinder 5 Misfire Detected Cylinder 6 Misfire Detected Cylinder 7	P0300 P0301 P0302 P0303 P0304 P0305 P0306 P0307 P0308	These DTC's will determine if a random or a cylinder specific misfire is occurring by monitoring crankshaft velocity	Deceleration index vs. Engine Speed Vs Engine load Deceleration index calculation is tailored to specific veh. Tables used are 1st tables encountered that are not max of range. Undetectable region at a given speed/load point is where all tables are max of range point. see Algorithm Description Document for additional details.	**(>**Idle SCD AND > Idle SCD ddt Tables) **OR** (>SCD Delta AND > SCD Delta ddt Tables) **OR** (>Idle Cyl Mode AND > Idle Cyl Mode ddt Tables) **OR** (>Cyl Mode AND > Cyl Mode ddt Tables) **OR** (>Rev Mode Table) **OR** (> AFM Table in Cyl Deact mode)	Engine Run Time ECT If ECT at startup ECT System Voltage + Throttle delta - Throttle delta	> 2 crankshaft revolutions -7 ºC < ECT < 130 ºC < -7 ºC 21 ºC < ECT < 130 ºC 9.00 <volts< 32.00 < 75.00 % per 25 ms < 75.00 % per 25 ms	Emission Exceedence = any (5) failed 200 rev blocks out of (16) 200 rev block tests Failure reported for (1) Exceedence in 1st (16) 200 rev block tests, or (4) Exceedences thereafter. any Catalyst Exceedence = (1) 200 rev block as data supports for catalyst damage.	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.
Misfire Detected Cylinder 8 Misfire Detected			Misfire Percent Emission Failure Threshold Misfire Percent Catalyst Damage When engine speed and load are less than the FTP cals (3) catalyst damage exceedences are allowed.	≥ 0.81 % P0300 ≥ 0.81 % emission >"Catalyst Damaging Misfire Percentage" Table whenever secondary conditions are met. ≤ 0 FTP rpm AND ≤ 0 FTP % load	Engine Speed Engine Load Misfire counts (at low speed/loads, one cylinder may not cause cat damage)	> 1200 rpm AND > 20 % load AND < 180 counts on one cylinder	Failure reported with (1 or 3) Exceedences in FTP, or (1) Exceedence outside FTP. Continuous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Engine Speed	375 < rpm < (Engine Speed Limit) - 400 Engine speed limit is a function of inputs like Gear and temperature typical Engine Speed Limit = 5600 rpm	4 cycle delay	
				disable conditions:	No active DTCs:	TPS_FA EnginePowerLimited MAF_SensorTFTKO MAP_SensorTFTKO IAT_SensorTFTKO ECT_Sensor_Ckt_TFTKO 5VoltReferenceB_FA CrankSensorTestFailedTKO CrankSensorFaultActive CrankIntakeCamCorrelationFA CrankExhaustCamCorrelationFA CrankCamCorrelationTFTKO AnyCamPhaser_FA AnyCamPhaser_TFTKO	4 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						If Monitor Rough Road=1 and RoughRoadSource="TOSS" Trans_Gear_Defaulted(TCM) (Auto Trans only) Clutch Sensor FA (Manual Trans only) Trans_Gear_Defaulted(TCM) (Auto Trans only)		
					P0315 & engine speed	> 1000 rpm		
					Fuel Level Low	LowFuelConditionDiagnosti	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 Stat	≠ Fuel Cut	4 cycle delay	
					Active Fuel Management	Transition in progress	7 cycle delay	
					Undetectable engine speed and engine load region	invalid speed load range in **decel index** tables	4 cycle delay	
					Abusive Engine Over Speed	> 8192 rpm	0 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					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 % > 30 mph	4 cycle delay	
					EGR Intrusive test	Active	0 cycle delay	
					Manual Trans Throttle Position AND Automatic transmission shift	Clutch shift > 95.00 %	4 cycle delay 7 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Driveline Ring Filter active After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early. Filter Driveline ring: Stop filter early:	4 engine cycles after misfire 3 Engine cycles after misfire		

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	> 3 %		
					Engine Speed	> 950 rpm		
					Veh Speed	> 3 mph		
					SCD	= 4 consecutive cyls		
					Cyl Mode	= 4 consecutive cyls		
					Rev Mode	= 4 consecutive cyls		
					Rough Road Section:			
					Monitor Rough Road	1 (1=Yes)		
					RoughRoadSource	FromABS		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					IF Rough Road is monitored, then ONE of the following Rough Road Sources will be used:			
					Rough Road Source = "TOSS"			
					Rough Road	detected		
					Rough Road Source = "WheelSpeedIn ECM"			
					ABS/TCS system	active		
					RoughRoad	detected		
					VSES	active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Rough Road Source = "FromABS" ABS/TCS system RoughRoad VSES	 active detected active		
Crankshaft Position System Variation Not Learned	P0315	Monitor for valid crankshaft error compensation factors	Sum of Compensation factors	≥ 4.0040 OR ≤ 3.9960	OBD Manufacturer Enable Counter	0	0.50 seconds Frequency Continuous 100 msec	1 Trips Type A
Knock Sensor (KS) Module Performance E38 & E67 controllers	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	≥ 400 RPM > 50 milligrams KS_Ckt_Perf_B1B2_FA ≥ 400 RPM > 50 milligrams	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) Circuit Bank 1 E38 & 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 Power Take Off	= 1 ≥ 400 RPM ≥ -40 deg. C ≥ 2 seconds = Not Active	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
Knock Sensor (KS) Performance Bank 1 E38 & E67 controllers	P0326	This diagnostic checks for an overactive knock sensor caused by excessive knock or noisy engine components	Knock Fast Retard (spark degrees)	> (FastRtdMax + 2.5) degrees spark See Supporting Tables for FastRtdMax	Diagnostic Enabled (1 = Enabled) Knock Detection Enabled Engine Speed MAP	= 1 > 0 Knock Detection Enabled is calculated by multiplying the following three factors: FastAttackRate FastAttackCoolGain FastAttackBaroGain (see Supporting Tables) ≥ 400 RPM ≥ 10 kPa	31 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.
					Power Take Off	= Not Active		
Knock Sensor (KS) Circuit Low Bank 1 E38 & E67 controllers	P0327	This diagnostic checks for an out of range low knock sensor signal	Sensor Input Signal Line **or** Sensor Return Signal Line	> 2.86 Volts < 1.48 Volts	ECT Engine Run Time	≥ -40 deg. C ≥ 2 seconds	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
					Valid Oil Temp Required? (1= Yes, 0 = No) <u>If Yes:</u> Engine Oil Temp and ValidOilTemp Model or No OilTemp Sensor DTC's <u>If No:</u> No Eng Oil Temp enable criteria	= 0 < 256 deg. C EngOilModeledTemp Valid EngOilTempSensor CircuitFA		
Knock Sensor (KS) Circuit High Bank 1 E38 & E67 controllers	P0328	This diagnostic checks for an out of range high knock sensor signal	Sensor Input Signal Line **or** Sensor Return Signal Line	< 2.02 Volts > 3.76 Volts	ECT Enginer Run Time	≥ -40 deg. C ≥ 2 seconds	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
					Valid Oil Temp Required? (1= Yes, 0 = No)	= 0		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					If Yes: Engine Oil Temp and ValidOilTemp Model or No OilTempSensor If No: No Eng Oil Temp enable criteria	< 256 deg. C EngOilModeledTemp Valid EngOilTempSensor CircuitFA		
Knock Sensor (KS) Circuit Bank 2 E38 & 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 Power Take Off	= 1 ≥ 400 RPM ≥ -40 deg. C ≥ 2 seconds = Not Active	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
Knock Sensor (KS) Circuit Low Bank 2 E38 & E67 controllers	P0332	This diagnostic checks for an out of range low knock sensor signal	Sensor Input Signal Line **or** Sensor Return Signal Line	> 2.86 Volts < 1.48 Volts	ECT Enginer Run Time Valid Oil Temp Required?	≥ -40 deg. C ≥ 2 seconds = 0	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 Yes: Engine Oil Temp and ValidOilTemp Model or No OilTempSensor If No: No Eng Oil Temp enable criteria	< 256 deg. C EngOilModeledTemp Valid EngOilTempSensor CircuitFA		
Knock Sensor (KS) Circuit High Bank 2 E38 & E67 controllers	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	≥ -40 deg. C ≥ 2 seconds	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
					Valid Oil Temp Required? If Yes: Engine Oil Temp and ValidOilTemp Model or No OilTempSensor	= 0 < 256 deg. C EngOilModeledTemp Valid EngOilTempSensor CircuitFA		

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			
Crankshaft Position (CKP) Sensor A Circuit	P0335	Determines if a fault exists with the crank position sensor signal	Engine-Cranking Crankshaft Test: Time since last crankshaft position sensor pulse received	>= 4.0 seconds	Engine-Cranking Crankshaft Test: Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow	 = FALSE = FALSE = FALSE > 3.0 grams/second))	Engine-Cranking Crankshaft Test: Continuous every 100 msec	Type B 2 trips
			Time-Based Crankshaft Test: No crankshaft pulses received	>= 0.3 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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Event-Based Crankshaft Test: No crankshaft pulses received		Event-Based Crankshaft Test: Engine is Running OR Starter is engaged No DTC Active:	 5VoltReferenceA_FA 5VoltReferenceB_FA P0340 P0341	Event-Based Crankshaft Test: 2 failures out of 10 samples One sample per engine revolution	
Crankshaft Position (CKP) Sensor A Performance	P0336	Determines if a performance fault exists with the crank position sensor signal	Crank Re-synchronization Test: Time in which 25 or more crank re-synchronizations occur Time-Based Crankshaft Test: No crankshaft synchronization gap found	< 20.0 seconds >= 0.4 seconds	Crank Re-synchronization Test: Engine Air Flow Cam-based engine speed No DTC Active: Time-Based Crankshaft Test: Engine is Running Starter is not engaged No DTC Active:	 >= 3.0 grams/second > 450 RPM 5VoltReferenceB_FA P0335 5VoltReferenceB_FA	Crank Re-synchronization Test: Continuous every 250 msec Time-Based Crankshaft Test: Continuous 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.
			Engine Start Test during Crank: Time since starter engaged without detecting crankshaft synchronization gap	>= 1.5 seconds	Engine Start Test during Crank: Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow	= FALSE = FALSE = FALSE > 3.0 grams/second))	Engine Start Test during Crank: Continuous every 100 msec	
			Event-Based Crankshaft Test: Crank Pulses received in one engine revolution OR Crank Pulses received in one engine revolution	< 51 seconds > 65 seconds	Event-Based Crankshaft Test: Engine is Running OR Starter is engaged No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA P0340 P0341	Event-Based Crankshaft Test: 8 failures out of 10 samples One sample per engine revolution	
Camshaft	P0340	Determines if a	Engine Cranking		Engine Cranking		Engine	Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Position (CMP) Sensor Circuit Bank 1 Sensor A		fault exists with the cam position bank 1 sensor A signal	Camshaft Test: Time since last camshaft position sensor pulse received OR Time that starter has been engaged without a camshaft sensor pulse Time-Based Camshaft Test: Fewer than 4 camshaft pulses received in a time Fast Event-Based Camshaft Test: No camshaft pulses received during first 24 MEDRES events	 >= 5.5 seconds >= 4.0 seconds > 3.0 seconds	Camshaft Test: Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow Time-Based Camshaft Test: Engine is Running Starter is not engaged No DTC Active: Fast Event-Based Camshaft Test: Crankshaft is synchronized	 = FALSE = FALSE = FALSE > 3.0 grams/second)) 5VoltReferenceA_FA	Cranking Camshaft Continuous every 100 msec Time-Based Camshaft Test: Continuous every 100 msec Fast Event-Based Camshaft Continuous every MEDRES	2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			(There are 24 MEDRES events per engine cycle)		Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged		event	
					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 8 failures out of 10 samples Continuous every engine cycle	
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor A	P0341	Determines if a performance fault exists with the cam position bank 1 sensor A signal	Fast Event-Based Camshaft Test: The number of camshaft pulses received during first 24 MEDRES events is less than 2 or greater than 8		Fast Event-Based Camshaft Test: Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic		Fast Event-Based Camshaft 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 24 MEDRES events per engine cycle) Slow Event-Based Camshaft Test: The number of camshaft pulses received during 100 engine cycles OR	 < 398 > 402	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	 Slow Event-Based Camshaft 8 failures out of 10 samples 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 Ignition Voltage	 > 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #2	P0352	This diagnostic checks the circuit	The ECM detects that the		Engine running Ignition Voltage	 > 5.00 Volts	50 Failures out of	Type: B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
CIRCUIT		for electrical integrity during operation. Monitors EST for Cylinder 2 (Cylinders 2 and 5 for V6 with waste spark)	commanded state of the driver and the actual state of the control circuit do not match.				63 Samples 100 msec rate	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	> 5.00 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	> 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #5	P0355	This diagnostic checks the circuit	The ECM detects that the		Engine running Ignition Voltage	> 5.00 Volts	50 Failures out of	Type: B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
CIRCUIT		for electrical integrity during operation. Monitors EST for Cylinder 5 (if applicable)	commanded state of the driver and the actual state of the control circuit do not match.				63 Samples 100 msec rate	MIL: YES Trips: 2
IGNITION CONTROL #6 CIRCUIT	P0356	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 6 (if applicable)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	> 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #7 CIRCUIT	P0357	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 7 (if applicable)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	> 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #8 CIRCUIT	P0358	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 8	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not		Engine running Ignition Voltage	> 5.00 Volts	50 Failures out of 63 Samples 100 msec	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 applicable)	match.				rate	
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)
		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-			Throttle Position	< 2.00 %		
					Vehicle Speed	< 1.24 MPH		
					Engine speed	> 1300 RPM for a minimum of 20 seconds since end of last idle period.		
					Engine run time	≥ MinimumEngineRunTime**, This is a function of Coolant Temperature, please see Supporting Tables**		
					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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		2) A Normalized Ratio of 1 essentially represents a good part and a ratio of 0 essentially represents a very bad part.			Green Converter Delay	Not Active		
					Induction Air	*-20 < ° C < 250*		
					Intrusive test(s): Fueltrim Post O2 EVAP EGR	Not Active		
					RunCrank Voltage	> 10.90 Volts		
					Ethanol Estimation	NOT in Progress		
		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	*40 < ° C < 129*		
					Barometric Pressure	> 70 KPA		
					Idle Time before going intrusive is	< 50 Seconds		
					Idle time is incremented if Vehicle speed	< 1.24 MPH and the throttle position < 2.00 % 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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					WarmedUpEvents counter resets to 0.) for at least 30 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 30 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 **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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					MAF	*4.00 < g/s < 20.00*		
					Predicted catalyst temperature	< 800 degC		
					Engine Fueling Criteria at Beginning of Idle Period			
					The following fueling related must also be met from between 4 and 7 seconds after the Catalyst Idle Conditions Met Criteria has been met for at least 4 seconds prior to allowing intrusive control			
					Number of pre-O2 switches	>= 2 grams/second		
					Short Term Fuel Trim Avg	*0.960 < ST FT Avg < 1.040*		
					Rapid Step Response (RSR) feature will initiate multiple tests:			
					If the difference between current EWMA value and the current OSC Normalized Ratio value is > 0.620 and the current OSC Normalized Ratio value is < 0.100			
					Maximum of 24 RSR tests to detect failure when RSR is enabled.			

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					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.
Catalyst System Low Efficiency Bank 2	P0430	Oxygen Storage	Normalized Ratio OSC Value (EWMA filtered)	< 0.350	***Valid Idle Period Criteria***		1 test attempted per valid idle period Minimum of 1 test per trip Maximum of 8 tests per trip Frequency: Fueling Related : 12.5 ms OSC Measurements: 100 ms Temp Prediction: 1000ms	Type A 1 Trip(s)
		The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and O2 during lean A/F excursions to store the excess oxygen (I.e. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H2 to release this stored oxygen (I.e. Cerium			Throttle Position	< 2.00 %		
					Vehicle Speed	*< 1.24 MPH*		
					Engine speed	> 1300 RPM for a minimum of 20 seconds since end of last idle period.		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		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.						
					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		
					RunCrank Voltage	> 10.90 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					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	*40 < ° C < 129*		
					Barometric Pressure	> 70 KPA		
					Idle Time before going intrusive is	< 50 Seconds		
					Idle time is incremented if Vehicle speed	< 1.24 MPH and the throttle position < 2.00 % 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 30 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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					WarmedUpEvents counter (counter must exceed 30 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 **Please see "Closed Loop Enable Criteria" section of the "Supporting Tables" tab for details.**			
					PRNDL is in Drive Range on an Auto Transmission vehicle.			
					Idle Stable Criteria :: Must hold true from after Catalyst Idle Conditions Met to the end of test			
					MAF	*4.00 < g/s < 20.00*		
					Predicted catalyst temperature	< 800 degC		
					Engine Fueling Criteria at Beginning of Idle Period			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					The following fueling related must also be met from between 4 and 7 seconds after the Catalyst Idle Conditions Met Criteria has been met for at least 4 seconds prior to allowing intrusive control			
					Number of pre-O2 switches	>= 2		
					Short Term Fuel Trim Avg	*0.96 < ST FT Avg < 1.04*		
					Rapid Step Response (RSR) feature will initiate multiple tests:			
					If the difference between current EWMA value and the current OSC Normalized Ratio value is > 0.620 and the current OSC Normalized Ratio value is < 0.100			
					Maximum of 24 RSR tests to detect failure when RSR is enabled.			
					Green Converter Delay Criteria			
					This is part of the check for the Catalyst Idle Conditions Met Criteria section			
					The diagnostic will not be enabled until the			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					following has been met:			
					Predicted catalyst temperature > 0 ° C for 0 seconds non-continuously. Note: this feature is only enabled when the vehicle is new and cannot be enabled in service			
					PTO Not Active			
					General Enable			
					DTC's Not Set			
					MAF_SensorFA			
					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			
Evaporative	P0442	This DTC will	The total delta from		Fuel Level	10 % ≤ Percent ≤ 90 %	Once per	1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Emission (EVAP) System Small Leak Detected		detect a small leak (≥ 0.030") in the EVAP system between the fuel fill cap and the purge solenoid. The engine off natural vacuum method (EONV) is used. EONV is an evaporative system leak detection diagnostic that runs when the vehicle is shut off when enable conditions are met. Prior to sealing the system and performing the diagnostic, the fuel volatility is analyzed. In an open system (Canister Vent Solenoid [CVS] open) high volatility fuel creates enough flow to generate a measurable pressure differential relative	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).		Drive Time Drive length ECT Baro Odometer Time since last complete test if normalized result and EWMA is passing OR Time since last complete test if normalized result or EWMA is failing Estimated ambient temperature at end of drive	≥ 900 seconds ≥ 9.7 miles ≥ 70 °C ≥ 70 kPa ≥ 10.0 miles ≥ 17 hours ≥ 10 hours 0 °C ≤ Temperature ≤ 34 °C	trip, during hot soak (up to 2400 sec.). No more than 2 unsuccessful attempts between completed tests.	Type A EWMA Average run length is 6 under normal conditions Run length is 3 to 6 trips after code clear or non-volatile reset

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		differential relative to atmospheric.			Estimate of Ambient Air Temperature Valid			
			When EWMA is , the DTC light is illuminated.	> 0.55 (EWMA Fail Threshold)	**Conditions for Estimate of Ambient Air Temperature to be valid:**			
		After the volatility check, the vent solenoid will close. After the vent is closed, typically a build up of pressure from the hot soak begins (phase-1). The pressure typically will peak and then begin to decrease as the fuel cools. When the pressure drops (-62.27) Pa from peak pressure, the vent is then opened for 60 seconds to	The DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 2 additional consecutive trips.	≤ 0.35 (EWMA Re-Pass	**1. Cold Start** Startup delta deg C (ECT-IAT) OR **2. Short Soak and Previous EAT Valid** Previous time since engine off OR **3. Not a Cold Start and Previous EAT Valid and between Short and Long Soak**	≤ 8 °C ≤ 7200 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		normalize the system pressure. The vent is again closed to begin the vacuum portion of the test (phase-2). As the fuel temperature continues to fall, a vacuum will begin forming. The vacuum will continue until it reaches a vacuum peak. When the pressure rises 62.27 Pa from vacuum peak, the test then completes. If the key is turned on while the diagnostic test is in progress, the test will abort.			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	7200 seconds < Time < 25200 seconds Vehicle Speed ≥ 19.3 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.
						< 25200 seconds Vehicle Speed ≥ 19.3 mph AND Mass Air Flow ≥ 0 g/sec		
					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.**			
					OR **5. Long Soak** Previous time since engine off	≥ 25200 seconds		
				Abort Conditions:	**1. High Fuel Volatility** During the volatility phase,			

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					fuel level refueling. OR **6. Vent Valve Override Failed** Device control using an off-board tool to control the vent solenoid, cannot exceed during the EONV test OR **7. Key up during EONV test** No active DTCs:	0.50 seconds FuelLevelDataFault MAF_SensorFA ECT_Sensor_FA IAT_SensorFA VehicleSpeedSensor_FA IgnitionOffTimeValid AmbientAirDefault P0443 P0446 P0449		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						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 90 seconds Vent Restriction Test: Tank Vacuum for 5 seconds BEFORE Purge Volume	< -623 Pa > 1245 Pa > 2989 Pa ≥ 20 liters	Fuel Level System Voltage Startup IAT Startup ECT BARO No active DTCs:	10 ≤ Percent ≤ 90 11 volts ≤ Voltage ≤ 32 volts 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C ≥ 70 kPa MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault	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.
			After setting the DTC for the first time, 2 liters of fuel must be consumed before setting the DTC for the second time.			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	The tank vacuum sensor voltage is compared to a window about the nominal sensor voltage offset (~1.5		This test will execute whenever the engine-off natural vacuum small leak test		This test is executed during an engine-off natural vacuum	1 trip Type A EWMA Averag e run

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		or phase-2 portions of the engine-off natural vacuum small leak test.	volts) Upper voltage threshold (voltage addition above the nominal voltage) Lower voltage threshold (voltage subtraction below the nominal voltage) The difference between tank vacuum sensor voltage and the nominal offset voltage is then normalized against the appropriate threshold listed above to produce a ratio between 0.0 and 1.0. This normalized re-zero ratio is then filtered with a EWMA (with 0= perfect pass and 1=perfect fail) When EWMA is , the DTC light is illuminated.	 0.2 volts 0.2 volts > 0.73 (EWMA Fail Threshold)	(P0442) executes		small leak test. The number of times that it executes can range from zero to two per engine-off period. The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete.	length: 6 Run length is 2 trips after code clear or non-volatile reset

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			The DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 2 additional consecutive trips.	≤ 0.40 (EWMA Re-Pass				
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	> 4.85 volts (97% of Vref or ~ -4172 Pa)	Time delay after sensor power up for sensor warm-up ECM State ≠ crank	is 0.10 seconds	80 failures out of 100 samples 100 ms / sample	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			0.5 volts (~1245 Pa) to 4.5 volts (~ -3736 Pa).		Stops 6.0 seconds after key-off		Continuous	
Fuel Tank Pressure (FTP) Sensor Circuit Intermittent	P0454	This DTC will detect intermittent tank vacuum sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event.	If an abrupt change in tank vacuum is detected the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that a refueling event occurred. If a refueling is confirmed, then the test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem.		This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period. The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete. The test will	1 trips Type A

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			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 %			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 while Tank vacuum After setting the DTC for the first time, 2 liters of fuel must be consumed before setting the DTC for the second time. Weak Vacuum Follow-up Test (fuel cap replacement test) Passes if tank	> 90 liters ≤ 2740 Pa	Fuel Level System Voltage BARO No active DTCs:	10 % ≤ Percent ≤ 90 % 11 volts ≤ Voltage ≤ 32 volts ≥ 70 kPa MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454	Once per cold start Time is dependent on driving conditions Maximum time before test abort is 1000 seconds	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			vacuum Note: Weak Vacuum Follow-up Test can only report a pass.	≥ 2740 Pa	<u>Cold Start Test</u> If ECT > IAT, Startup temperature delta (ECT-IAT): Cold Test Timer Startup IAT Startup ECT <u>Weak Vacuum Follow-up Test</u> This test can run following a weak vacuum failure or on a hot restart.	≤ 8 °C ≤ 1000 seconds 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C	<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 (For use on vehicles with a single fuel tank)	P0461	This DTC will detect a fuel sender stuck in range in the primary fuel tank.	Delta Fuel Volume change over an accumulated 150 miles.	< 5 liters	Engine Running No active DTCs:	 VehicleSpeedSensor_FA	250 ms / sample Continuous	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Fuel Level Sensor 1 Circuit Low Voltage	P0462	This DTC will detect a fuel sender stuck out of range low in the primary fuel tank.	Fuel level Sender % of 5V range	< 10 %	Run/Crank Voltage Run/Crank voltage goes to 0 volts at key off	11 volts ≤ Voltage ≤ 32 volts	100 failures out of 125 samples 100 ms / sample Continuous	2 trips Type B
Fuel Level Sensor 1 Circuit High Voltage	P0463	This DTC will detect a fuel sender stuck out ofrange high in the primary fuel tank.	Fuel level Sender % of 5V range	> 60 %	Run/Crank Voltage Run/Crank voltage goes to 0 volts at key off	11 volts ≤ Voltage ≤ 32 volts	100 failures out of 125 samples 100 ms / sample Continuous	2 trips Type B
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		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	1 trips Type A

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem. An intermintant change in fuel level is defined as: The fuel level changes and does not remain for 30 seconds during a 600 second refueling rationality test.	 by 10 % > 10 %			the test is determined by the refueling rationality test, which can take up to 600 seconds to complete. The test will report a failure if 2 out of 3 samples are failures. 100 ms / sample	
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	Tank Vacuum for 5 seconds BEFORE Test time	> 2491 Pa ≥ refer to "P0496: Purge Valve Leak Test Engine Vacuum Test Time (Cold	Fuel Level System Voltage BARO Startup IAT Startup ECT Engine Off Time No active DTCs:	10 % ≤ Percent ≤ 90 % 11 volts ≤ Voltage ≤ 32 volts ≥ 70 kPa 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C ≥ 28800.0 seconds	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.
		closed.		Start) as a Function of Fuel Level table" in Supporting Tables Tab.		MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault 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	< 91.00 rpm	Baro	> 70 kPa	Diagnostic runs in	2 trips Type B
			filter coefficient	0.003	Coolant Temp	> 60 °C and < 125 °C	every 12.5 ms loop	
					Engine run time	≥ 60 sec	Diagnostic reports	
					Ignition voltage	32 ≥ volts ≥ 11	pass or fail in	
				Time since gear change		≥ 3 sec	10 sec	
				Time since a TCC mode change		> 3 sec	once all enable	
					IAT	> -20 °C	conditions are met	
					Vehicle speed	≤ 1.24 mph		
				Commanded RPM delta		≤ 25 rpm		
					For manual transmissions: Clutch Pedal TOT Threshold or Clutch Pedal BOT Threshold	> 88.00 pct < 20.00 pct		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						PTO not active		
						Transfer Case not in 4WD LowState		
						Off-vehicle device control (service bay control) must not be active.		
					No active DTCs	AmbientAirDefault		
						ECT_Sensor_FA		
						EGRValveCircuit_FA		
						EGRValvePerformance_FA		
						IAT_SensorCircuitFA		
						EvapFlowDuringNonPurge_FA		
						FuelTrimSystemB1_FA		
						FuelTrimSystemB2_FA		
						FuelInjectorCircuit_FA		
						MAF_SensorFA		
						EngineMisfireDetected_FA		
						IgnitionOutputDriver_FA		
						EnginePowerLimited		
						TPS_FA		
						TPS_Performance_FA		
						VehicleSpeedSensor_FA		
						FuelLevelDataFault		
						LowFuelConditionDiagnostic		
						Clutch Sensor FA		
					All of the above met for Idle time	> 10 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
High Engine Speed Idle System	P0507	This DTC will determine if a high idle exists	Filtered Engine Speed Error	> -182.00 rpm	Baro	> 70 kPa	Diagnostic runs in	2 trips Type B
			filter coefficient	0.003	Coolant Temp	> 60 °C and < 125 °C	every 12.5 ms loop	
					Engine run time	≥ 60 sec	Diagnostic reports	
					Ignition voltage	32 ≥ volts ≥ 11	pass or fail in	
				Time since gear change		≥ 3 sec	10 sec	
				Time since a TCC mode change		> 3 sec	once all enable	
					IAT	> -20 °C	conditions are met	
					Vehicle speed	≤ 1.24 mph		
				Commanded RPM delta		≤ 25 rpm		
					For manual transmissions: Clutch Pedal TOT Threshold or Clutch Pedal BOT Threshold	> 88.00 pct < 20.00 pct		
						PTO not active		
						Transfer Case not in 4WD LowState		
						Off-vehicle device control (service bay control) must not be active.		
					No active DTCs	AmbientAirDefault		
						ECT_Sensor_FA		
						EGRValveCircuit_FA		
						EGRValvePerformance_FA		
						IAT_SensorCircuitFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						EvapFlowDuringNonPurge_FA		
						FuelTrimSystemB1_FA		
						FuelTrimSystemB2_FA		
						FuelInjectorCircuit_FA		
						MAF_SensorFA		
						EngineMisfireDetected_FA		
						IgnitionOutputDriver_FA		
						EnginePowerLimited		
						TPS_FA		
						TPS_Performance_FA		
						VehicleSpeedSensor_FA		
						FuelLevelDataFault		
						LowFuelConditionDiagnostic		
						Clutch Sensor FA		
					All of the above met for Idle time	> 10 sec		
Engine Oil Pressure (EOP) Sensor Performance	P0521	Determines if the Engine Oil Pressure (EOP) Sensor is stuck or biased in range	**To fail a currently passing test:** The filtered, weighted difference between measured EOP and predicted EOP (a function of engine speed and engine oil temp.):	< -48.0 kPa OR > 45.0 kPa	Diagnostic enabled/disable	Enabled	Performed every 100 msec	2 trip(s) Type B
					Oil Pressure Sensor In Use	Present		
			To pass a currently failing The filtered, weighted difference between measured		Filtered engine oil pressure test weighting (function of engine speed, engine oil temperature, predicted oil pressure, and engine load			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			EOP and predicted EOP (a function of engine speed and engine oil temp.):	> -45.0 kPa AND < 42.0 kPa	stability). Details on Supporting Tables Tab (P0521 Section) No active DTC's	>= 0.30 weighting Fault bundles: CrankSensorFA ECT_Sensor_FA MAF_SensorFA IAT_SensorFA EOPCircuit_FA		
Engine Oil Pressure (EOP) Sensor Circuit Low Voltage	P0522	Determines if the Engine Oil Pressure (EOP) Sensor circuit voltage is too low	(Engine Oil Pressure Sensor Circuit Voltage) / 5 Volts	< 5 percent	Engine Running Ignition Voltage Sensor Present Diagnostic enabled/disable	= True <= 32.0 V and >= 11.0 V Yes Enabled	50 failures out of 63 samples Performed every 100 msec	2 trip(s) Type B
Engine Oil Pressure (EOP) Sensor Circuit High Voltage	P0523	Determines if the Engine Oil Pressure (EOP) Sensor circuit voltage is too high	(Engine Oil Pressure Sensor Circuit Voltage) / 5 Volts	> 85 percent	Engine Running Ignition Voltage Sensor Present Diagnostic enabled/disable	= True <= 32.0 V and >= 11.0 V Yes Enabled	204 failures out of 255 samples Performed every 100 msec	2 trip(s) Type B
Cruise Control Mutil-Functon Switch Circuit	P0564	Detect when cruise control multi-function switch circuit (analog) voltage is in an illegal range	Cruise Control analog circuit voltage must be in an "illegal range" for greater than a calibratable period of time for cruise		CAN cruise switch diagnostic enable in ECM	TRUE -1	fail continuously for greater than 0.750 seconds	Type: C MIL: NO

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			switch states that are received over serial data					Trips: 1
Cruise Control Resume Circuit	P0567	Detects a failure of the cruise resume switch in a continously applied state	Cruise Control Resume switch remains applied for greater than a calibratable period of time for architecture where cruise switch states are received over serial data		CAN cruise switch diagnostic enable in ECM	TRUE -1	fail continuously for greater than 90.000 seconds	Type: C MIL: NO Trips: 1

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Cruise Control Set Circuit	P0568	Detects a failure of the cruise set switch in a continously applied state	Cruise Control Set switch remains applied for greater than a calibratable period of time for architecture where cruise switch states are received over serial data		CAN cruise switch diagnostic enable in ECM	TRUE -1	fail continuously for greater than 90.000 seconds fail continuously for greater than 90.000 seconds	Type: C MIL: NO Trips: 1
Cruise Control Input Circuit	P0575	Detects rolling count or protection value errors in Cruise Control Switch Status serial data signal	If x of y rolling count / protection value faults occur, disable cruise for duration of fault		Cruise Control Switch Serial Data Error Diagnostic Enable	TRUE -1	10 / 16 counts	Type: C MIL: NO Trips: 1
Brake Pedal	P057B	This diagnostic	**DTC Fail:**		Brake Pedal		Performed	Type:

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Position Sensor Circuit Range/Performance		monitors the Brake Pedal Position Sensor for a stuck in range failure	Calculated brake pedal position delta and resulting filtered EWMA calculation(supporting table) is less than a value for a	0.4 threshold / 2 counts	Position Range	TRUE X	every 25 msec	A
					Ignition voltage	> 10 volts		MIL: YES
					EWMA Filter Value	0.3		Trips: 1
			DTC Pass: Calculated brake pedal position delta and resulting filtered EWMA calculation(supporting table) is greater than a value for a calibratable number of EWMA tests):	0.4 threshold / 1 counts	No active DTC's	P057C / P057D		
					Criteria to Run Complete Test:			
					shift lever	In park at least once this key on		
					shift lever position	≠ park		
					vehicle speed	> 5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					accelerator pedal position	< 5		
					calculated brake pedal position delta samples	1000 samples	Each calculated difference test is a minimum of 25 seconds (1000 counts @ 25ms)	
					Fast Test To Pass Criteria:			
					calculated brake pedal position delta samples	50 samples	Each calculated difference test is a minimum of seconds (1000 counts @ 25ms)	
Brake Pedal Position Sensor Circuit Low	P057C	Detects low circuit failure when brake pedal position is below calibratable value	If x of y faults occur, default brake pedal position to zero for duration of fault	0.25	Brake Pedal Position Diagnostic Enable	TRUE -1	20 / 32 counts	Type: A MIL: YES Trips:

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
								1
Brake Pedal Position Sensor Circuit High	P057D	Detects high circuit failure when brake pedal position is above calibratable value	If x of y faults occur, default brake pedal position to zero for duration of fault	4.75	Brake Pedal Position Diagnostic Enable	TRUE -1	20 / 32 counts	Type: A MIL: YES 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 Diagnostic reports a fault if 5 failures occur after the first pass is	Type A 1 trips
Control Module Not Programmed	P0602	This DTC will be stored if the PCM is a service PCM that has not been programmed.	Output state invalid		PCM State	= crank or run PCM is identified through calibration as a Service	Diagnostic runs at powerup	Type A 1 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up does not match checksum at power-down				Diagnostic runs at powerup Diagnostic reports a fault if 1	Type A 1 trips
ECM RAM Failure	P0604	Indicates that the ECM is unable to correctly read data from or write data to RAM	Primary processor data pattern written doesn't match the pattern read for a count >	1 count if found on first memory scan. 5 counts if found on subsequent scans.			Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously	Trips: 1 Type: A MIL: YES
			Secondary processor battery backed RAM failed checksum twice for original values at power up and the defaulted values				Completion at intilization, <500 ms	
			Secondary processor copy of calibration area to RAM failed for a count >	2 counts			Completion at intilization, <500 ms	
			Secondary Processor data				Will finish within 30	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			pattern written doesn't match the pattern read consecutive times				seconds at all engine conditions.	
			Secondary Processor TPS or APPS minimum learned values fail compliment check continuously				0.0625 sec continuous	
ECM Processor	P0606	Indicates that the ECM has detected an internal processor integrity 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	0.1875 sec in the secondary processor	Trips: 1 Type: A MIL: YES
			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	7.57 %.		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Secondary processor detects Primary's calculated throttle position is greater > than Secondary's calculated Throttle Position when reduce engine power is active by	39.26 %.		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions		
			Software tasks on the Primary Processor in the 12.5 ms loop were not executed or were not executed in the correct order.	0.0625 sec continuous		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	0.0625 sec continuous	
			Software tasks on the Primary Processor in the 25 ms loop were not executed or were not executed in the correct order.	0.1250 sec continuous		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	0.1250 sec continuous	
			Software tasks on the Primary Processor in the 50 ms loop were not	0.2500 sec continuous		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will	0.2500 sec continuous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			executed or were not executed in the correct order.			be reported for all conditions		
			Software tasks on the Primary Processor in the 100 ms loop were not executed or were not executed in the correct order.	0.5000 sec continuous		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	0.5000 sec continuous	
			Software tasks on the Primary Processor in the 250 ms loop were not executed or were not executed in the correct order.	1.2500 sec continuous		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	1.2500 sec continuous	
			The first completion of the RAM diagnostic on the Primary Processor was completed > the amount of time	360.0000 sec continuous		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	360.0000 sec continuous	
			The first completion of the ROM diagnostic on the Primary Processor was completed >	360.0000 sec continuous		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all	360.0000 sec continuous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			the amount of time			conditions		
			Software tasks on the Secondary Processor were not executed or were not executed in the correct order.	Two Consecutive Loops (12.5ms * 2) 25ms		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	25 ms	
			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			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	
			Loss or invalid message of SPI communication from the Primary Processor at			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all	In the secondary processor 0.4750 sec at	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			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			conditions	initialization, 0.1750 sec continuous or 20 / 200 intermittent.	
			Primary processor check of the secondary processor by verifing the hardware line toggle between the two processors toggles within the threshold values	9.3750 ms and 15.6250 ms		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	9 counts continuous at initialization or 9 counts continuous; 12.5 ms /count in the primary processor	
			Primary Processor TPS or APP 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	0.1000 sec continuous	
			The ocillator failed for the Primary processor where the	27.85 kHz and 37.68 kHz		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is	100 ms continuous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			clock is outside the threshold			false, else the failure will be reported for all conditions		
			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	12.5 ms continuous	
			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	12.5 ms continuous	
			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	
			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	
			The primary processor check of the ALU failed to	Two Consecutive Times		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is	12.5ms continuous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			compute the expected result			false, else the failure will be reported for all conditions		
			Primary 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	
Main & MHC state of health fault	P0607		Primary state of health (SOH) discrete line is not toggling between the two processors for a time >	0.4875 sec		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	0.4875 sec continuous	Trips: 1 Type: C MIL: NO
Control Module Accelerator Pedal Position (APP) System Performance	P060D	Verify that the indicated accelerator pedal position calculation is correct	PPS sensor switch fault - When the APP sensor 2 is shorted to ground, the sensor value is >	41		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions Engine Running TPS minimum learn is not active No Pedal related errors or diagnostic faults. Diagnostic is enabled (Only applicable for Legacy accelerator pedals)	Consecutive checks within 200ms or 2 / 2 counts; 175 ms/count	Trips: 1 Type: A MIL: YES
			Difference between primary processor	5		Run/crank voltage or Powertrain relay voltage >	44 / 40 counts or 39	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			indicated accelerator pedal position and secondary indicated accelerator pedal position is >			6.00 and reduced power is false, else the failure will be reported for all conditions Primary processor Pedal Sync Error is FALSE	counts continuous; 12.5 ms/count in the secondary processor	
Control Module EEPROM Error	P062F	Indicates that the NVM Error flag has not been cleared	Last EEPROM write did not complete		Ignition State	= unlock/accesory, run, or crank	1 test failure	Type B 2 trips
							Diagnostic runs once at powerup	
5 Volt Reference #1 Circuit	P0641	Detects a continuous or intermittent short on th 5 volt reference circuit #1	Primary Processor Vref1 < or Primary Processor Vref1 > or the difference between Primary filtered Vref1 and Primary Vref1 >	4.875 5.125 0.05		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 0.1875 continuous; 12.5 ms/count in primary processor	Trips: 1 Type: A MIL: YES
			Secondary Processor Vref1 < or Secondary Processor Vref1 >	4.875 5.125			19 / 39 counts or 15 counts continuous; 12.5 ms/count in secondary processor	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Malfunction Indicator Lamp (MIL) Control Circuit (ODM)	P0650	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Remote Vehicle Start is not active	11 volts ≤ Voltage ≤ 32 volts	20 failures out of 25 samples 250 ms / sample Continuous	2 trip Type B NO MIL
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 > or the difference between Primary filtered Vref2 and Primary Vref2 >	4.875 5.125 0.05		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 0.1875 sec continuous; 12.5 ms/count in primary processor	Trips: 1 Type: A MIL: YES
			Secondary Processor Vref2 < or Secondary Processor Vref2 >	4.875 5.125			19 / 39 counts or 15 counts continuous; 12.5 ms/count in secondary processor	
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		Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	8 failures out of 10 samples 250 ms / sample	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			match.				Continuous	
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 > 3 volts	Powertrain relay commanded "ON" No active DTCs:	 PowertrainRelayStateOn_FA	5 failures out of 6 samples 1 second / sample Stuck Test: 100 ms/ sample Continous failures ≥ 4 seconds	2 trips Type B
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 Control Module Emissions-Related DTC set			Time since power-up > 3 seconds	Continuous	1 trips Type A (No MIL)
Inlet Airflow System Performance (naturally aspirated applications)	P1101	Determines if there are multiple air induction problems affecting airflow and/or manifold pressure.	Filtered Throttle Model Error AND (ABS(Measured Flow – Modeled Air Flow) Filtered OR ABS(Measured	<= 300 kPa*(g/s) > 12 grams/sec	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied	>= 450 RPM <= 5200 RPM > -7 Deg C < 125 Deg C > -20 Deg C < 125 Deg C	Continuous Calculation are performed every 12.5 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			MAP – MAP Model 1) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered	> 15.0 kPa) > 15.0 kPa	together)	>= 0.00 Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Estimate 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 EGRValvePerformance_FA MAF_SensorCircuitFA		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						CrankSensorFA ECT_sensor_FA ECT_Sensor_FP IAT_SensorFA IAT_SensorCircuitFP CylDeacSystemTFTKO		
EngineMetal OvertempActive	P1258	The objective of the algorithm is to protect the engine in the event of engine metal overtemperature, mainly due to loss of coolant	Engine Coolant For	≥ 129 °C ≥ 10 seconds	Engine Run Time If feature was active and it set the coolant sensor fault then feature will be enabled on coolant sensor fault pending on the next trip.	≥ 10 Seconds	Fault present for ≥ 0 seconds	1 trips Type A
ABS Rough Road malfunction	P1380	This diagnostic detects if the ABS controller is indicating a fault, and misfire is present. When this occurs, misfire will continue to run.	GMLan Message: "Wheel Sensor Rough Road Magnitude Validity"	= FALSE	Vehicle Speed Engine Speed Engine Load RunCrankActive	VSS ≥ 5 mph rpm < 8192 load < 60 = TRUE	40 failures out of 80 samples 250 ms /sample Continuous	1 Trips Type C "Special Type C"
					Active DTC	P0300, MIL Request		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
ABS System Rough Road Detection Communication Fault	P1381	This diagnostic detects if the rough road information is no longer being received from the ABS controller, and misfire is present. When this occurs, misfire will continue to run.	Loss of GMLan Message: "Wheel Sensor Rough Road Magnitude"	= FALSE	Vehicle Speed Engine Speed Engine Load RunCrankActive	VSS ≥ 5 mph rpm < 8192 load < 60 = TRUE	40 failures out of 80 samples 250 ms /sample Continuous	1 Trips Type C "Special Type C"
					Active DTC	P0300, MIL Request		
Replicated Transmission Output Speed (RTOS) Sensor	P150A	No activity in the RTOS Signal circuit	RTOS Sensor Raw Speed	<= 60 RPM	Transmission output Speed Angular Velocity	>= 1000 RPM	>= 4.50 Fail Time (Sec)	Type B 2 trips
					Engine Speed	<= 7500 RPM >= 200 RPM for >= 5.0 sec		
					Vehicle Speed	<= 124 MPH for >= 5.0 sec		
					Ignition Voltage Ignition Voltage Disabled For Following DTCS:	<= 32.0 volts >= 9.0 volts VehicleSpeedSensor_FA P150B		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Replicated Transmission Output Speed (RTOS) Sensor	P150B	RTOS Signal Circuit Intermittent	RTOS Sensor Loop-to-Loop speed change	>= 350 RPM	Raw Transmission Output Speed	> 300 RPM for >= 2 sec.	>= 3.25 Fail Time (Sec)	Type B 2 trips
					Output Speed change	<= 150 RPM for >= 2 sec.		
					Engine Speed	<= 7500 RPM >= 200 RPM for >= 5.0 sec		
					Vehicle Speed	<= 124 MPH for >= 5.0 sec		
					Ignition Voltage	<= 32.0 volts		
					Ignition Voltage	>= 9.0 volts		
					Disabled For Following DTCS:	VehicleSpeedSensor_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 (PTEI3)	Diagnostic enable bit	1	Diagnostic runs in 12.5 ms loop	2 trips Type B
			Transmission engine speed protection	not equal to 2's complement of transmission engine speed request + Transmission alive rolling count	Engine run time	0.50 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					# of Protect Errors	10 protect errors out of 10 samples		
					# of Alive Rolling Errors	6 rolling count errors out of 10 samples		
					No idle diagnostic 506/507 code	IAC_SystemRPM_FA		
					No Serial communication loss to TCM	(U0101)		
					Engine Running	= TRUE		
					Power mode	Run Crank Active		
Throttle Actuator Control - Position Performance	P1516	Detect a throttle positioning error	The throttle model and actual Throttle position differ by > or The actual Throttle position and throttle model differ by >	7.568 %. 7.568 %.	Engine Running or Ignition Voltage > and Ignition Voltage > and Throttle is being Controlled and Communication Fault (SPI is not set)	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions 11 5.4	0.1875 sec in the secondary processor	Trips: 1 Type: A MIL: YES

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					and TPS minimum learn is not active Ignition voltage failure is false (P1682)			
		Detect throttle control is driving the throttle in the incorrect direction	Thottle Position >	39.761 %.	(Throttle is being Controlled and TPS minimum learn is active) or Reduce Engine Power is Active	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	0.1375 sec continuous	
		Degraded Motor	Desired throttle position is stable within 0.25 for 4.0000 sec and the delta between Indicated throttle position and desired throttle position in greater than 2.00 %		Engine Running or Ignition Voltage > and Ignition Voltage > and Throttle is being Controlled and Communication	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions 11 5.4	0.4875 sec continuous on secondary processor	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Fault (SPI is not set) and TPS minimum learn is not active Ignition voltage failure is false (P1682)			
Remote Vehicle Speed Limiting Signal Circuit	P162B	Determines if the speed request from OnStar is valid	**Password Protect error** - Serial Communication message - ($3ED) **OR** **Rolling count error** - Serial Communication message ($3ED)	Message <> two's complement of message Message <> previous message rolling count value +	Vehicle Requested Speed Limit	< 98 MPH - Can be lower speed if being requested by another non_ECM module	>= 10 Password Protect errors out of 10 samples >= 10 Rolling count errors out of 10 samples Performed every 25 msec	1 trip(s) Type C
Ignition Voltage Correlation	P1682	Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage & the Powertrain Relay Ignition Voltage	|Run/Crank – PT Relay Ignition| >	3.00 Volts	Powertrain commanded on and (Run/crank voltage > or PT Relay Ignition voltage >	Table, f(IAT). See supporting tables 5.5	240 / 480 counts or 0.1750 sec continuous; 12.5 msec/count in main processor	Trips: 1 Type: A MIL: YES

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					and Run/crank voltage >	5.5		
Post Catalyst Fuel Trim System Low Limit Bank 1 (Too Rich)	P2096	Determines if the post catalyst O2 sensor based fuel control system has been unable to adapt to a rich exhaust gas condition that results in an emissions correlated failure.	Rich Fail Counts: Note: If the fail count threshold is reached, a fail is reported and the diagnostic will not report again until the next trip. If the sample count threshold is reached before a fail is reported, a pass is reported, the counters are reset to 0, and evaluation starts again.	> 500 out of 1000 samples Note: 10 sample counts = 1 second	The following must be true for:	> 0.0 sec	Frequency: Continuous Monitoring in 100ms loop	2 Trip(s) Type B
					PTO:	NOT active		
					Intrusive diagnostic fuel control:	FALSE (i.e. catalyst monitor diagnostic)		
					Long Term Secondary Fuel Trim Enabled	Please see "**Long Term Secondary Fuel Trim Enable Criteria**" in Supporting Tables		
					Ambient air pressure	>= 70 kPa		
					Engine air flow	>= 0 g/s and <= 10000 g/s		
					Intake manifold air pressure	>= 0 kPa and <= 200 kPa		
					Induction air temperature	>= -7 °C and <= 45 °C		
					Start up coolant temperature	> -7 °C		
					NO ACTIVE DTCs:			
					AmbientAirDefault_NA AIR System FA			

<table>
<tr><th>Component/ System</th><th>Fault Code</th><th>Monitor Strategy Description</th><th>Malfunction Criteria</th><th>Threshold Value</th><th>Secondary Parameters</th><th>Enable Conditions</th><th>Time Required</th><th>MIL illum.</th></tr>
<tr><td></td><td></td><td colspan="3"></td><td>Ethanol Composition Sensor FA
ECT_Sensor_FA
EGRValveCircuit_FA
EGRValvePerformance_FA
IAT_Sensor_FA
CamSnsrLctnAny_FA
EvapEmissionSystem_FA
EvapFlowDuringNonPurge_FA
FuelTankPressureSensorCircuit_FA
EvapPurgeSolenoidCircuit_FA
EvapSmallLeak_FA
EvapVentSolenoidCircuit_FA
FuelInjectorCircuit_FA
MAF_SensorFA
MAF_SensorTFTKO
MAP_SensorFA
MAP_EngineVacuumStatus
EngineMisfireDetected_FA
A/F Imbalance Bank1
O2S_Bank_1_Sensor_1_FA
O2S_Bank_1_Sensor_2_FA</td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td colspan="7">Additional notes, strategy and enable requirements:</td></tr>
<tr><td></td><td></td><td rowspan="6">If the post catalyst O2 voltage is outside a control window, the integral offset is adjusted in an attempt to move the voltage back inside the control</td><td colspan="6">The above specified Sample Counter will increment if:</td></tr>
<tr><td colspan="3">The current post O2 airflow mode is a selected cell:</td><td>See supporting tables:
Selected Cells</td><td rowspan="3"></td></tr>
<tr><td colspan="3">AND</td></tr>
<tr><td colspan="3">Accumulated Cell Count is greater than
(counts spent in the given cell while enabled)</td><td>See supporting tables:
Cell Accum Min</td></tr>
<tr><td colspan="6">The above specified Fail Counter will increment if the Sample Counter increments AND:</td></tr>
<tr><td colspan="3">Filtered post O2 voltage is beyond the fail threshold:</td><td>See supporting tables:
> O2 Rich Thresh</td></tr>
</table>

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		window. The offset value is used to adjust the front O2 sensor control to bias the bulk average exhaust air/fuel ratio either lean or rich. The integral offset value is retained between trips.	for more than this many counts:			See supporting tables: **Out of Window Count**		
			AND					
			The post catalyst O2 integral offset is:			See supporting tables: <= **Integral Offset Min**		
			Note - the Post O2 filter coefficient is:			See supporting tables: **Post O2 Filt Coefficient**		
		Re-Pass Feature						
		If a fault is active from a prior trip and the above fail threshold is not met on the current trip, a Re-Pass sample counter must exceed a threshold in order for a pass to be reported.	Re-Pass sample counter is This counter will increment if neither the filtered post O2 voltage nor the integral offset are in failing regions (see fail conditions specified above)	>= 800 counts Note: 10 sample counts = 1 second	If neither a pass nor a fail can be reported before the sample counter reaches its threshold, no report is made (indeterminate state).			
		High Vapor (HV) Delay Feature						
		The diagnostic is at risk of reporting a false fail when excessively High	Canister purging is active and Long term fuel correction for	<= 0.82 >= 5.0 sec	Filtered post O2 voltage is outside the window defined	See supporting tables: **HV Post Low** and **HV Post High**	When these conditions are met, HV is detected	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		Vapor (HV) conditions that impact the fuel control system are present. This HV condition is indicated when the criteria to the right are met. In this situation, the diagnostic will temporarily stop evaluation. When the HV condition subsides, evaluation will resume.			by:		and the diagnostic will temporarily stop evaluation.	
					Integral offset is outside the window defined by:	See supporting tables: **HV Integral Offset Low** and **HV Integral Offset High**		
			If HV has caused the diagnostic to stop evaluation, evaluation will resume when long term fuel correction is for	> 0.85 >= 20.0 sec		Note: When either the filtered post O2 voltage or the integral offset returns to the above defined windows, the diagnostic will immediately resume evaluation.		
			If HV has caused the diagnostic to stop evaluation, evaluation will resume when the purge valve closes for	>= 20.0 sec				
Post Catalyst Fuel Trim System High Limit Bank 1 (Too Lean)	P2097	Determines if the post catalyst O2 sensor based fuel control system has been unable to adapt to a lean exhaust gas condition that results in an emissions correlated failure	Lean Fail Counts: Note: If the fail count threshold is reached, a fail is reported and the diagnostic will not report again until the next trip. If the sample count	> 800 out of 1000 samples Note: 10 sample counts = 1 second	Same enable conditions for P2096, P2097, P2098, P2099 (see P2096 enable conditions)		Frequency: Continuous Monitoring in 100ms loop	2 Trip(s) Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			threshold is reached before a fail is reported, a pass is reported, the counters are reset to 0, and evaluation starts again.					
		Additional notes, strategy and enable requirements:						
		If the post catalyst O2 voltage is outside a control window, the integral offset is adjusted in an attempt to move the voltage back inside the control window. The offset value is used to adjust the front O2 sensor control to bias the bulk average exhaust air/fuel ratio either lean or rich. The integral offset value is retained between trips.	**The above specified Sample Counter will increment if:**					
			The current post O2 airflow mode is a selected cell:			See supporting tables: **Selected Cells**		
			AND					
			Accumulated Cell Count is greater than (counts spent in the given cell while enabled)			See supporting tables: **Cell Accum Min**		
			The above specified Fail Counter will increment if the Sample Counter increments AND:					
			Filtered post O2 voltage is beyond the fail threshold:			See supporting tables: < **O2 LeanThresh**		
			for more than this many counts:			See supporting tables: **Out of Window Count**		
			AND					
			The post catalyst O2 integral offset is:			See supporting tables: >= **Integral Offset Max**		
			Note - the Post O2 filter coefficient is:			See supporting tables: **Post O2 Filt Coefficient**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		Re-Pass Feature: same for P2096, P2097, P2098, P2099 (see P2096 for details)						
		High Vapor (HV) Delay Feature: same as rich fault for bank 1 (see P2096)						
Post Catalyst Fuel Trim System Low Limit Bank 2 (Too Rich)	P2098	Same as bank 1 rich fault (see P2096)	Rich Fail Counts: Note: Same as bank 1 rich fault (see P2096)	> 500 out of 1000 samples Note: 10 sample counts = 1 second	Same enable conditions for P2096, P2097, P2098, P2099 (see P2096 enable conditions)		Frequency: Continuous Monitoring in 100ms loop	2 Trip(s) Type B
					NOTE: The Bank1 faults listed in the P2096 section are replaced by:			
					A/F Imbalance Bank2 O2S_Bank_2_Sensor_1_FA O2S_Bank_2_Sensor_2_FA			
		Additional notes, strategy and enable requirements: same as bank 1 rich fault (see P2096)						
		Re-Pass Feature: same for P2096, P2097, P2098, P2099 (see P2096 for details)						
		High Vapor (HV) Delay Feature						
		The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions that impact the fuel control system are present. This HV condition is indicated when the criteria to the right are met. In this situation, the	Canister purging is active and Long term fuel correction is for	<= 0.82 >= 5.0 sec	Filtered post O2 voltage is outside the window defined by:	See supporting tables: **HV Post Low** and **HV Post High**	When these conditions are met, HV is detected and the diagnostic will temporarily stop evaluation.	
			If HV has caused the diagnostic to stop evaluation, evaluation will resume when long term fuel correction		Integral offset is outside the window defined by:	See supporting tables: **HV Integral Offset Low** and **HV Integral Offset High**		
						Note: When either the filtered post O2 voltage or		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		situation, the diagnostic will temporarily stop evaluation. When the HV condition subsides, evaluation will resume.	is for	> 0.85 >= 20.0 sec		the integral offset returns to the above defined windows, the diagnostic will immediately resume evaluation.		
			If HV has caused the diagnostic to stop evaluation, evaluation will resume when the purge valve closes for	>= 20.0 sec				
Post Catalyst Fuel Trim System High Limit Bank 2 (Too Lean)	P2099	Same as bank 1 lean fault (see P2097)	Lean Fail Counts: Note: Same as bank 1 lean fault (see P2097)	> 800 out of 1000 samples Note: 10 sample counts = 1 second	Same enable conditions for P2096, P2097, P2098, P2099 (see P2096 enable conditions)		Frequency: Continuous Monitoring in 100ms loop	2 Trip(s) Type B
					NOTE: The Bank1 faults listed in the P2096 section are replaced by:			
					A/F Imbalance Bank2 O2S_Bank_2_Sensor_1_FA O2S_Bank_2_Sensor_2_FA			
		Additional notes, strategy and enable requirements: same as bank 1 lean fault (see P2097)						
		Re-Pass Feature: same for P2096, P2097, P2098, P2099 (see P2096 for details)						
		High Vapor (HV) Delay Feature: same as rich fault for bank 2 (see P2098)						
Throttle Actuator Control - Position Performance	P2101	Detect a throttle positioning error	The throttle model and actual Throttle position differ by > or The actual Throttle	7.568 %.		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all	15 / 15 counts; 12.5 msec/count in the primary	Trips: 1 Type: A MIL:

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			position and throttle model differ by >	7.568 %.	Engine Running or Ignition Voltage > 11 and Ignition Voltage > 5.5 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)	conditions	processor	YES
		Detect throttle control is driving the throttle in the incorrect direction or exceed the reduced power limit	Thottle Position >	39.26 %.	TPS minimum learn is active	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	11 counts; 12.5 msec/count in the primary processor	
			Thottle Position >	39.06 %.	Reduce Engine Power is Active			

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 >	1.689	Throttle de-energized	No 5V reference error or fault for # 2 5V reference circuit (P0651)	0.4969 sec continuous	Trips: 1
			AND TPS2 Voltage > On the main processor	1.789	No TPS circuit faults			Type: C
			Or		PT Relay Voltage > 5.500			MIL: NO
			TPS1 Voltage > AND TPS2 Voltage > On the secondary processor	1.689 1.789				
APP1 Circuit	P2120	Detects a continuous or intermittent short or open in APP1 circuit on the secondary processor but sensor is in range on the primary	Secondary APP1 Voltage < or Secondary APP1 Voltage >	0.463 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	19 / 39 counts or 14 counts continuous; 12.5 msec/count in the secondary processor	Trips: 1 Type: A MIL: YES

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		processor				No 5 V reference #2 error No 5 V reference #2 DTC (P0651)		
APP1 Circuit Low	P2122	Detects a continuous or intermittent short or open in APP1 circuit on both processors or just the primary processor	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	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the primary processor	Trips: 1 Type: A MIL: YES
			Secondary APP1 Voltage <	0.463		No 5 V reference #2 error No 5 V reference #2 DTC (P0651)	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the secondary processor	
APP1 Circuit High	P2123	Detects a continuous or intermittent short in APP1 circuit on both processors or just the primary processor	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	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the primary processor	Trips: 1 Type: A MIL: YES
			Secondary APP1 Voltage >	4.75		No 5 V reference #2 error	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.
						No 5 V reference #2 DTC (P0651)	continuous; 12.5 ms/count in the secondary processor	
APP2 Circuit	P2125	Detects a continuous or intermittent short or open in APP2 circuit on the secondary processor but sensor is in range on the primary processor	Secondary APP2 Voltage < or Secondary APP2 Voltage >	0.325 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 No 5 V reference #1 error No 5 V reference #1 DTC (P0641)	19 / 39 counts or 14 counts continuous; 12.5 msec/count in the secondary processor	Trips: 1 Type: A MIL: YES
APP2 Circuit Low	P2127	Detects a continuous or intermittent short or open in APP2 circuit on both processors or just the primary processor	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 No 5 V reference #1 error No 5 V reference #1 DTC (P0641)	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the primary processor	Trips: 1 Type: A MIL: YES
			Secondary APP2 Voltage <	0.325			19 / 39 counts or 14 counts continuous; 12.5	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
							ms/count in the secondary processor	
APP2 Circuit Low	P2128	Detects a continuous or intermittent short in APP2 circuit on both processors or just the primary processor	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	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the primary processor	Trips: 1 Type: A MIL: YES
			Secondary APP2 Voltage >	2.6		No 5 V reference #1 error No 5 V reference #1 DTC (P0641)	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the secondary processor	
Throttle Position (TP) Sensor 1-2 Correlation	P2135	Detects a continuous or intermittent correlation fault between TPS sensors #1 and #2 on primary or secondary processor	Difference between TPS1 displaced and TPS2 displaced >	6.998 % offset at min. throttle position with a linear threshold to 9.698 % at max. throttle position		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 ms/count in the primary processor	Trips: 1 Type: A MIL: YES
			Difference between (normalized min TPS1) and			No TPS sensor faults		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			(normalized min TPS2) >	4.999 % Vref		(P0120, P0122, P0123, P0220, P0222, P0223) No 5V reference error or fault for # 2 5V reference circuit (P0651)		
			Difference between TPS1 displaced and TPS2 displaced >	6.998 % offset at min. throttle position with a linear threshold to 9.698 % at max. throttle position		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 ms/count in the secondary processor	
			Difference between (normalized min TPS1) and (normalized min TPS2) >	5.000 % Vref		No TPS sensor faults (P0120, P0122, P0123, P0220, P0222, P0223) No 5V reference error or fault for # 2 5V reference circuit (P0651)		
Accelerator Pedal Position (APP) Sensor 1-2 Correlation	P2138	Detects a continuous or intermittent correlation fault between APP sensors #1 and #2 on primary or secondary processor	Difference between APP1 displaced and APP2 displaced >	10.001 % offset at min. pedal position with a linear threshold to 10.001 % at max. pedal position		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 ms/count in the primary processor	Trips: 1 Type: A MIL: YES
			Difference between (normalized min APP1) and			No APP sensor faults		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			(normalized min APP2) >	5.000 % Vref		(P2120, P2122, P2123, P2125, P2127, P2128) No 5V reference error or fault for #1 or # 2 5V reference circuits (P0641, P0651)		
			Difference between APP1 displaced and APP2 displaced >	10.001 % offset at min. pedal position with a linear threshold to 10.001 % at max. pedal position		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 ms/count in the secondary processor	
			Difference between (normalized min APP1) and (normalized min APP2) >	5.000 % Vref		No APP sensor faults (P2120, P2122, P2123, P2125, P2127, P2128) No 5V reference error or fault for #1 or # 2 5V reference circuits (P0641,		
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 > or During TPS min learn on the Secondary	0.935	No TPS circuit errors No TPS circuit	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 secs continuous	Trips: 1 Type: A MIL: YES

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			processor, TPS Voltage >	0.935	faults P1682 is not active Minimum TPS learn active			
			and					
			Number of learn attempts >	10 counts				
			AND TPS2 Voltage > On the Primary processor	1.789	Throttle de-energized No TPS circuit faults			
			OR TPS1 Voltage >	1.689	PT Relay Voltage >	5.5		
			AND TPS2 Voltage > On the Secondary processor	1.789				
Cooling System Performance	P2181	This DTC detects thermostat malfunction (i.e. stuck open)	Engine Coolant Temp (ECT) is ≤ target temperature of 75 Deg C and normalized ratio is ≤ than 2. When above is present for more than 5 seconds, fail counts start.		No Active DTC's	MAF_SensorFA IAT_SensorFA	30 failures out of 90 samples 1 sec /sample	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Engine total airgrams is accumulated when 17 ≤ AirFlow ≤ 450 grams per second.				Once per ignition key cycle	
						THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA		
			Ratio Definition: Current temp difference between ECT and RCT minus PwrUp difference divided by total airgrams. Note: Minimum total airgrams is 500.0 grams.		Engine not run time	≥ 1800 seconds		
					Engine run time	90 ≤ Time ≤ 1370 seconds		
					Fuel Condition	Ethanol ≤ 87%		
					ECT at Power Up	-7.0 ≤ ECT ≤ 70.0 °C		
					IAT min	-7°C ≤ IAT ≤ 55°C.		
					Airflow	17.0 ≤ Airflow ≤ 450.0 GPS		
Air Fuel Imbalance Bank 1	P219A	Determines if the air-fuel delivery system is imbalanced by monitoring the pre and post catalyst O2 sensor voltage	Bank 1 Filtered Length Ratio variable	> 0.38 at any time during the trip	System Voltage	*10 <= V <= 32 for >= 4 seconds*	Frequency: Continuous Monitoring of O2 voltage signal in 12.5ms loop	2 Trip(s) Type B
					ECT	> -20 oC		
					Engine Run Time	>= 10 seconds		
					Engine speed	*1000 <= rpm <= 3500*		
			OR		Engine speed			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		characteristics. To improve S/N, pre-catalyst O2 voltages between 1000 and 0 millivolts are ignored. This feature is enabled at Air Per Cylinder values <= 0 mg/cylinder. Note: If the first voltage value is >= the second voltage value, AND/OR the Air Per Cylinder value is equal to zero, the feature is not used on this application and the full pre-catalyst O2 voltage range is utilized.	Bank 1 AFM (DoD) Filtered Length Ratio variable (AFM applications only)	> 1.00 at any time during the trip	change during the current 3.13 sec sample period is <=	*8192 rpm*	The AFIM Filtered Length Ratio variable is updated after every 3.13 seconds of valid data. The first report is delayed for 131 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.	
			AND		Mass Airflow	*10.0 <= g/s <= 510.0*		
			Bank 1 Filtered Post catalyst O2 voltage is NOT between Note: If the first voltage value is >= the second voltage value, this is an indication that the post catalyst O2 data is not used for diagnosis on this application.	1000 and 0 millivolts	Air Per Cylinder	*140 <= mg/cylinder <= 680*		
					Air Per Cylinder change during the current 3.13 sec sample period is <=	*8192 mg/cylinder*		
					% Ethanol	<= 87 %		
					Positive (rising) Delta O2 voltage during previous 12.5ms is OR	> 5.0 millivolts		
					OR			
					Negative (falling) Delta O2 voltage during previous 12.5ms is	< -5.0 millivolts		
					For AFM (Cylinder Deactivation) vehicles only	No AFM state change during current 3.13 second sample period.		
					O2 sensor switches	>= 0 times during current 3.13 second sample		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						period	be detected.	
					Quality Factor	>= 0.74 in the current operating region		
		Monitor Strategy Notes: The AFIM Filtered Length Ratio is derived from the pre-O2 sensor voltage metric known as String Length. String Length is simply the curve length of the O2 sensor voltage over a fixed time period of 3.13 seconds. The reason we use String Length is because it comprehends both O2 signal frequency and amplitude in one metric. The busier the O2 voltage (an indication of imbalance), the longer the String Length will be.	The AFIM Filtered Length Ratio is the difference between the measured String Length and a 17x17 table lookup value,divided by the same lookup value, and finally multiplied by a Quality Factor (the latter ranges between 0 and 1, based on robustness to false diagnosis in the current operating region). The reason we use a ratio of the String Lengths is so that we can normalize the failure metric over various engine speed and load regions since engine speed and load directly impact pre-O2 String Length, especially when AFIM failures are present. In order	The Quality Factor (QF) calibrations are located in a 17x17 lookup table versus engine speed and load (see Supporting Tables). A QF of “1” is an indication that we were able to achieve at least 4sigma/2sigma robustness in that speed/load region. QF values less than “1” indicate that we don’t have 4sigma/2sigma robustness in that region. The quality of the data is determined via statistical analysis of	No EngineMisfireDetected_FA			
					No MAP_SensorFA			
					No MAF_SensorFA			
					No ECT_Sensor_FA			
					No Ethanol Composition Sensor FA			
					No TPS_ThrottleAuthorityDefaulted			
					No FuelInjectorCircuit_FA			
					No AIR System FA			
					No O2S_Bank_1_Sensor_1_FA			
					No O2S_Bank_2_Sensor_1_FA			
					No EvapPurgeSolenoidCircuit_FA			
					No EvapFlowDuringNonPurge_FA			
					No EvapVentSolenoidCircuit_FA			
					No EvapSmallLeak_FA			
					No EvapEmissionSystem_FA			
					No FuelTankPressureSensorCircuit_FA			
					Device Control Not Active			
					Intrusive Diagnostics Not Active			
					Engine OverSpeed Protection Not Active			
					Reduced Power Mode (ETC DTC) Not Active			
					PTO Not Active			
					Traction Control Not Active			
					Fuel Control Status			
					Closed Loop	Enabled		
					Long Term FT	Enabled		
						Please see "Closed Loop Enable Criteria" and "Long Term FT Enable		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			are present. In order to filter out signal noise (to avoid false failures), the Length Ratio is filtered using a common first-order lag filter. The result is the AFIM Filtered Length Ratio	analysis of String Length data. QF values less than 0.74 identify regions where diagnosis is not possible.		**Criteria" in Supporting Tables.**		
					Cumulative (absolute) delta MAF during the current 3.13 second sample period is	*< 500 g/s* *Note: This protects against false diagnosis during severe transient maneuvers.*		
					Data collection is suspended under the following circumstances:	- for 0.5 seconds after AFM transitions - for 0.5 seconds after Closed Loop transitions from Off to On - for 0.5 seconds after purge transitions from Off to On or On to Off - for 0.5 seconds after the AFIM diagnostic transitions from Disabled to Enabled		
Air Fuel Imbalance Bank 2	P219B	Determines if the air-fuel delivery system is imbalanced by monitoring the pre and post catalyst O2 sensor voltage characteristics.	Bank 2 Filtered Length Ratio variable	> 0.68 at any time during the trip	System Voltage	*10 <= V <= 32 for >= 4 seconds*	Frequency: Continuous Monitoring of O2 voltage signal in 12.5ms loop	2 Trip(s) Type B
					ECT	> -20 oC		
					Engine Run Time	>= 10 seconds		
					Engine speed	*1000 <= rpm <= 3500*		
			OR		Engine speed change during the current 3.13 sec sample			
			Bank 2 AFM (DoD) Filtered Length Ratio variable (AFM	> 1.00 at any time during the trip				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			applications only)		period is <=	*8192 rpm*	The AFIM Filtered Length Ratio variable is updated after every 3.13 seconds of valid data. The first report is delayed for 350 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.	
		To improve S/N, pre-catalyst O2 voltages between 1000 and 0 millivolts are ignored. This feature is enabled at Air Per Cylinder values <= 0 mg/cylinder. Note: If the first voltage value is >= the second voltage value, AND/OR the Air Per Cylinder value is equal to zero, the feature is not used on this application and the full pre-catalyst O2 voltage range is utilized.	**AND**		Mass Airflow	*10.0 <= g/s <= 510.0*		
			Bank 2 Filtered Post catalyst O2 voltage is NOT between Note: If the first voltage value is >= the second voltage value, this is an indication that the post catalyst O2 data is not used for diagnosis on this application.	1000 and 0 millivolts	Air Per Cylinder	*140 <= mg/cylinder <= 680*		
					Air Per Cylinder change during the current 3.13 sec sample period is <=	*8192 mg/cylinder*		
					% Ethanol	<= 87 %		
					Positive (rising) Delta O2 voltage during previous 12.5ms is	> 5.0 millivolts		
					OR			
					Negative (falling) Delta O2 voltage during previous 12.5ms is	< -5.0 millivolts		
					For AFM (Cylinder Deactivation) vehicles only	No AFM state change during current 3.13 second sample period.		
					O2 sensor switches	>= 0 times during current 3.13 second sample period		
					Quality Factor	>= 0.74 in the current operating region		
		Monitor Strategy	The AFIM Filtered	The Quality				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		Notes: The AFIM Filtered Length Ratio is derived from the pre-O2 sensor voltage metric known as String Length. String Length is simply the curve length of the O2 sensor voltage over a fixed time period of 3.13 seconds. The reason we use String Length is because it comprehends both O2 signal frequency and amplitude in one metric. The busier the O2 voltage (an indication of imbalance), the longer the String Length will be.	Length Ratio is the difference between the measured String Length and a 17x17 table lookup value,divided by the same lookup value, and finally multiplied by a Quality Factor (the latter ranges between 0 and 1, based on robustness to false diagnosis in the current operating region). The reason we use a ratio of the String Lengths is so that we can normalize the failure metric over various engine speed and load regions since engine speed and load directly impact pre-O2 String Length, especially when AFIM failures are present. In order to filter out signal noise (to avoid false failures), the Length	Factor (QF) calibrations are located in a 17x17 lookup table versus engine speed and load (see Supporting Tables). A QF of “1” is an indication that we were able to achieve at least 4sigma/2sigma robustness in that speed/load region. QF values less than “1” indicate that we don’t have 4sigma/2sigma robustness in that region. The quality of the data is determined via statistical analysis of String Length data. QF values less than 0.74	No EngineMisfireDetected_FA No MAP_SensorFA No MAF_SensorFA No ECT_Sensor_FA No Ethanol Composition Sensor FA No TPS_ThrottleAuthorityDefaulted No FuelInjectorCircuit_FA No AIR System FA No O2S_Bank_1_Sensor_1_FA No O2S_Bank_2_Sensor_1_FA No EvapPurgeSolenoidCircuit_FA No EvapFlowDuringNonPurge_FA No EvapVentSolenoidCircuit_FA No EvapSmallLeak_FA No EvapEmissionSystem_FA No FuelTankPressureSensorCircuit_FA Device Control Not Active Intrusive Diagnostics Not Active Engine OverSpeed Protection Not Active Reduced Power Mode (ETC DTC) Not Active PTO Not Active Traction Control Not Active			
					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.**		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			failures), the Length Ratio is filtered using a common first-order lag filter. The result is the AFIM Filtered Length Ratio	less than 0.74 identify regions where diagnosis is not possible.	Cumulative (absolute) delta MAF during the current 3.13 second sample period is	*< 500 g/s* *Note: This protects against false diagnosis during severe transient maneuvers.*		
					Data collection is suspended under the following circumstances:	- for 0.5 seconds after AFM transitions - for 0.5 seconds after Closed Loop transitions from Off to On - for 0.5 seconds after purge transitions from Off to On or On to Off - for 0.5 seconds after the AFIM diagnostic transitions from Disabled to Enabled		
Fuel Conductivity Out Of Range (water in fuel)	P2269	Detects the presence of High Conductivity Fuel (e.g. water in fuel) via a specific range of sensor frequency. High conductivity in the fuel causes a significant upward shift in the sensor's output frequency.	Flex Fuel Sensor Output Frequency	> 185 Hertz	Powertrain Relay	> 11.0 Volts < 32.0 Volts	50 failures out of 63 samples 100 ms loop Continuous	2 trip(s) Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
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 < 830 mvolts AND 2) Accumulated air flow during stuck lean test > 230 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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					B1S2 Failed this key cycle	P013A, P013B, P013E, P013F, P2270 or P2271		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria** (B1S2, B2S2) in Supporting Tables tab.		
					Low Fuel Condition Diag	= False		
					Engine Speed to initially enable test	1100 <= RPM <= 2500		
					Engine Speed range to keep test enabled (after initially enabled)	1050 <= RPM <= 2650		
					Engine Airflow	3 gps <= Airflow <= 20 gps		
					Vehicle Speed to initially enable test	40.4 mph <= Veh Speed <= 82.0 mph		
					Vehicle Speed range to keep test enabled (after initially enabled)	36.0 mph <= Veh Speed <= 87.0 mph		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Closed loop integral	0.74 <= C/L Int <= 1.08		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					Power Take Off	= not active		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater on Time	>= 80.0 sec		
					Predicted Catalyst temp	550 ºC <= Cat Temp <= 900 ºC		
					Fuel State	= DFCO possible		
					All of the above met for at least 2.0 seconds, and then the Force Cat Rich stage is requested.			
					During Stuck Lean test the following must stay TRUE or the test will abort			
					Commanded Fuel	0.95 <= EQR <= 1.10		
O2 Sensor Signal Stuck Rich Bank 1 Sensor 2	P2271	This DTC determines if the post catalyst O2 sensor is stuck in a	Post O2 sensor cannot achieve the lean threshold voltage.	1) Post O2S signal > 150 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted	Frequency: Once per trip	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		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.	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.	AND 2) Accumulated air flow during stuck rich test > 82 grams.	B1S2 Failed this key cycle System Voltage ICAT MAT Burnoff delay	ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013B, P013E, P013F or P2270 10.0 volts < system voltage< 32.0 volts = Not Valid	Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Green O2S Condition	= Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria** (B1S2, B2S2) in Supporting Tables tab.		
					Low Fuel Condition Diag	= False		
					Engine Speed	1100 <= RPM <= 2500		
					Engine Airflow	3 gps <= Airflow <= 20 gps		
					Vehicle Speed	40.4 mph <= Veh Speed <= 82.0 mph		
					Closed loop integral	0.74 <= C/L Int <= 1.08		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					Power Take Off	= not active		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater on Time	>= 80.0 sec		
					Predicted Catalyst temp	550 ºC <= Cat Temp <= 900 ºC		
					Fuel State	= DFCO possible		
					DTC's Passed	= P2270 (and P2272 (if applicable))		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					DTC's Passed DTC's Passed	= P013E (and P014A (if applicable)) = P013A (and P013C (if applicable))		
					After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).			
O2 Sensor Signal Stuck Lean Bank 2 Sensor 2	P2272	This DTC determines if the post catalyst O2 sensor is stuck in a normal lean voltage range and thereby can no longer be used for post oxygen sensor fuel control or for catalyst monitoring. The diagnostic is an intrusive test (during coast) which increases the delivered fuel to achieve the required rich threshold.	Post O2 sensor cannot achieve the rich threshold voltage. AND The Accumulated mass air flow monitored during the Stuck Lean Voltage Test is greater than the threshold before the above voltage threshold is met.	1) Post O2S signal < 830 mvolts AND 2) Accumulated air flow during stuck lean test > 230 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, P014B, P2272 or P2273		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria** (B1S2, B2S2) in Supporting Tables tab.		
					Low Fuel Condition Diag	= False		
					Engine Speed to initially enable test	1100 <= RPM <= 2500		
					Engine Speed range to keep test enabled (after initially enabled)	1050 <= RPM <= 2650		
					Engine Airflow	3 gps <= Airflow <= 20 gps		
					Vehicle Speed to initially enable test	40.4 mph <= Veh Speed <= 82.0 mph		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Vehicle Speed range to keep test enabled (after initially enabled)	36.0 mph <= Veh Speed <= 87.0 mph		
					Closed loop integral	0.74 <= C/L Int <= 1.08		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					Power Take Off	= not active		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater on Time	>= 80.0 sec		
					Predicted Catalyst temp	550 ºC <= Cat Temp <= 900 ºC		
					Fuel State	= DFCO possible		
					All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested.			
					During Stuck Lean test the following must stay TRUE or the test will abort			
					Commanded Fuel	0.95 <= EQR <= 1.10		

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 > 150 mvolts AND 2) Accumulated air flow during stuck rich test > 82 grams.	No Active DTC's B2S2 Failed this key cycle System Voltage	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013C, P013D, P014A, P014B or P2272 10.0 volts < system voltage< 32.0 volts	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria** (B1S2, B2S2) in Supporting Tables tab.		
					Low Fuel Condition Diag	= False		
					Engine Speed	1100 <= RPM <= 2500		
					Engine Airflow	3 gps <= Airflow <= 20 gps		
					Vehicle Speed	40.4 mph <= Veh Speed <= 82.0 mph		
					Closed loop integral	0.74 <= C/L Int <= 1.08		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					Power Take Off	= not active		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater on Time	>= 80.0 sec		
					Predicted Catalyst temp	550 ºC <= Cat Temp <= 900 ºC		
					Fuel State	= DFCO possible		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					DTC's Passed	= P2270 (and P2272 (if applicable))		
					DTC's Passed	= P013E (and P014A (if applicable))		
					DTC's Passed	= P013A (and P013C (if applicable))		
					After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).			
Transmission Control Torque Request Circuit	P2544	Determines if the torque request from the TCM is valid	**Protect error** - Serial Communication message - ($199 -	Message <> two's complement of message			>= 16 Protect errors during key cycle	2 trip(s)
			OR					
			Rolling count error - Serial Communication message ($199 -	Message <> previous message rolling count value +	Diagnostic enabled/disable	Enabled	>= 6 Rolling count errors out of ten samples	Type B
			OR		Power Mode	= Run		
			RAM Error - Internal ECU fault	Transmission torque request value or request type dual store not equal	Engine Running	= True	>= 3 RAM errors during key cycle	
					Run/Crank Active	> 0.50 Sec		
			OR					
			Range Error - Serial Communication message - ($199 -	> 450 Nm			>= 3 out of 10 samples	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			OR					
			Multi-transition error - Trans torque intervention	Requested torque intervention type toggles from not increasing request to increasing request			>= 3 multi-transitions out of 5 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 Time between ignition off timer Time since last ignition off timer increment Current ignition off time < old ignition off time	< 0 seconds > 10 seconds < 0.8 seconds > 1.2 seconds ≥ 1.375 seconds	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 1 second / sample test runs once each key-off	2 trips Type B DTC sets on next key cycle if failure detected

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Current ignition off timer minus old ignition off timer	≠ 1				
Engine Serial Number (ESN) Not Programmed or Incompatible	P264F	This DTC will be stored if the Engine Serial Number (ESN) has not been programmed.	Any ESN digits	= FF	OBD Manufacturer Enable Counter	= 0	250 ms / test Continuous	Type A 1 trips
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures	≥ 5 counts	CAN hardware is bus OFF for	> 0.1125 seconds	Diagnostic runs in 12.5 ms loop	2 Trip(s)
			out of these samples	≥ 5 counts	Diagnostic enable timer	> 3.0000 seconds		Type B
Lost Communication With TCM	U0101	This DTC monitors for a loss of communication with the transmission control module	Message is not received from controller for this many counts	12 counts	Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	The fail diagnostic runs in the 6.25 ms loop with pass conditions reported to the DFIR in the 1000ms loop.	2 Trip(s)
			out of these samples	12 counts	Power mode is RUN			Type B
					Communication bus is not OFF			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					or is typed as a C code			
					Normal Communication is enabled			
					Normal Transmit capability is TRUE			
					The diagnostic system is not disabled			
					The bus has been on for	> 3.0000 seconds		
					A message has been selected to monitor.			
Lost Communication With Anti-Lock Brake System (ABS) Control Module	U0121	This DTC monitors for a loss of communication with the ABS control module.	Message is not received from controller for this many counts	12 counts	Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	The fail diagnostic runs in the 6.25 ms loop with pass conditions reported to the DFIR in the 1000ms loop.	1 Trip(s)
			out of these samples	12 counts	Power mode is RUN			Type C

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Communication bus is not OFF			Special Type C
					or is typed as a C code			
					Normal Communication is enabled			
					Normal Transmit capability is TRUE			
					The diagnostic system is not disabled			
					The bus has been on for	> 3.0000 seconds		
					A message has been selected to monitor.			
Lost Communication With Body Control Module	U0140	This DTC monitors for a loss of communication with the Body Control Module.	Message is not received from controller for this many counts	12 counts	Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	The fail diagnostic runs in the 6.25 ms loop with pass conditions reported to the DFIR in the 1000ms loop.	1 Trip(s)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			out of these samples	12 counts	Power mode is RUN			Type C
					Communication bus is not OFF			Special Type C
					or is typed as a C code			
					Normal Communication is enabled			
					Normal Transmit capability is TRUE			
					The diagnostic system is not disabled			
					The bus has been on for	> 3.0000 seconds		
					A message has been selected to monitor.			

FAPD Section

P2096, P2097, P2098, P2099 Cell Accum Min

Post O2 Air Flow Mode	Bank1 Decel	Bank2 Decel	Bank1 Idle	Bank2 Idle	Bank1 Cruise	Bank2 Cruise	Bank1 Light Accel	Bank2 Light Accel	Bank1 Heavy Accel	Bank2 Heavy Accel
Cell Accum Min Count (10 counts = 1 sec.)	300	300	300	300	0	0	300	300	300	300

P2097, P2099 Integral Offset Max

Post O2 Air Flow Mode	Decel	Idle	Cruise	Light Accel	Heavy Accel
Post O2 Integral Offset Max [mV]	140	140	390	390	390

P2096, P2098 Integral Offset Min

Post O2 Air Flow Mode	Decel	Idle	Cruise	Light Accel	Heavy Accel
Post O2 Integral Offset Min [mV]	-140	-140	-390	-390	-390

P2097, P2099 O2 Lean Thresh

Post O2 Airflow Mode Cell	Bank1 Decel	Bank2 Decel	Bank1 Idle	Bank2 Idle	Bank1 Cruise	Bank2 Cruise	Bank1 Light Accel	Bank2 Light Accel	Bank1 Heavy Accel	Bank2 Heavy Accel
O2 Lean Threshold [mV]	610	610	610	610	610	610	610	610	610	610

P2096, P2098 O2 Rich Thresh

Post O2 Airflow Mode Cell	Bank1 Decel	Bank2 Decel	Bank1 Idle	Bank2 Idle	Bank1 Cruise	Bank2 Cruise	Bank1 Light Accel	Bank2 Light Accel	Bank1 Heavy Accel	Bank2 Heavy Accel
O2 Rich Threshold [mV]	785	785	785	785	785	785	785	785	785	785

P2096, P2097, P2098, P2099 Out Of Window Count

Post O2 Airflow Mode Cell	Decel	Idle	Cruise	Light Accel	Heavy Accel
Out of Window Count (10 counts = 1 sec.)	0	0	0	0	0

P2096, P2097, P2098, P2099 Selected Cells

Post O2 Airflow Mode Cell	Bank1 Decel	Bank2 Decel	Bank1 Idle	Bank2 Idle	Bank1 Cruise	Bank2 Cruise	Bank1 Light Accel	Bank2 Light Accel	Bank1 Heavy Accel	Bank2 Heavy Accel
Post O2 Airflow Mode Selected Cell 0 if not selected, 1 if selected	0	0	0	0	1	1	1	1	1	1

P2096, P2097, P2098, P2099 HV Post Low

Post O2 Airflow Mode Cell	Bank1 Decel	Bank2 Decel	Bank1 Idle	Bank2 Idle	Bank1 Cruise	Bank2 Cruise	Bank1 Light Accel	Bank2 Light Accel	Bank1 Heavy Accel	Bank2 Heavy Accel
KaFAPD_U_HV_PO2_FiltLoThresh	695	695	695	695	695	695	695	695	695	695

P2096, P2097, P2098, P2099 HV Post High

Post O2 Airflow Mode Cell	Bank1 Decel	Bank2 Decel	Bank1 Idle	Bank2 Idle	Bank1 Cruise	Bank2 Cruise	Bank1 Light Accel	Bank2 Light Accel	Bank1 Heavy Accel	Bank2 Heavy Accel
KaFAPD_U_HV_PO2_FiltHiThresh	795	795	795	795	775	775	785	785	785	785

P2096, P2097, P2098, P2099 HV Integral Offset Low

Post O2 Airflow Mode Cell	Bank1 Decel	Bank2 Decel	Bank1 Idle	Bank2 Idle	Bank1 Cruise	Bank2 Cruise	Bank1 Light Accel	Bank2 Light Accel	Bank1 Heavy Accel	Bank2 Heavy Accel
KaFAPD_U_HV_PO2_IntOffLoThresh	-115	-115	-115	-115	-365	-365	-365	-365	-365	-365

P2096, P2097, P2098, P2099 HV Integral Offset High

Post O2 Airflow Mode Cell	Bank1 Decel	Bank2 Decel	Bank1 Idle	Bank2 Idle	Bank1 Cruise	Bank2 Cruise	Bank1 Light Accel	Bank2 Light Accel	Bank1 Heavy Accel	Bank2 Heavy Accel
KaFAPD_U_HV_PO2_IntOffHiThresh	105	105	105	105	355	355	355	355	355	355

P2096, P2097, P2098, P2099 Post O2 Filt Coefficient

Bank and Index	Bank 1 Index 0	Bank 2 Index 0	Bank 1 Index 1	Bank 2 Index 1	Bank 1 Index 2	Bank 2 Index 2	Bank 1 Index 3	Bank 2 Index 3	Bank 1 Index 4	Bank 2 Index 4
Filter Coefficient	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050
Current Filtered Post O2 Voltage	0	0	500	500	600	600	700	700	800	800

P0068: MAP / MAF / TPS Correleation

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

X-axis	5.0003	10.0006	14.9994	19.9997	25.0000	30.0003	35.0006	39.9994	99.9985
Data	34.1953	32.3125	30.2031	25.6172	23.5313	22.3281	21.7734	100.0000	100.0000

X axis is TPS (%)

Data is MAF threshold (grams/sec)

X-axis	5.0003	10.0006	14.9994	19.9997	25.0000	30.0003	35.0006	39.9994	99.9985
Data	26.9766	29.7813	31.2813	36.2813	44.2734	63.9844	69.0078	255.0000	255.0000

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

X-axis	600.00	1400.00	2200.00	3000.00	3800.00	4600.00	5400.00	6200.00	7000.00
Data	25.0000	60.0000	100.0000	140.0000	180.0000	220.0000	250.0000	280.0000	300.0000

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

X-axis	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00
Data	0.0000	18.0000	40.0000	75.0000	135.0000	250.0000	500.0000	500.0000	500.0000

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

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	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
50	0.0	0.0	3.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
60	0.0	0.0	3.5	6.0	6.0	6.0	7.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
70	0.0	0.0	4.0	6.0	6.0	7.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
80	0.0	0.0	4.0	6.0	6.0	7.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
90	0.0	0.0	4.0	6.0	6.0	7.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
100	0.0	0.0	4.0	6.0	6.0	7.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
110	0.0	0.0	4.0	6.0	6.0	7.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
120	0.0	0.0	4.0	6.0	6.0	7.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
130	0.0	0.0	4.0	6.0	6.0	7.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
140	0.0	0.0	4.0	6.0	6.0	7.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
150	0.0	0.0	4.0	6.0	6.0	7.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
160	0.0	0.0	4.0	6.0	6.0	7.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
170	0.0	0.0	4.0	6.0	6.0	7.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
180	0.0	0.0	4.0	6.0	6.0	7.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0

Knock Detection Enabled Factors:

Knock Detection Enabled = FastAttackRate * FastAttackCoolGain * FastAttackBaroGain

RPM:	**0**	**512**	**1024**	**1536**	**2048**	**2560**	**3072**	**3584**	**4096**	**4608**	**5120**	**5632**	**6144**	**6656**	**7168**	**7680**	**8192**
FastAttackRate:	0.00	2.50	3.00	4.00	4.50	4.50	4.25	4.00	3.75	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50

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

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

P0327/P0332 ShortLowThresh

Engine Oil Temp (deg C):	**90**	**95**	**100**	**105**	**110**	**115**	**120**	**125**	**130**	**135**	**140**	**145**	**150**	**155**	**160**
ShortLowThreshSig	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.59	2.44	2.29	2.14	1.98	1.83	1.68
ShortLowThreshRet	2.69	2.69	2.69	2.69	2.69	2.69	2.69	2.69	2.69	2.38	2.08	1.77	1.47	1.16	0.86

P0328P0333 ShortHiThresh

Engine Oil Temperature (deg C):

Engine Oil Temp (deg C):	**90**	**95**	**100**	**105**	**110**	**115**	**120**	**125**	**130**	**135**	**140**	**145**	**150**	**155**	**160**
ShortHiThreshSig	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58
ShortHiThreshRet	6.66	6.66	6.66	6.66	6.66	6.66	6.66	6.66	6.66	6.66	6.66	6.66	6.66	6.66	6.66

Tables supporting P219A and P219B Diagnostics:

P219A **KtOXYD_cmp_AFIM_LngthThrsh1**

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008
80	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008
120	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008
160	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008
200	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008
240	125008	125008	125008	125008	125008	20784	24160	36384	19888	22272	22272	125008	125008	125008	125008	125008	125008
280	125008	125008	125008	20864	20864	20784	24160	36384	19888	22272	28320	34368	125008	125008	125008	125008	125008
320	125008	125008	125008	20864	20864	23312	29952	42768	20768	23072	44672	44672	125008	125008	125008	125008	125008
360	125008	125008	125008	26672	26672	25328	35520	50496	23968	25216	49632	49632	125008	125008	125008	125008	125008
400	125008	125008	125008	30976	30976	37968	42016	53776	27648	24944	57584	57584	125008	125008	125008	125008	125008
440	125008	125008	125008	31936	31936	31280	43136	58944	40288	27632	64128	61808	66560	125008	125008	125008	125008
480	125008	125008	125008	32960	32960	37728	38896	62608	56832	34560	68624	73216	66560	125008	125008	125008	125008

520	125008	125008	125008	28240	28240	38176	38624	64400	48944	56992	67968	79424	69344	125008	125008	125008	125008
560	125008	125008	125008	30560	30560	32432	28528	63008	58688	46928	71520	72128	72128	125008	125008	125008	125008
640	125008	125008	125008	32832	32832	40032	34960	45728	40032	48416	72880	72496	72128	125008	125008	125008	125008
720	125008	125008	125008	32832	32832	40032	34960	45728	40032	49168	72880	72880	125008	125008	125008	125008	125008
800	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008

P219A **KtOXYD_cmp_AFIM_LngthThrsh1_DoD (AFM applications only)**

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008
80	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008
120	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008
160	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008
200	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008
240	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008
280	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008
320	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008
360	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008
400	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008
440	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008
480	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008
520	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008
560	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008
640	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008
720	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008
800	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008

P219B **KtOXYD_cmp_AFIM_LngthThrsh2**

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008
80	125008	125008	10160	10160	10144	11104	11440	12016	12016	125008	125008	125008	125008	125008	125008	125008	125008
120	125008	125008	10160	10160	10144	11104	11440	12016	13616	16560	18048	17824	16976	125008	125008	125008	125008
160	125008	125008	9072	9072	10352	11488	12224	14640	15792	16560	18048	17824	18368	21152	21152	125008	125008
200	125008	125008	12704	12704	13504	19664	19920	18864	18320	16224	19424	21600	19776	21152	21152	125008	125008
240	125008	125008	12928	12928	14960	21568	20736	26096	19056	19472	20976	23904	21952	21392	21392	125008	125008
280	125008	125008	12928	13424	15696	23888	21104	34768	21008	21120	22496	28464	22896	21552	21552	125008	125008
320	125008	125008	125008	17984	17984	29808	25312	32736	22000	21664	24640	30320	28304	23056	23056	125008	125008
360	125008	125008	125008	23744	23744	30368	32672	35600	26464	22528	25424	28976	28928	22464	22464	125008	125008
400	125008	125008	125008	26384	26384	33552	35968	36896	27360	23264	25952	33568	30848	29136	29136	125008	125008
440	125008	125008	125008	29456	29456	31536	36400	37616	27632	26496	28272	37376	37024	28000	28000	125008	125008
480	125008	125008	125008	27952	27952	28288	38096	33536	32576	31504	28208	38336	39408	28240	28240	125008	125008
520	125008	125008	125008	29136	29136	29776	53840	38704	31936	37024	28416	44016	38464	28768	28768	125008	125008
560	125008	125008	125008	33504	33504	25840	42768	33504	28528	39376	30736	57824	44896	30944	30944	125008	125008
640	125008	125008	125008	25424	25424	26544	33968	43184	39920	47584	41440	51248	49536	40240	30944	125008	125008
720	125008	125008	125008	25424	25424	26544	33968	43184	39920	47584	41440	51248	49536	49536	125008	125008	125008
800	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008	125008

P219B **KtOXYD_cmp_AFIM_LngthThrsh2_DoD (AFM applications only)**

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008
80	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008
120	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008
160	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008
200	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008
240	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008
280	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008
320	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008
360	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008
400	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008
440	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008
480	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008
520	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008
560	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008
640	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008
720	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008
800	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008	99008

P219A **KtOXYD_K_AFIM_QualFactor1**

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
200	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
240	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
280	0.00	0.00	0.00	0.00	0.00	0.00	0.75	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
320	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
360	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
400	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
440	0.00	0.00	0.00	0.00	0.00	0.50	0.75	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
480	0.00	0.00	0.00	0.00	0.00	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
520	0.00	0.00	0.00	0.00	0.00	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
560	0.00	0.00	0.00	0.00	0.00	0.50	1.00	1.00	0.50	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
640	0.00	0.00	0.00	0.00	0.00	0.50	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
720	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
800	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

P219A **KtOXYD_K_AFIM_QualFactor1_DoD (AFM applications only)**

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
200	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
240	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
280	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
320	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

360	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
400	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
440	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
480	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
560	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
640	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
720	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
800	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

P219B **KtOXYD_K_AFIM_QualFactor2**

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
120	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
200	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
240	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
280	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
320	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
360	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
400	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
440	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
480	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
520	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
560	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
640	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
720	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
800	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

P219B **KtOXYD_K_AFIM_QualFactor2_DoD (AFM applications only)**

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
200	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
240	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
280	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
320	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
360	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
400	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
440	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
480	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
560	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
640	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
720	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
800	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Tables supporting Brake Pedal Position Sensor Diagnostic

P057B

CmpltTestPointWeight

Axis	0.00	0.05	0.08	0.25	0.35	0.45	0.55	0.75	1.00
Curve	0.0	0.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0

FastTestPointWeight

Axis	0.00	0.05	0.08	0.25	0.35	0.45	0.55	0.75	1.00
Curve	0.2	0.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Tables supporting Clutch Diagnostics:

P0806

EngTorqueThreshold Table **axis is Percent Clutch Pedal Position, 0 = bottom of travel**

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

P0806

ResidualErrorEnableLow Table **axis is Gear**

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

P0806

ResidualErrorEnableHigh Table **axis is Gear**

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

The following tables define the Lean and Rich failure thresholds for FASD

P0171 & P0174 **Long Term Trim Lean (Lean Fail 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
Long Term Fuel Trim Lean	1.295	1.295	1.295	1.295	1.295	1.295	1.295	1.295	1.295	1.295	1.295	1.295	1.295	1.295	1.295	1.295	1.295

P0172 & P0175 **Non Purge Rich Limit (Rich Fail 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
Long Term Fuel Non-Purge	0.770	0.770	0.770	0.770	0.770	0.770	0.770	0.770	0.770	0.770	0.770	0.770	0.770	0.770	0.770	0.770	0.770

P0172 & P0175 **Purge Rich Limit (Triggers Rich Intrusive test)**

% 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	0.775	0.775	0.775	0.775	0.775	0.775	0.775	0.775	0.775	0.775	0.775	0.775	0.775	0.775	0.775	0.775	0.775

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

P0172, P0174, and P0175	Long-Term Fuel Trim Cell Usage																
Cell I.D.	CeFADR_e_(	CeFADR_e_(	CeFADR_e_(	CeFADR_e_(	CeFADR_e_(	CeFADR_e_(	CeFADR_e_(	CeFADR_e_(	CeFADR_e_(	CeFADR_e_(	CeFADR_e_(	CeFADR_e_(	CeFADR_e_(	CeFADR_e_(	CeFADR_e_(	CeFADR_e_(	CeFADR_e_Cell15_PurgOffDecel
FASD Cell Usage	CeFADD_e_$	CeFADD_e_$	CeFADD_e_$	CeFADD_e_$	CeFADD_e_$	CeFADD_e_$	CeFADD_e_$	CeFADD_e_$	CeFADD_e_$	CeFADD_e_$	CeFADD_e_$	CeFADD_e_$	CeFADD_e_$	CeFADD_e_$	CeFADD_e_$	CeFADD_e_$	CeFADD_e_NonSelectedCell
FASD Enabled In Cell?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NO

P1400 Detail

KnlDLC_T_ECT_Axis

Coolant Temperature	-11	-10	1	2	16	17	38	39	100

KalDLC_n_CLO_ThrshOfst[CilDLR_DR]

be considered Cat Light Off	1000	125	125	125	125	125	125	1000	1000

KalDLC_n_CLO_ThrshOfst[CilDLR_PN]

be considered Cat Light Off	1000	125	125	125	125	125	125	1000	1000

KalDLC_n_EngDsrdBase[CilDLR_PN]

Coolant Temperature	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Base RPM	800	800	800	800	780	750	705	665	625	575	550	550	550	570	580	600	620

KalDLC_n_EngDsrdBase[CilDLR_DR]

Coolant Temperature	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Base RPM	800	800	800	800	780	750	705	665	625	575	550	550	550	570	580	600	620

P0420 / P0430 Detail

MinimumEngineRunTime

Coolant Temp	40	50	60	70	80
Engine Run Time	300	300	300	300	300

MinCatTemp X AXIS PTS

CATD_ExhaustWarmMin_L	400	0
CATD_ExhaustWarmMin_L	400	1
CATD_ExhaustWarmMin_L	400	2
CATD_ExhaustWarmMin_L	400	3
CATD_ExhaustWarmMin_L	400	4
CATD_ExhaustWarmMin_L	400	5
CATD_ExhaustWarmMin_L	400	6
CATD_ExhaustWarmMin_L	400	7

MinAirflowToWarmCatalyst

Engine Coolant	0	45	90
MinAirFlowToWrmCat	20	18	18

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

TPS Residual Weight Factor based on RPM

RPM	0	250	750	1250	1750	2250	2750	3250	3750	4250	4750	5250	5750	6250	6750	7250	9000
	1.000	1.000	0.784	0.865	0.907	0.770	0.669	0.655	0.616	0.625	0.611	0.616	0.616	0.616	1.000	1.000	1.000

MAF Residual Weight Factor based on RPM

RPM	0	250	750	1250	1750	2250	2750	3250	3750	4250	4750	5250	5750	6250	6750	7250	9000
	1.000	1.000	0.890	0.916	0.728	0.646	0.600	0.556	0.531	0.522	0.534	0.534	0.527	1.000	1.000	1.000	1.000

MAF Residual Weight Factor Based on MAF Estimate

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

MAP1 Residual Weight Factor based on RPM

RPM	0	250	750	1250	1750	2250	2750	3250	3750	4250	4750	5250	5750	6250	6750	7250	9000
	1.000	0.894	0.751	0.714	0.690	0.651	0.655	0.625	0.625	0.642	0.638	0.601	0.585	0.632	1.000	1.000	1.000

MAP2 Residual Weight Factor based on RPM

RPM	0	250	750	1250	1750	2250	2750	3250	3750	4250	4750	5250	5750	6250	6750	7250	9000
	1.000	1.000	0.744	0.684	0.877	0.524	0.814	0.744	0.801	0.789	0.564	0.515	0.526	1.000	1.000	1.000	1.000

SCIAP1 Residual Weight Factor based on RPM

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

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
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Boost Residual Weight Factor based on % of Boost

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

Supercharger Intake Flow Rationality Diagnostic Failure Matrix

DTC Set	TPS Model Failure	MAF Model Failure	MAP 1 Model Failure	MAP 2 Model Failure	SCIAP 1 Model Failure	SCIAP 2 Model Failure
No DTC	F	F	F	F	F	F
No DTC	F	F	F	F	F	T
No DTC	F	F	F	F	T	F
P012B	F	F	F	F	T	T
No DTC	F	F	F	T	F	F
P1101	F	F	F	T	F	T
P1101	F	F	F	T	T	F
P1101	F	F	F	T	T	T
No DTC	F	F	T	F	F	F
P1101	F	F	T	F	F	T
P1101	F	F	T	F	T	F
P1101	F	F	T	F	T	T

P0106	F	F	T	T	F	F
P1101	F	F	T	T	F	T
P1101	F	F	T	T	T	F
P1101	F	F	T	T	T	T
No DTC	F	T	F	F	F	F
P0101	F	T	F	F	F	T
No DTC	F	T	F	F	T	F
P0101, P012B	F	T	F	F	T	T
P1101	F	T	F	T	F	F
P0101	F	T	F	T	F	T
P1101	F	T	F	T	T	F
P0101, P012B	F	T	F	T	T	T
P1101	F	T	T	F	F	F
P1101	F	T	T	F	F	T
P1101	F	T	T	F	T	F
P1101	F	T	T	F	T	T
P1101	F	T	T	T	F	F
P1101	F	T	T	T	F	T
P1101	F	T	T	T	T	F
P1101	F	T	T	T	T	T
P0121	T	F	F	F	F	F
No DTC	T	F	F	F	F	T
P0121	T	F	F	F	T	F
P1101	T	F	F	F	T	T
P1101	T	F	F	T	F	F
P1101	T	F	F	T	F	T
P1101	T	F	F	T	T	F
P1101	T	F	F	T	T	T
P0121	T	F	T	F	F	F
P1101	T	F	T	F	F	T
P0121	T	F	T	F	T	F
P1101	T	F	T	F	T	T
P1101	T	F	T	T	F	F
P1101	T	F	T	T	F	T
P1101	T	F	T	T	T	F
P1101	T	F	T	T	T	T
P0121	T	T	F	F	F	F
P1101	T	T	F	F	F	T
P0121	T	T	F	F	T	F
P1101	T	T	F	F	T	T
P1101	T	T	F	T	F	F
P1101	T	T	F	T	F	T
P1101	T	T	F	T	T	F
P1101	T	T	F	T	T	T
P0121	T	T	T	F	F	F
P1101	T	T	T	F	F	T
P0121	T	T	T	F	T	F
P1101	T	T	T	F	T	T

P0108, P012D: MAP/SCIAP Cold Run Time Threshold

X axis is Engine Coolant Temperature in Deg C

Temp	-30	-15	0	15	30
	0.0	0.0	0.0	0.0	0.0

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

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

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

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

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

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

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

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

	IAT Range Low	Hi	-40	-28	-16	-4	8	20	32	44	56	68	80
Primary	10 ° C	54.5 ° C	17626	17626	17626	17626	17626	15882	14137	12392	10648	8903	7159
Alternate	-7.0 ° C	10.0 ° C	16976	16976	16976	15517	14060	12600	11142	9684	8225	8225	8225

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

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

	IAT Range Low	Hi	-40	-28	-16	-4	8	20	32	44	56	68	80
Primary	10.0 ° C	54.5 ° C	1100	1015	930	845	760	675	590	505	420	335	250
Alternate	-7.0 ° C	10.0 ° C	1020	935	850	765	680	595	510	425	340	255	170

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

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

	0.000	0.010	0.020	0.030	0.040	0.050	0.060	0.080	0.090	0.100	0.120	0.140	0.160	0.180	0.200	0.210	2.000
0.000	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
0.010	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
0.020	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.030	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.040	1	1	1	1	1	1	1	1	1	1	1	1	1	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
0.080	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	0	0
0.120	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
0.130	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0
0.140	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0
0.150	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0
0.160	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0
0.170	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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

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

	0.000	0.010	0.020	0.030	0.040	0.050	0.060	0.080	0.090	0.100	0.120	0.140	0.160	0.180	0.200	0.210	2.000
0.000	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
0.010	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
0.020	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
0.030	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
0.040	1	1	1	1	1	1	1	1	1	1	1	1	1	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
0.080	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	0	0
0.120	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
0.130	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0
0.140	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0
0.150	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0
0.160	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0
0.170	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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	1.1201	1.1201	1.1201	1.1201	1.1201
25.0	1.1201	1.1201	1.1201	1.1201	1.1201
50.0	1.1299	1.1299	1.1299	1.1299	1.1299
75.0	1.1401	1.1401	1.1401	1.1401	1.1401
100.0	1.1499	1.1499	1.1499	1.1499	1.1499

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	0.8999	0.8999	0.8999	0.8999	0.8999
25.0	0.8999	0.8999	0.8999	0.8999	0.8999
50.0	0.8999	0.8999	0.8999	0.8999	0.8999
75.0	0.8999	0.8999	0.8999	0.8999	0.8999
100.0	0.8999	0.8999	0.8999	0.8999	0.8999

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

Multiple DTC Use 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

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

load / Load	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
8	600	450	300	220	150	120	90	70	55	32767	32767	32767	32767
9	565	420	275	210	140	100	85	65	50	32767	32767	32767	32767
11	480	400	320	195	135	100	80	60	50	32767	32767	32767	32767
12	480	400	320	200	140	100	80	60	50	32767	32767	32767	32767
13	680	500	320	220	145	100	80	60	50	32767	32767	32767	32767
14	715	525	275	225	150	90	80	60	50	32767	32767	32767	32767
15	750	425	300	230	150	100	85	50	60	32767	32767	32767	32767
16	785	440	320	240	180	110	85	55	65	32767	32767	32767	32767
17	800	500	350	250	190	120	90	60	65	32767	32767	32767	32767
18	900	550	400	335	200	130	105	70	70	32767	32767	32767	32767
19	950	625	425	370	240	140	110	85	75	32767	32767	32767	32767
21	975	700	450	400	295	150	120	90	85	32767	32767	32767	32767
22	1000	800	500	430	320	160	130	95	90	32767	32767	32767	32767
24	1050	850	625	465	340	165	140	100	95	32767	32767	32767	32767
25	1050	900	750	500	360	240	190	130	100	32767	32767	32767	32767
27	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: Idle SCD ddt

load	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
8	600	450	300	220	150	120	90	70	55	32767	32767	32767	32767
9	565	420	275	210	140	100	85	65	50	32767	32767	32767	32767
11	480	400	320	195	135	100	80	60	50	32767	32767	32767	32767
12	480	400	320	200	140	100	80	60	50	32767	32767	32767	32767
13	680	500	320	220	145	100	80	60	50	32767	32767	32767	32767
14	715	525	275	225	150	90	80	60	50	32767	32767	32767	32767
15	750	425	300	230	150	100	85	50	60	32767	32767	32767	32767
16	785	440	320	240	180	110	85	55	65	32767	32767	32767	32767
17	800	500	350	250	190	120	90	60	65	32767	32767	32767	32767
18	900	550	400	335	200	130	105	70	70	32767	32767	32767	32767
19	950	625	425	370	240	140	110	85	75	32767	32767	32767	32767
21	975	700	450	400	295	150	120	90	85	32767	32767	32767	32767
22	1000	800	500	430	320	160	130	95	90	32767	32767	32767	32767
24	1050	850	625	465	340	165	140	100	95	32767	32767	32767	32767
25	1050	900	750	500	360	240	190	130	100	32767	32767	32767	32767
27	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

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

load / Load	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
8	600	450	300	220	150	120	90	70	55	32767	32767	32767	32767
9	565	420	275	210	135	100	85	65	50	32767	32767	32767	32767
11	480	400	320	195	135	100	80	60	48	32767	32767	32767	32767
12	480	400	320	200	140	115	80	60	50	32767	32767	32767	32767
13	680	500	320	220	160	125	90	65	50	32767	32767	32767	32767
15	750	550	350	230	190	130	95	80	50	32767	32767	32767	32767
17	820	600	380	300	230	160	115	90	55	32767	32767	32767	32767
19	975	700	425	370	270	180	130	105	80	32767	32767	32767	32767
22	1100	800	500	430	320	230	150	125	90	32767	32767	32767	32767
25	1050	900	750	500	360	240	190	150	110	32767	32767	32767	32767
29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
33	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
42	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
48	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
61	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: SCD Delta ddt

load	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
8	600	450	300	220	150	120	90	70	55	32767	32767	32767	32767
9	565	420	275	210	135	100	85	65	50	32767	32767	32767	32767
11	500	400	300	197	135	100	80	60	45	32767	32767	32767	32767
12	490	400	310	200	140	115	80	60	50	32767	32767	32767	32767
13	680	500	320	220	160	125	90	65	50	32767	32767	32767	32767
15	750	550	350	240	190	130	95	80	50	32767	32767	32767	32767
17	820	600	380	350	250	160	115	90	55	32767	32767	32767	32767
19	975	700	425	420	300	180	130	105	80	32767	32767	32767	32767
22	1100	800	500	500	360	230	150	125	90	32767	32767	32767	32767
25	1050	900	750	550	450	240	190	150	110	32767	32767	32767	32767
29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
33	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
42	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
48	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
61	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

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

load / Load	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
8	1800	1400	1000	600	450	300	200	160	120	100	80	65	45
9	1700	1300	900	550	425	300	200	160	120	100	80	65	45
11	1600	1200	800	550	425	300	200	160	120	100	80	65	50
12	1600	1000	775	550	425	300	200	170	120	100	80	65	50
13	1700	1200	750	575	425	310	200	180	135	110	80	65	50
14	1750	1250	750	575	400	310	200	180	140	110	85	75	55
15	1800	1300	800	575	390	310	200	180	150	110	90	75	60
16	1800	1325	800	600	380	310	200	180	150	120	95	80	70

17	1800	1350	900	650	390	330	210	175	150	120	100	85	75
18	1700	1375	1050	825	400	340	240	180	150	120	100	90	75
19	1600	1400	1200	900	450	375	275	190	150	125	100	95	80
21	1690	1450	1210	950	500	400	275	210	160	130	100	100	90
22	1780	1500	1220	1000	600	450	275	220	180	140	130	120	90
24	1865	1550	1235	1050	700	500	300	220	180	150	140	125	95
25	1950	1550	1250	1100	800	550	325	230	190	155	150	125	100
27	2100	1600	1300	1150	850	600	375	300	210	170	175	150	125
29	2100	1600	1300	1150	850	600	450	325	250	180	175	150	125

P0300-P0308: Idle Cyl Mode ddt

load	**400**	**500**	**600**	**700**	**800**	**900**	**1000**	**1100**	**1200**	**1300**	**1400**	**1500**	**1600**
8	1800	1400	1000	600	450	300	200	160	120	100	80	65	45
9	1700	1300	900	550	425	300	200	160	120	100	80	65	45
11	1600	1200	800	550	425	300	200	160	120	100	80	65	50
12	1600	1000	775	550	425	300	200	170	120	100	80	65	50
13	1700	1200	750	575	425	310	200	180	135	110	80	65	50
14	1750	1250	750	575	400	310	200	180	140	110	85	75	55
15	1800	1300	800	575	390	310	200	180	150	110	90	75	60
16	1800	1325	800	600	380	310	200	180	150	120	95	80	70
17	1800	1350	900	650	390	330	210	175	150	120	100	85	75
18	1700	1375	1050	825	400	340	240	180	150	120	100	90	75
19	1600	1400	1200	900	450	375	275	190	150	125	100	95	80
21	1690	1450	1210	950	500	400	275	210	160	130	100	100	90
22	1780	1500	1220	1000	600	450	275	220	180	140	130	120	90
24	1865	1550	1235	1050	700	500	300	220	180	150	140	125	95
25	1950	1550	1250	1100	800	550	325	230	190	155	150	125	100
27	2100	1600	1300	1150	850	600	375	300	210	170	175	150	125
29	2100	1600	1300	1150	850	600	450	325	250	180	175	150	125

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

Load	**400**	**500**	**600**	**700**	**800**	**900**	**1000**	**1100**	**1200**	**1400**	**1600**	**1800**	**2000**	**2200**	**2400**	**2600**	**2800**	3000	3500	4000	4500	5000	5500	6000	6500	7000
8	1800	1400	1000	600	375	280	200	170	120	70	45	35	35	25	20	15	12	10	7	6	6	6	6	6	6	6
9	1700	1300	900	550	340	270	160	160	120	65	37	30	25	18	17	12	12	9	6	5	5	5	5	5	5	5
11	1600	1200	800	500	350	250	200	150	115	60	40	35	25	18	16	12	9	8	5	5	5	5	5	5	5	5
12	1400	1100	800	500	375	280	200	140	120	65	45	35	26	22	16	13	11	8	5	4	5	5	5	5	5	5
13	1650	1200	750	575	425	300	200	165	125	70	45	35	28	22	20	15	12	8	5	4	4	4	4	4	4	4
15	1800	1300	800	550	450	320	200	190	110	75	50	35	30	25	24	18	14	9	6	5	4	4	4	4	4	4
17	1800	1350	900	750	550	375	225	225	150	90	60	45	35	30	25	20	15	10	6	5	4	4	4	4	4	4
19	1600	1400	1200	900	600	425	275	250	200	110	75	55	45	40	30	25	18	12	7	6	4	3	3	3	3	3
22	1780	1500	1220	1000	750	550	375	300	220	130	85	65	55	45	38	28	22	15	9	6	5	4	3	3	3	3
25	1950	1600	1250	1100	800	580	450	340	250	150	100	80	65	50	40	34	25	17	10	7	5	4	4	4	4	4
29	2100	1700	1300	1150	850	600	500	400	290	175	125	95	75	60	45	38	28	19	12	8	5	4	4	4	4	4
33	2200	1800	1400	1200	900	650	550	450	320	200	140	110	80	70	55	43	33	22	14	9	6	4	4	4	4	4
38	2000	1800	1600	1400	1000	700	600	500	350	220	160	120	100	80	60	47	38	27	16	10	6	5	5	5	5	5
42	2200	2000	1800	1600	1100	750	650	550	400	240	180	140	110	90	70	55	43	30	18	12	7	6	5	5	5	5
48	2200	2000	1800	1600	1200	800	700	700	500	280	200	170	135	100	75	60	48	35	20	14	9	7	6	6	6	6
54	2200	2000	1800	1600	1200	900	800	750	650	280	230	180	140	115	85	65	50	40	22	16	11	10	8	8	8	8
61	2200	2000	1800	1600	1200	1000	850	800	750	400	270	200	155	120	90	70	65	45	24	18	13	11	10	10	10	10

P0300-P0308: Cyl Mode ddt

load	**400**	**500**	**600**	**700**	**800**	**900**	**1000**	**1100**	**1200**	**1400**	**1600**	**1800**	**2000**	**2200**	**2400**	**2600**	**2800**	3000	3500	4000	4500	5000	5500	6000	6500	7000
8	1800	1400	1000	600	350	280	200	170	110	70	45	30	15	25	16	11	10	**9**	**0**	0	0	0	0	0	0	0
9	1700	1300	900	550	300	250	150	150	110	65	35	30	20	15	18	10	10	8	0	0	0	0	0	0	0	0
11	1550	1200	850	550	350	275	200	150	120	70	40	35	30	25	20	13	10	9	0	0	0	0	0	0	0	0
12	1350	1100	850	500	350	280	200	150	110	75	50	35	26	20	16	13	10	10	0	0	0	0	0	0	0	0
13	1250	1000	750	500	375	300	200	175	115	80	50	35	28	22	20	15	12	10	0	0	0	0	0	0	0	0
15	1800	1300	800	600	450	375	200	215	140	85	60	40	30	25	24	18	14	10	0	0	0	0	0	0	0	0
17	1800	1350	900	750	600	450	225	250	175	90	75	45	35	30	25	20	15	11	0	0	0	0	0	0	0	0
19	1500	1400	1300	900	625	475	275	300	200	130	90	55	45	40	30	25	20	15	0	0	0	0	0	0	0	0
22	1650	1500	1350	1000	850	550	425	350	250	150	100	65	55	45	40	30	22	18	0	0	0	0	0	0	0	0
25	1850	1600	1350	1100	950	675	500	400	300	180	120	80	60	50	45	35	25	22	0	0	0	0	0	0	0	0
29	2050	1700	1350	1150	1000	700	650	450	325	200	150	100	75	60	50	40	30	25	0	0	0	0	0	0	0	0
33	2100	1800	1500	1200	1000	750	700	580	350	225	160	110	80	70	60	45	35	30	0	0	0	0	0	0	0	0
38	2000	1800	1600	1400	1100	800	750	600	400	250	180	120	100	80	60	50	40	33	0	0	0	0	0	0	0	0
42	2200	2000	1800	1600	1200	850	800	650	450	275	200	140	100	90	70	60	43	36	0	0	0	0	0	0	0	0
48	2200	2000	1800	1600	1200	900	850	750	550	300	220	170	135	100	80	65	50	40	0	0	0	0	0	0	0	0
54	2200	2000	1800	1600	1200	1000	900	800	650	325	250	180	140	115	90	70	55	45	0	0	0	0	0	0	0	0
61	2200	2000	1800	1600	1200	1100	950	850	750	400	270	200	155	120	100	80	70	55	0	0	0	0	0	0	0	0

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

load	**1100**	**1200**	**1400**	**1600**	**1800**	**2000**	**2200**	**2400**	**2600**	**2800**	3000	3500	4000	4500	5000	5500	6000	6500	7000
8	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	85	50	45	35	25	25	25	**25**	**25**
9	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	75	50	35	35	30	30	24	24	24
11	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	80	60	40	35	30	30	25	25	25
12	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	90	70	45	40	30	30	26	26	26
13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	100	80	55	40	35	35	28	28	28
15	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	110	90	60	45	40	40	30	30	30
17	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	130	100	70	50	45	45	35	35	35
19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	150	120	80	60	50	50	40	40	40
22	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	180	140	90	70	55	55	45	45	45
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	200	160	110	80	60	60	55	55	55
29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	220	180	130	90	70	70	70	70	70
33	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	260	200	150	100	90	90	85	85	85
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	300	240	170	120	100	100	100	100	100
42	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	360	260	190	130	110	110	110	110	110
48	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	380	300	200	140	120	120	125	125	125
54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	400	320	240	160	130	130	135	135	135
61	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	500	350	260	180	150	150	150	150	150

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

400	**500**	**600**	**700**	**800**	**900**	**1000**	**1100**	**1200**	**1400**	**1600**	**1800**	**2000**	**2200**	**2400**	**2600**	**2800**	3000	3500

load
Load

8	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
9	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
11	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
12	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
15	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
17	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
22	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
33	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
42	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
48	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
61	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: Zero torque engine load

Zero Torque: All Cylinders active

RPM	Pct load
400	11.00
500	10.00
600	9.00
700	8.00
800	8.00
900	8.00
1000	8.00
1100	8.00
1200	8.00
1400	8.00
1600	8.00
1800	8.00
2000	8.00
2200	8.50
2400	8.50
2600	8.90
2800	9.00
3000	9.10
3500	11.92
4000	14.13
4500	16.35
5000	18.57
5500	20.79
6000	23.00
6500	25.22
7000	27.44

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

Zero Torque: Active Fuel Management (AFM)

RPM	Pct load
400	11.00
500	10.00
600	9.00
700	8.00
800	8.00
900	8.00
1000	8.00
1100	8.00
1200	8.00
1400	8.00
1600	8.00
1800	8.00
2000	8.00
2200	8.50
2400	8.50
2600	8.90
2800	9.00
3000	9.10
3500	11.92
4000	14.13
4500	16.35
5000	18.57
5500	20.79
6000	23.00
6500	25.22
7000	27.44

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

Catalyst Damaging Misfire Percentage

load
Load

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

RoughRoadSource = CeRRDR_e_WheelSpeedInECM or CeRRDR_e_SerialDataFromABS
Rough Road Threshold

Kph	0	12	24	36	48	60	72	84	96	108	120	132	144	158	170	181	194
Accel	0.40	0.44	0.48	0.52	0.56	0.60	0.64	0.68	0.72	0.76	0.80	0.84	0.88	0.92	0.96	1.00	1.04

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	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
-4.3750	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
1.2500	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
6.8750	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
12.5000	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
18.1250	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
23.7500	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
29.3750	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
35.0000	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453

40.6250	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
46.2500	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
51.8750	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
57.5000	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
63.1250	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
68.7500	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
74.3750	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453
80.0000	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-174.4132	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453	-124.5453

P0442: Estimate of Ambient Temperature Valid Conditioning Time

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

Axis	Curve
0	300
600	330
1200	390
1800	450
2400	510
3000	600
3600	600
4200	600
4800	600
5400	600
6000	600
6600	588
7200	575
7800	563
8400	550
9000	538
9600	525
10200	513
10800	500
11700	475
12600	450
13500	425
14400	400
15300	375
16200	350
17100	325
18000	300
19200	283
20400	267
21600	250
22800	233
24000	217
25200	200

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	100
6	96
12	92
19	88
25	84
31	81
37	77
44	73
50	69
56	65
62	62
69	58
75	54
81	50
87	46
94	43
100	39

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

KtEGRD_p_StepDelta

X axis is Kpa BARO

65	70	75	80	85	90	95	100	105
3.1953	3.1953	3.1953	3.1953	3.1953	3.1953	3.1953	3.1953	3.1953

KtEGRD_p_StepMAP_DIFF

X axis is Kpa BARO

65	70	75	80	85	90	95	100	105
0.2656	0.3906	0.5078	0.6328	0.7500	0.7656	0.7813	0.7969	0.8125

KtEGRD_Cnt_StepSamplesPerTrip

X axis is Kpa BARO

65	70	75	80	85	90	95	100	105
8.0000	7.0000	7.0000	6.0000	6.0000	6.0000	5.0000	5.0000	5.0000

KtEGRD_Cnt_SamplesAfterStep

X axis is Kpa BARO

65	70	75	80	85	90	95	100	105
10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000

KtEGRD_Cnt_SamplesAfterReset

X axis is Kpa BARO

65	70	75	80	85	90	95	100	105
10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000

KtPHSD_phi_CamPosErrorLimIc1

X axis is Deg C
Y axis is RPM

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

KtPHSD_phi_CamPosErrorLimEc1

X axis is Deg C
Y axis is RPM

	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
1200	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
1600	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
2000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
2400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
2800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
3200	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
3600	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
4000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
4400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
4800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
5200	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
5600	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
6000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
6400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
6800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000

KtPHSD phi CamPosErrorLimIc2

X axis is Deg C
Y axis is RPM

	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
1200	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
1600	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
2000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
2400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
2800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
3200	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
3600	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
4000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
4400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
4800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
5200	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
5600	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
6000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
6400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
6800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000

KtPHSD phi CamPosErrorLimEc2

X axis is Deg C
Y axis is RPM

	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
1200	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
1600	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
2000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
2400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
2800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
3200	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
3600	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
4000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
4400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
4800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
5200	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
5600	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
6000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
6400	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
6800	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000

KtPHSD t StablePositionTimeIc1

X axis is Deg C
Y axis is RPM

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

KtPHSD t StablePositionTimeEc1

X axis is Deg C
Y axis is RPM

	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
1200	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
1600	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
2000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
2400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
2800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
3200	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
3600	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
4000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
4400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
4800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
5200	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
5600	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
6000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
6400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
6800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000

KtPHSD t StablePositionTimeIc2

X axis is Deg C
Y axis is RPM

	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
1200	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
1600	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
2000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
2400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
2800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
3200	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
3600	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
4000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
4400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
4800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
5200	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
5600	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
6000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
6400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
6800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000

KtPHSD t StablePositionTimeEc2

X axis is Deg C
Y axis is RPM

	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
1200	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
1600	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
2000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
2400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
2800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
3200	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
3600	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
4000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
4400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
4800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
5200	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
5600	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
6000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
6400	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
6800	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000

Closed Loop Enable Criteria

Coolant greater than
KtFSTA T ClosedLoopTemp

Start-Up Coolant	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Coolant	85.0	80.0	75.0	65.0	45.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0

and engine run time greater than
KtFSTA t ClosedLoopTime

Start-Up Coolant	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Close Loop Enable Time	120.0	90.0	65.0	45.0	25.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0

and pre converter 02 sensor voltage greater than
KtFULC U O2 SensorReadyThrshHi

	> 550
Voltage	*milliVolts*

or less than
KtFULC U O2 SensorReadyThrshLo

	< 350
Voltage	*milliVolts*

and
COSC (Converter Oxygen Storage Control) not enabled
and
Consumed AirFuel Ratio is stoichiometry i.e. not in component protection
and
POPD or Catalyst Diagnostic not intrusive
and
All cylinders whose valves are active also have their injectors enabled
and
O2S Bank 1 TFTKO, O2S Bank 2 TFTKO, FuelInjectorCircuit FA and CylinderDeacDriverTFTKO = False

Long Term FT Enable Criteria

Closed Loop Enable and
Coolant greater than
KtFCLL T AdaptiveLoCoolant

	> 39
Coolant	*Celcius*

or less than
KtFCLL T AdaptiveHiCoolant

	< 140
Coolant	*Celcius*

and MAP less than
KtFCLL p AdaptiveLowMAP Limit

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

and
TPS ThrottleAuthorityDefaulted = False
and
Flex Fuel Estimate Algorithm is not active
and
Catalyst or EVAP large leak test not intrusive

Secondary Fuel Trim Enable Criteria

Closed Loop Enable and
KtFCLP U O2ReadyThrshLo

Voltage	*< 350 milliVolts*

for
KcFCLP Cnt O2RdyCyclesThrsh

(events * 12.5 milliseconds)	*> 10 events*

Long Term Secondary Fuel Trim Enable Criteria

KtFCLP t PostIntqlDisableTime

Start-Up Coolant	-40	-29	-18	-6	5	16	28	39	50	61	73	84	95	106	118	129	140
Post Integral Enable Time	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0

Plus
KtFCLP t PostIntqlRampInTime

Start-Up Coolant	-40	-29	-18	-6	5	16	28	39	50	61	73	84	95	106	118	129	140
Post Integral Ramp In Time	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0

and
KeFCLP T IntegrationCatalystMax

Modeled Catalyst Temperat	*< 950 Celcius*

and
KeFCLP T IntegrationCatalystMin

Modeled Catalyst Temperat	*> 450 Celcius*

and
KtFCLP T CoolantThrsh

Coolant	*> 80 Celcius*

and
(KeFCLP Pct CatAccuSlphrPostDsbl

Modeled converter sulfur pe	*< 38 Percent*

and
Post Integral < KaFCLP U SlphrIntglOfst Thrsh)

X axis: Post O2 Sensor	ClOXYR_O2_PostCat1	O2_PostCat2
Y axis: Post O2 Mode	iFCLP_Decel	1000	1000
Z: Post Integral threshold	CiFCLP_Idle	1000	1000
	CiFCLP_Cruise	1000	1000
	CiFCLP_LightAccel	1000	1000
	CiFCLP_HeavyAccel	1000	1000

and
PO2S Bank 1 Snsr 2 FA and PO2S Bank 2 Snsr 2 FA = False

Tables supporting Engine Oil Temperature Sensor

P0196

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

Axis	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve	79.5	79.5	79.5	60.0	60.0	39.8	39.8	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0

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

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

P0521

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

Axis	0	900	1000	2000	2500	3000	3100	5000	6000
Curve	0.00	0.00	0.45	0.45	0.45	0.45	0.00	0.00	0.00

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

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

EngLoadStabilityWeightFactorTable — **AXIS is Delta APC, Curve is Weight Factor**

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

EngOilPredictionWeightFactorTable — **AXIS is Predicted Engine Oil Pressure, Curve is Engine Oil Prediction Weight Factor**

Axis	160	170	200	275	360	375	400	450	500
Curve	0.00	0.10	1.00	1.00	1.00	1.00	1.00	0.25	0.00

Cert Doc Bundle Name	Pcodes							
IAC_SystemRPM_FA	P0506	P0507						
TCM_EngSpdReqCkt	P150C							
FuelTrimSystemB1_FA	P0171	P0172						
FuelTrimSystemB2_FA	P0174	P0175						
FuelTrimSystemB1_TFTKO	P0171	P0172						
FuelTrimSystemB2_TFTKO	P0174	P0175						
NA	P2096	P2097	P2098	P2099				
A/F Imbalance Bank1	P219A							
A/F Imbalance Bank2	P219B							
AIRSystemPressureSensor FA	P2430	P2431	P2432	P2433	P2435	P2436	P2437	P2438
AIR System FA	P0411	P2440	P2444					
AIRValveControlCircuit FA	P0412							
AIRPumpControlCircuit FA	P0418							
Clutch Sensor FA	P0806	P0807	P0808					
ClutchPositionSensorCircuitLo FA	P0807							
ClutchPositionSensorCircuitHi FA	P0808							
Ethanol Composition Sensor FA	P0178	P0179	P2269					
EngineMetalOvertempActive	P1258							
FuelInjectorCircuit_FA	P0201	P0202	P0203	P0204	P0205	P0206	P0207	P0208
FuelInjectorCircuit_TFTKO	P0201	P0202	P0203	P0204	P0205	P0206	P0207	P0208
CatalystSysEfficiencyLoB1_FA	P0420							
CatalystSysEfficiencyLoB2_FA	P0430							
AmbientAirPressCktFA	P2228	P2229						
AmbientAirPressCktFA_NoSnsr	P0106	P0107	P0108					
AmbientAirDefault	For Naturally Aspirated Engines:				P0106	P0107	P0108	P2227 P2228 P2229
	For Super Charged Engines:				P012B	P012C	P012D	P2227 P2228 P2229
	For Engines with no Baro Sensor:				P0106	P0107	P0108	

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

Cert Doc Bundle Name	Pcodes											
SCIAP_SensorFA	P012B	P012C	P012D									
SCIAP_SensorTFTKO	P012B	P012C	P012D									
SCIAP_SensorCircuitFP	P012C	P012D										
AfterThrottlePressureFA_NA	P0106	P0107	P0108									
AfterThrottlePressureFA_SC	P012B	P012C	P012D									
AfterThrottleVacuumTFTKO_NA	P0106	P0107	P0108									
AfterThrottleVacuumTFTKO_SC	P012B	P012C	P012D									
SCIAP_SensorCircuitFA	P012C	P012D										
AfterThrottlePressTFTKO_NA	P0106	P0107	P0108									
AfterThrottlePressTFTKO_SC	P012B	P012C	P012D									
MAP_SensorCircuitFA	P0107	P0108										
MAP_EngineVacuumStatus	MAP_SensorFA OR P0107, P0108 Pending											
ECT_Sensor_Ckt_FA	P0117	P0118										
ECT_Sensor_Ckt_TPTKO	P0117	P0118										
ECT_Sensor_Ckt_TFTKO	P0117	P0118										
ECT_Sensor_DefaultDetected	P0117	P0118	P0116									
ECT_Sensor_FA	P0117	P0118	P0116	P0128								
ECT_Sensor_TFTKO	P0117	P0118	P0116									
ECT_Sensor_Perf_FA	P0116											
ECT_Sensor_Ckt_FP	P0117	P0118										
ECT_Sensor_Ckt_High_FP	P0118											
ECT_Sensor_Ckt_Low_FP	P0117											
THMR_Insuff_Flow_FA	P00B7											
THMR_Therm_Control_FA	P0597	P0598	P0599									
THMR_RCT_Sensor_Ckt_FA	P00B3	P00B4										
THMR_ECT_Sensor_Ckt_FA	P0117	P0118	P0116	P00B6								
O2S_Bank_ 1_TFTKO	P0131	P0132	P0134	P2A00								
O2S_Bank_ 2_TFTKO	P0151	P0152	P0154	P2A03								
O2S_Bank_1_Sensor_1_FA	P2A00	P0131	P0132	P0133	P0134	P0135	P0053	P1133	P015A	P015B	P0030	
O2S_Bank_1_Sensor_2_FA	P013A	P013B	P013E	P013F	P2270	P2271	P0137	P0138	P0140	P0141	P0054	P0036
O2S_Bank_2_Sensor_1_FA	P2A03	P0151	P0152	P0153	P0154	P0155	P0059	P1153	P015C	P015D	P0050	
O2S_Bank_2_Sensor_2_FA	P013C	P013D	P014A	P014B	P2272	P2273	P0157	P0158	P0160	P0161	P0060	P0056

Cert Doc Bundle Name	Pcodes											
PO2S_Bank_1_Snsr_2_FA	P0137	P0138	P0140	P0036	P0054	P0141	P2270	P2271				
PO2S_Bank_2_Snsr_2_FA	P0157	P0158	P0160	P0056	P0060	P0161	P2272	P2273				
EngineMisfireDetected_TFTKO	P0300	P0301	P0302	P0303	P0304	P0305	P0306	P0307	P0308			
EngineMisfireDetected_FA	P0300	P0301	P0302	P0303	P0304	P0305	P0306	P0307	P0308			
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
EvapPurgeSolenoidCircuit_FA	P0443											
EvapFlowDuringNonPurge_FA	P0496											
EvapVentSolenoidCircuit_FA	P0449											
EvapSmallLeak_FA	P0442											
EvapEmissionSystem_FA	P0455	P0446										

Cert Doc Bundle Name	Pcodes					
FuelTankPressureSnsrCkt_FA	P0452	P0453				
CoolingFanSpeedTooHigh_FA	P0495					
FanOutputDriver_FA	P0480	P0481	P0482			
FuelLevelDataFault	P0461	P0462	P0463	P2066	P2067	P2068
PowertrainRelayFault	P1682					
PowertrainRelayStateOn_FA	P0685					
PowertrainRelayStateOn_Error	P0685					
IgnitionOffTimer_FA	P2610					
IgnitionOffTimeValid	P2610					
EngineModeNotRunTimerError	P2610					
EngineModeNotRunTimer_FA	P2610					
VehicleSpeedSensor_FA	P0502	P0503	P0722	P0723		
VehicleSpeedSensorError	P0502	P0503	P0722	P0723		

LowFuelConditionDiagnostic	Flag set to TRUE if the fuel level < 10 AND No Active DTCs: FuelLevelDataFault P0462 P0463 for at least 30 seconds.
Transfer Pump is Commanded On	Fuel Volume in Primary Fuel Tank < 0.0 liters AND Fuel Volume in Secondary Fuel Tank ≥ 100.0 liters AND 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,

Cert Doc Bundle Name	Pcodes							
	AND Engine Running							
EGRValvePerformance_FA	P0401	P042E						
EGRValveCircuit_FA	P0403	P0404	P0405	P0406				
EGRValve_FP	P0405	P0406	P042E					
EGRValveCircuit_TFTKO	P0403	P0404	P0405	P0406				
EGRValvePerformance_TFTKO	P0401	P042E						
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				
EngOilTempSensorCircuitFA	P0197	P0198						
EngOilModeledTempValid	ECT_Sens	IAT_SensorCircuitFA						
EngOilPressureSensorCktFA	P0522	P0523						
EngOilPressureSensorFA	P0521	P0522	P0523					
CylnderDeacDriverTFTKO	P3401	P3409	P3417	P3425	P3433	P3441	P3449	
BrakeBoosterSensorFA	P0556	P0557	P0558					
BrakeBoosterVacuumValid	P0556	P0557	P0558					
BrakeBoosterVacuumValid	VehicleSpe	MAP_SensorFA						
CylnderDeacDriverTFTKO	P3401	P3409	P3417	P3425	P3433	P3441	P3449	

Cert Doc Bundle Name	Pcodes										
EngineTorqueEstInaccurate	EngineMis	FuelInje	FuelInje	FuelTrim	FuelTrim	MAF_Se	MAP_Se	EGRValuePerforamnce_FA			
PPS1_OutOfRange_Composite	P2122	P2123	P0651								
PPS2_OutOfRange_Composite	P2127	P2128	P0641								
PPS1_OutOfRange_Composite	P2122	P2123	P0651								
PPS2_OutOfRange_Composite	P2127	P2128	P0641								
PPS1_OutOfRange	P2122	P2123									
PPS2_OutOfRange	P2127	P2128									
PPS1_OutOfRange	P2122	P2123									
PPS2_OutOfRange	P2127	P2128									
AcceleratorPedalFailure	P2122	P2123	P2127	P2128	P2138	P0641	P0651				
ControllerRAM_Error_FA	P0604										
ControllerProcessorPerf_FA	P0606										
TPS1_OutOfRange_Composite	P0122	P0123	P0651								
TPS2_OutOfRange_Composite	P0222	P0223	P0652								
TPS_FA	P0120	P0122	P0123	P0220	P0222	P0223	P2135				
TPS_TFTKO	P0120	P0122	P0123	P0220	P0222	P0223	P2135				
TPS_Performance_FA	P0068	P0121	P1516	P2101							
TPS_Performance_TFTKO	P0068	P0121	P1516	P2101							
TPS_FaultPending	P0120	P0122	P0123	P0220	P0222	P0223	P2135				
TPS_ThrottleAuthorityDefaulted	P0068	P0120	P0122	P0123	P0220	P0222	P0223	P1516	P2135	P2176	
EnginePowerLimited	P0068	P0606	P0120	P0122	P0123	P0220	P0222	P0223	P0641	P0651	
	P1516	P2101	P2120	P2122	P2123	P2125	P2127	P2128	P2135	P2138	P2176
5VoltReferenceA_FA	P0641										
5VoltReferenceB_FA	P0651										
TOSS_Fault		ECM:	P0502	P0503							
		TCM:	P0722	P0723							
ShiftSolenoidFaults (TCM)		M30/M70:	P0751	P0752	P0756	P0757					
		MYC/MYD:	P0751	P0752	P0756	P0757	P0973	P0974	P0976	P0977	
TransTurbineSpeedValid(TCM)		M30/M70:	P0716	P0717							
		MYC/MYD:	P0716	P0717	P07BF	P07C0					

Cert Doc Bundle Name	Pcodes											
Trans_Gear_Defaulted(TCM)	M30/M70:	P0705	P1810	P1815	P1816	P1817	P1818	P1915	P1820	P182A	P1822	P182C
		P1823	P182D	P1825	P182E	P1826	P182F					
KS_CktPerfB1B2_FA	P0324	P0325	P0326	P0327	P0328	P0330	P0332	P0333				
EST_DriverFltActive	P0351	P0352	P0353	P0354	P0355	P0356	P0357	P0358				