17 OBDG05 ECM Summary Tables (6.0L / L96)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Intake Camshaft Actuator Solenoid Circuit – Bank 1	P0010	Detects a VVT system error by monitoring the circuit for electrical integrity	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		System supply voltage is within limits Output driver is commanded on, Ignition switch is in crank or run position	> 11 Volts, and < 32 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type B 2 trips
Intake Camshaft System Performance – Bank 1	P0011	Detects a VVT system error by comparing the desired and actual cam positions when VVT is activated	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive	(Intake cam Bank 1)Cam Position Error > KtPHSD_phi_CamPosErrorLimIc1 Deg (see Supporting Table)	The following DTC's are NOT active: P0010 IntkCMP B1 Circuit P0340, P0341, Intake B1 Cam sensors P0335, P0336, Crank sensors P0016, P0017, P0018, P0019 Cam to crank rationality Engine is running VVT is enabled Desired camshaft position > 0 Power Take Off (PTO) not active	System Voltage > 11 Volts, and System Voltage < 32 Volts Desired cam position cannot vary more than 7.5 Cam Deg for at least KtPHSD_t_StablePositionTimeIc1 seconds (see Supporting Table)	200 failures out of 1000 samples 100 ms /sample	Type B 2 trips
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 One sample per cam rotation	Type B 2 trips
O2S Heater Control Circuit Bank 1 Sensor 1	P0030	This DTC checks the Heater Output Driver circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit) or voltage high during driver closed state (indicates short to voltage).		Ign Switch position Ignition Voltage Engine Speed	= Crank or Run position 11.0 volts < Ign Voltage < 32.0 volts > 400 RPM	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips
O2S Heater Control Circuit Bank 1 Sensor 2	P0036	This DTC checks the Heater Output Driver circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit) or voltage high during driver closed state (indicates short to voltage).		Ign Switch position Ignition Voltage Engine Speed	= Crank or Run position 11.0 volts < Ign Voltage < 32.0 volts > 400 RPM	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
O2S Heater Control Circuit Bank 2 Sensor 1	P0050	This DTC checks the Heater Output Driver circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit) or voltage high during driver closed state (indicates short to voltage).		Ign Switch position Ignition Voltage Engine Speed	= Crank or Run position 11.0 volts < Ign Voltage < 32.0 volts > 400 RPM	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips
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	Type B 2 trips
HO2S Heater Resistance Bank 1 Sensor 2	P0054	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Learned Heater Resistance.	Calculated Heater Resistance < 4.1 ohms -OR- Calculated Heater Resistance > 10.8 ohms	No Active DTC's Coolant – IAT 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	Type B 2 trips
O2S Heater Control Circuit Bank 2 Sensor 2	P0056	This DTC checks the Heater Output Driver circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit) or voltage high during driver closed state (indicates short to voltage).		Ign Switch position Ignition Voltage Engine Speed	= Crank or Run position 11.0 volts < Ign Voltage < 32.0 volts > 400 RPM	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips
HO2S Heater Resistance Bank 2 Sensor 1	P0059	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Learned Heater Resistance.	Calculated Heater Resistance < 3.1 ohms -OR- Calculated Heater Resistance > 9.8 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	Type B 2 trips
HO2S Heater Resistance Bank 2 Sensor 2	P0060	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Learned Heater Resistance.	Calculated Heater Resistance < 4.1 ohms -OR- Calculated Heater Resistance > 10.8 ohms	No Active DTC's Coolant – IAT 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	Type B 2 trips
MAP / MAF / Throttle Position Correlation	P0068	Detect when MAP and MAF do not match estimated engine airflow as established by the TPS	1) Difference between measured MAP and estimated MAP exceeds threshold (kPa), or P0651 (5 Volt Ref), or P0107 (MAP circuit low), or P0108 (MAP circuit high) have failed this key cycle, then MAP portion of diagnostic fails	Table, f(TPS). See supporting tables	Engine Speed Run/crank voltage or Powertrain	> 800 RPM	Continuously fail MAP and MAF portions of diagnostic for 0.1875 sec 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.
						relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	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				
Radiator Coolant Temp Sensor Circuit Low Voltage	P00B3	This DTC detects a short to ground in the RCT signal circuit or the RCT sensor.	RCT Resistance (@ 150ºC)	< 45 Ohms	Engine run time Or IAT min	> 0.0 seconds ≤ 150.0 °C	5 failures out of 25 samples 1 sec /sample Continuous	Type B 2 trips
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)	> 419000 Ohms	Engine run time Or IAT min	> 10.0 seconds ≥ -7.0 °C	5 failures out of 25 samples 1 sec /sample Continuous	Type B 2 trips
Radiator Coolant Temp - Engine Coolant Temp (ECT) Correlation	P00B6	This DTC detects a difference between ECT and RCT after a soak condition.	A failure will be reported if any of the following occur: 1) Absolute difference between ECT at power up & RCT at power up is ≥ an IAT based threshold table lookup value(fast fail)	See "P00B6: Fail if power up ECT exceeds RCT by these values" in the Supporting tables section	No Active DTC's	VehicleSpeedSensor_FA IAT_SensorCircuitFA RCT_Sensor_Ckt_FA ECT_Sensor_Ckt_FA IgnitionOffTimeValid TimeSinceEngineRunningValid	1 failure 500 msec /sample Once per valid cold start	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			2) Absolute difference between ECT at power up & RCT at power up is > by 19.3 C and a block heater has not been detected 3) ECT at power up > IAT at power up by 19.3 C and the time spent cranking the engine without starting is greater than 10.0 seconds with the LowFuelConditionDiag	= False **(See Supporting Tables)**	Engine Off Soak Time Non-volatile memory initization Test complete this trip Test aborted this trip IAT LowFuel Condition Diag **(See Supporting Tables)** **Block Heater detection is enabled when either of the following occurs:** 1) ECT at power up > IAT at power up by 2) Cranking time **Block Heater is detected and diagnostic is aborted when 1)or 2) occurs. Diagnostic is aborted when 3) or 4) occurs:** 1a) Vehicle drive time 1b) Vehicle speed 1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is below 1b as follows: 1d) IAT drops from power up IAT 2a) ECT drops from power up ECT 2b) Engine run time 3) Engine run time with vehicle speed below 1b 4) Minimum IAT during test	> 28800 seconds = Not occurred = False = False ≥ -7 ºC = False > 19.3 ºC < 10.0 Seconds > 400 Seconds with > 14.9 MPH and 0.00 times the seconds with vehicle speed below 1b ≥ 3.3 ºC ≥ 1 ºC Within < 30 Seconds > 1800 Seconds > -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	<= 230 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 <= 4600 RPM > -7 Deg C < 129 Deg C > -20 Deg C < 125 Deg C >= 0.00 Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM Modeled Air Flow multiplied by MAF Residual Weight Factor	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.
						based on RPM and MAF Residual Weight Factor Based on MAF Estimate MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM See table "IFRD Residual Weighting Factors".		
					No Active DTCs:	MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA ECT Sensor Ckt FA IAT SensorFA IAT SensorFP CylDeacSystemTFTKO		
Mass Air Flow Sensor Circuit Low Frequency	P0102	Detects a continuous short to low or a open in either the signal circuit or the MAF sensor	MAF Output	<= 1500 Hz (~ 1.58 gm/sec)	Engine Run Time Engine Speed Ignition Voltage Above criteria present for a period of time	 > 1.0 seconds >= 300 RPM >= 8.0 Volts >= 1.0 seconds	400 failures out of 500 samples 1 sample every cylinder firing event	Type B 2 trips
Mass Air Flow Sensor Circuit High Frequency	P0103	Detects a high frequency output from the MAF sensor	MAF Output	>= 14500 Hz (~ 332.07 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	<= 230 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 <= 4600 RPM > -7 Deg C < 129 Deg C > -20 Deg C < 125 Deg C >= 0.00 Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM MAP Model 1 multiplied by MAP1 Residual Weight Factor based on RPM MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM	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.
						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		
Manifold Absolute Pressure Sensor Circuit Low	P0107	Detects a continuous short to low or open in either the signal circuit or the MAP sensor.	MAP Voltage	< 3.0 % of 5 Volt Range (0.2 Volts = 3.5 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips
Manifold Absolute Pressure Sensor Circuit High	P0108	Detects an open sensor ground or continuous short to high in either the signal circuit or the MAP sensor.	MAP Voltage	> 90.0 % of 5 Volt Range (4.5 Volts = 115.1 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips
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 (ECT) Sensor Performance	P0116	This DTC detects ECT temp sensor stuck in mid range.	A failure will be reported if any of the following occur: 1) ECT at power up > IAT at power up by an IAT based table lookup value after a minimum 28800 second soak (fast fail). 2) ECT at power up > IAT at power up by 19.3 C after a minimum 28800 second soak and a block heater has not been detected	See "P0116: Fail if power up ECT exceeds IAT by these values" in the Supporting tables section.	No Active DTC's Non-volatile memory initization Test complete this trip	VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA IgnitionOffTimeValid TimeSinceEngineRunningValid = Not occurred = False	1 failure 500 msec /sample Once per valid cold start	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			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 **(See Supporting Tables)**	Test aborted this trip IAT LowFuelCondition Diag **(See Supporting Tables)**	= 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 1b) Vehicle speed 1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is below 1b as follows: 1d) IAT drops from power up IAT	> 400 Seconds with > 14.9 MPH 0.00 times the seconds with vehicle speed below 1b ≥ 3.3 ºC		
					2a) ECT drops from power up ECT 2b) Engine run time	> 1 ºC Within ≤ 30 Seconds		
					3) Engine run time with vehicle speed below 1b	> 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 Continuous	Type B 2 trips
Engine Coolant Temp Sensor Circuit High	P0118	Circuit Continuity This DTC detects a short to high or open in the ECT signal circuit or the ECT sensor.	ECT Resistance (@ -60ºC)	> 419000 Ohms	Engine run time Or IAT min	> 10.0 seconds ≥ -7.0 °C	5 failures out of 6 samples 1 sec /sample Continuous	Type B 2 trips
TPS1 Circuit	P0120	Detects a continuous or intermittent short or open in TPS1 circuit on the secondary processor but sensor is in range on the	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	19 / 39 counts or 14 counts continuous; 12.5	Trips: 1 Type: A MIL:

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		sensor is in range on the primary processor				No 5 V reference #2 error No 5 V reference #2 DTC (P0651)	12.5 ms/count in the secondary processor	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	> 230 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 together) No Active DTCs:	>= 450 RPM <= 4600 RPM > -7 Deg C < 129 Deg C > -20 Deg C < 125 Deg C >= 0.00 Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Estimate See table "IFRD Residual Weighting Factors". MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensorFA ECT_sensor_FA ECT Sensor FP IAT SensorFA IAT SensorCircuitFP CylDeacSystemTFTKO	Continuous Calculation are performed every 12.5 msec	Type B 2 trips
TPS1 Circuit Low	P0122	Detects a continuous or intermittent short or open in TPS1 circuit on both processors or just the primary processor	Primary TPS1 Voltage <	0.325		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	79 / 159 counts; 57 counts continuous; 3.125 ms /count in the primary	Trips: 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	
TPS1 Circuit High	P0123	Detects a continuous or intermittent short in TPS1	Primary TPS1 Voltage >	4.75		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced	79 / 159 counts; 57	Trips: 1

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		circuit on both processors or just the primary processor				power is false, else the failure will be reported for all conditions	counts continuous; 3.125 ms /count in the primary	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	
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 **Range #2 (Alternate) 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 ≤ 1370 seconds Ethanol ≤ 87% -7.0 ≤ ECT ≤ 70.0 °C ≥ 17.0 gps -7.0 ≤ ECT ≤ 60.0 °C ≥ 17.0 gps	1 failure to set DTC 1 sec /sample Once per ignition key cycle	Type B 2 trips
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 < 40 mvolts	No Active DTC's AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Fuel Device Control	TPS_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 = Not active = Not active 10.0 volts < system voltage< 32.0 volts = Not active = Not active = Not active	285 failures out of 350 samples Frequency: Continuous in 100 milli - second loop	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					AIR Device Control	= Not active
					Low Fuel Condition Diag	= False
						(See Supporting Tables)
					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	> 5.0 seconds
O2S Circuit High Voltage Bank 1 Sensor 1	P0132	This DTC determines if the O2 sensor circuit is shorted to high.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is > 1050 mvolts	No Active DTC's	TPS_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	Type B 2 trips
					AIR intrusive test	= Not active
					Fuel intrusive test	= Not active
					Idle intrusive test	= Not active
					EGR intrusive test	= Not active
					System Voltage	10.0 volts < system voltage< 32.0 volts
					EGR Device Control	= Not active
					Idle Device Control	= Not active
					Fuel Device Control	= Not active
					AIR Device Control	= Not active
					Low Fuel Condition Diag	= False
						(See Supporting Tables)
					Equivalence Ratio	0.9922 ≤ equiv. ratio ≤ 1.0137
					Throttle Position	0.0 % <= Throttle <= 70.0 %
					Fuel Control State	= Closed Loop
					Fuel Control State	not = Power Enrichment
					Closed Loop Active	= TRUE
					All Fuel Injectors for active Cylinders	Enabled (On)
					Fuel State	DFCO not active
					Fuel Condition	Ethanol <= 87%
					All of the above met for	
					Time	> 2 seconds
O2S Slow Response Bank 1 Sensor 1	P0133	This DTC determines if the O2 sensor response time is degraded.	The average response time is caluclated over the test time, and compared to the threshold. Or If Slope Time L/R or R/L Switches are below the threshold.	Refer to "P0133 - O2S Slow Response Bank 1 Sensor 1" 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	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA	Sample time is 60 seconds Frequency: Once per trip	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
				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.		EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA EthanolCompositionSensor_FA EngineMisfireDetected_FA		
					Bank 1 Sensor 1 DTC's not active	= P0131, P0132 or P0134		
					System Voltage	10.0 volts < system voltage< 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 **(See Supporting Tables)**		
					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 <= 85 gps		
					Engine speed	1200 <= RPM <= 3000		
					Fuel	< 87 % Ethanol		
					Baro	> 70 kpa		
					Throttle Position	>= 5 %		
					Low Fuel Condition Diag	= False **(See Supporting Tables)**		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					LTM (Block Learn) fuel cell	= Enabled. See definition of **Multiple DTC Use - Response Cell Enable** Table in Supporting Tables tab.		
					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 EthanolCompositionSensor_FA	400 failures out of 500 samples. Minimum of 0 delta TPS changes required to report fail.	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					System Voltage	10.0 volts < system voltage< 32.0 volts	Delta TPS is incremented when the TPS % change >= 0.0 %	
					AFM Status	= All Cylinders active	Frequency: Continuous	
					Heater Warm-up delay	= Complete		
					Predicted Exhaust Temp (by location)	= Wamed Up	100msec loop	
					Engine Run Time	> 300 seconds		
					Fuel	<= 87 % Ethanol		
O2S Heater Performance Bank 1 Sensor 1	P0135	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	Measured Heater Current.	Measured Heater current < 0.3 amps -OR- Measured Heater current > 3.1 amps	No Active DTC's	ECT_Sensor_FA	8 failures out of 10 samples	Type B 2 trips
					System Voltage	10.0 volts < system voltage< 32.0 volts	Frequency: 1 tests per trip	
					Heater Warm-up delay	= Complete	5 seconds delay between tests and 1 second execution rate	
					B1S1 O2S Heater Duty Cycle	> zero		
					O2S Heater device control	= Not active		
					All of the above met for			
					Time	> 120 seconds		
O2S Circuit Low Voltage Bank 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	320 failures out of 400 samples	Type B 2 trips
						MAP_SensorFA		
						AIR System FA	Frequency: Continuous in 100 milli - second loop	
						Ethanol Composition Sensor FA		
						EvapPurgeSolenoidCircuit_FA		
						EvapFlowDuringNonPurge_FA		
						EvapVentSolenoidCircuit_FA		
						EvapSmallLeak_FA		
						EvapEmissionSystem_FA		
						FuelTankPressureSnsrCkt_FA		
						FuelInjectorCircuit_FA		
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
						(See Supporting Tables)		
					Equivalence Ratio	0.9922 ≤ equiv. ratio ≤ 1.0137		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Throttle Position	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	> 5.0 seconds		
O2S Circuit High Voltage Bank 1 Sensor 2	P0138	This DTC determines if the O2 sensor circuit is shorted to high.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is > 1050 mvolts	No Active DTC's	TPS_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	Type B 2 trips
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False **(See Supporting Tables)**		
					Equivalence Ratio	0.9922 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	3.0 % <= Throttle <= 70.0 %		
					Fuel Control State	= Closed Loop		
					Fuel Control State	not = Power Enrichment		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel State	DFCO not active		
					Fuel Condition	Ethanol <= 87%		
					All of the above met for			
					Time	> 2 seconds		
O2 Sensor Slow Response Rich to Lean Bank 1 Sensor 2	P013A	This DTC determines if the post catalyst O2 sensor has Slow Response in a predefined Rich to Lean voltages range during Rich to Lean transition. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	The EWMA of the Post O2 sensor normalized integral value is greater than the threshold. OR The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds) is greater than the	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	Frequency: Once per trip Note: if NaPOPD_b_ ResetFastRe spFunc= FALSE for the given Fuel Bank OR	1 trip Type A EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			airflow threshold.				NaPOPD_b_ RapidRespo nseActive = TRUE, multiple tests per trip are allowed	
						MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA		
					B1S2 Failed this key cycle	P013B, P013E, 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 **(See Supporting Tables)**		
					Post fuel cell	= Enabled. See definition of **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** in Supporting Tables tab		
					DTC's Passed	= P2270 (and P2272 (if applicable))		
					DTC's Passed	= P013E (and P014A (if applicable))		
					After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).			
O2 Sensor Slow Response Lean to Rich Bank 1 Sensor 2	P013B	This DTC determines if the post catalyst O2 sensor has Slow Response in a predefined Lean to Rich voltages range during Lean to Rich transition. The diagnostic is an intrusive test which increases the delivered A/F ratio to achieve the required rich threshold.	The EWMA of the Post O2 sensor normalized integral value is greater than the threshold. OR The Accumulated mass air flow monitored during the Slow Response Test (between the 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	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_ ResetFastRe spFunc= FALSE for the given Fuel Bank OR NaPOPD_b_ RapidRespo nseActive = TRUE, multiple tests per trip are allowed	1 trip 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 P013A, P013E, P013F, P2270 or P2271		
					B1S2 Failed this key cycle			
					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.		
					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 **(See Supporting Tables)**		
					Post fuel cell	= Enabled. See definition of **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** in Supporting Tables tab		
					DTC's Passed	= P2270 (and P2272 (if applicable))		
					DTC's Passed	= P013E (and P014A (if applicable))		
					DTC's Passed	= P013A (and P013C (if applicable))		
					DTC's Passed	= P2271 (and P2273 (if applicable))		
					DTC's Passed	= P013F (and P014B (if applicable))		
					After above conditions are met: Fuel Enrich mode continued.			
					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	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR	1 trip Type A EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			airflow threshold.				NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	
						MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013D, P014A, P014B, P2272 or P2273		
					B2S2 Failed this key cycle			
					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 **(See Supporting Tables)**		
					Post fuel cell	= Enabled. See definition of **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** in Supporting Tables tab		
					DTC's Passed	= P2270 (and P2272 (if applicable))		
					DTC's Passed	= P013E (and P014A (if applicable))		
					After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).			
O2 Sensor Slow Response Lean to Rich Bank 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	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_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 trip Type A EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013C, P014A, P014B, P2272 or P2273		
					B2S2 Failed this key cycle			
					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.		
					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 **(See Supporting Tables)**		
					Post fuel cell	= Enabled. See definition of **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** in Supporting Tables tab		
					DTC's Passed	= P2270 (and P2272 (if applicable))		
					DTC's Passed	= P013E (and P014A (if applicable))		
					DTC's Passed	= P013A (and P013C (if applicable))		
					DTC's Passed	= P2271 (and P2273 (if applicable))		
					DTC's Passed	= P013F (and P014B (if applicable))		
					After above conditions are met: Fuel Enrich mode continued.			
					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	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
							NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	
						MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA		
					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 **(See Supporting Tables)**		
					Post fuel cell	= Enabled. See definition of **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** in Supporting Tables tab		
					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).			
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	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	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						EngineMisfireDetected_FA EthanolCompositionSensor_FA		
					B1S2 Failed this key cycle	P013A, P013B, P013E, 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.		
					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 **(See Supporting Tables)**		
					Post fuel cell	= Enabled. See definition of **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** in Supporting Tables tab		
					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		
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.	Type B 2 trips
						MAF_SensorFA	Minimum of 0 delta TPS changes required to report fail.	
						EthanolCompositionSensor_FA		
					System Voltage	10.0 volts < system voltage < 32.0 volts	Delta TPS is incremented when the TPS % change >= 0.0 %	
					AFM Status	= All Cylinders active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Heater Warm-up delay Predicted Exhaust Temp (by location) Engine Run Time Fuel	= Complete = Wamed Up > 300 seconds <= 87 % Ethanol	100msec loop Frequency: Once per trip for post sensors	
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 System Voltage Heater Warm-up delay B1S2 O2S Heater Duty Cycle O2S Heater device control **All of the above met for** Time	ECT_Sensor_FA 10.0 volts < system voltage< 32.0 volts = Complete > zero = Not active > 120 seconds	8 failures out of 10 samples Frequency: 1 tests per trip 5 seconds delay between tests and 1 second execution rate	Type B 2 trips
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 Learned heater resistance ICAT MAT Burnoff delay	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 = Valid = Not Valid	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Green O2S Condition	= Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria** (B1S2, B2S2) in Supporting Tables tab.		
					Low Fuel Condition Diag	= False **(See Supporting Tables)**		
					Post fuel cell	= Enabled. See definition of **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** in Supporting Tables tab		
					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).			
O2 Sensor Delayed Response Lean to Rich Bank 2 Sensor 2	P014B	This DTC determines if the post catalyst O2 sensor has an initial delayed response to an A/F change from Lean to Rich. The diagnostic is an intrusive test which increases the delivered A/F ratio to achieve the required rich threshold.	Post O2 sensor cannot go above the threshold voltage. AND The Accumulated mass air flow monitored during the Delayed Response Test is greater than the threshold.	1) Post O2S signal < 350 mvolts AND 2) Accumulated air flow during lean to rich test > 1100 grams.	No Active DTC's		Frequency: Once per trip Note: if NaPOPD_b_ ResetFastRe spFunc= FALSE for the given Fuel Bank OR NaPOPD_b_ RapidRespo nseActive = TRUE, multiple tests per trip are allowed	Type B 2 trips
						TPS_ThrottleAuthorityDefaulted		
						ECT_Sensor_FA IAT_SensorFA		
						MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA		
					B2S2 Failed this key cycle	P013C, P013D, P014A, P2272 or 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.		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					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 **(See Supporting Tables)**		
					Post fuel cell	= Enabled. See definition of **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** in Supporting Tables tab		
					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		
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 < 40 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	285 failures out of 350 samples Frequency: Continuous in 100 milli - second loop	Type B 2 trips
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False **(See Supporting Tables)**		
					Equivalence Ratio	0.9922 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	3 % <= Throttle <= 70 %		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Fuel Control State Closed Loop Active All Fuel Injectors for active Cylinders Fuel Condition Fuel State	= Closed Loop = TRUE Enabled (On) Ethanol <= 87% DFCO not active		
					All of the above met for			
					Time	> 5.0 seconds		
O2S Circuit High Voltage Bank 2 Sensor 1	P0152	This DTC determines if the O2 sensor circuit is shorted to high.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is > 1050 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	Type B 2 trips
					AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Diag	= Not active = Not active = Not active = Not active 10.0 volts < system voltage< 32.0 volts = Not active = Not active = Not active = Not active = False		
						(See Supporting Tables)		
					Equivalence Ratio Throttle Position Fuel Control State Fuel Control State Closed Loop Active All Fuel Injectors for active Cylinders Fuel State Fuel Condition	0.9922 ≤ equiv. ratio ≤ 1.0137 0.0 % <= Throttle <= 70.0 % = Closed Loop not = Power Enrichment = TRUE Enabled (On) DFCO not active 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 If Slope Time L/R or R/L Switches are below the threshold.	Refer to "P0153 - O2S Slow Response Bank 2 Sensor 1" 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	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA	Sample time is 60 seconds Frequency: Once per trip	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
				calculated separately		EthanolCompositionSensor_FA EngineMisfireDetected_FA		
					Bank 2 Sensor 1 DTC's not active	= P0151, P0152 or P0154		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False **(See Supporting Tables)**		
					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 <= 85 gps		
					Engine speed	1200 <= RPM <= 3000		
					Fuel	< 87 % Ethanol		
					Baro	> 70 kpa		
					Throttle Position	>= 5 %		
					Low Fuel Condition Diag	= False **(See Supporting Tables)**		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					LTM (Block Learn) fuel cell	= Enabled. See definition of **Multiple DTC Use - Response Cell Enable Table** in Supporting Tables tab.		
					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 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	400 failures out of 500 samples.	Type B 2 trips
						MAF_SensorFA	Minimum of 0 delta TPS changes required to report fail	
						EthanolCompositionSensor_FA		
					System Voltage	10.0 volts < system voltage< 32.0 volts	Delta TPS is incremented when the TPS % change >= 0.0 %	
					AFM Status	= All Cylinders active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Heater Warm-up delay Predicted Exhaust Temp (by location) Engine Run Time Fuel	= Complete = 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 O2S Heater device control **All of the above met for** Time	 ECT_Sensor_FA 10.0 volts < system voltage< 32.0 volts = Complete > zero = Not active > 120 seconds	8 failures out of 10 samples Frequency: 1 tests per trip 5 seconds delay between tests and 1 second execution rate	Type B 2 trips
O2S Circuit Low Voltage Bank 2 Sensor 2	P0157	This DTC determines if the O2 sensor circuit is shorted to low.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is < 50 mvolts	No Active DTC's AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Diag Equivalence Ratio Throttle Position Fuel Control State Closed Loop Active All Fuel Injectors for active Cylinders Fuel Condition Fuel State **All of the above met for**	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 = Not active = Not active 10.0 volts < system voltage< 32.0 volts = Not active = Not active = Not active = Not active = False **(See Supporting Tables)** 0.9922 ≤ equiv. ratio ≤ 1.0137 3 % <= Throttle <= 70 % = Closed Loop = TRUE Enabled (On) Ethanol <= 87% DFCO not active	320 failures out of 400 samples Frequency: Continuous in 100 milli - second loop	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Time	> 5.0 seconds		
O2S Circuit High Voltage Bank 2 Sensor 2	P0158	This DTC determines if the O2 sensor circuit is shorted to high.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is > 1050 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	Type B 2 trips
					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		
						(See Supporting Tables)		
					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 Sensor 1	P015A	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	> 0.45 EWMA (sec)	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131 P0132 P0134	Frequency: Once per trip Note: if NaESPD_b_FastInitRespIsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponseIsActive = TRUE,	1 trip Type A EWMA
			OR [The Accumulated time monitored during the R2L Delayed Response Test (Gross failure).					
			AND	≥ 1.80 Seconds				
			Pre O2 sensor voltage is above]	> 550 mvolts				
					System Voltage	10.0 < Volts < 32.0		
					EGR Device Control	= Not active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Idle Device Control	= Not active
					Fuel Device Control	= Not active
					AIR Device Control	= Not active
					Low Fuel Condition Diag	= False
						(See Supporting Tables)
					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 test	1100 ≤ RPM ≤ 2500
					Engine Speed range to keep test enabled (after initially enabled)	1050 ≤ RPM ≤ 2650
					Engine Airflow	3 ≤ gps ≤ 20
					Vehicle Speed to initially enable test	40.4 ≤ MPH ≤ 82.0
					Vehicle Speed range to keep test enabled (after initially enabled)	36.0 ≤ MPH ≤ 87.0 mph
					Closed loop integral	0.74 ≤ C/L Int ≤ 1.08
					Closed Loop Active	= TRUE
					Evap	not in control of purge
					Ethanol	not in estimate mode
					Post fuel cell	= Enabled. See definition of **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** in Supporting Tables tab
					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 Mode entered (wo driver initiated pedal input).	
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	The EWMA of the Pre O2 sensor normalized L2R time delay value OR [The Accumulated time monitored during	> 0.48 EWMA (sec)	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA	Frequency: Once per trip Note: if NaESPD_b_ FastInitRespI sActive =	1 trip Type A EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		intrusive test which runs in an enriched fuel mode to achieve the required response.	[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	≥ 2.00 Seconds < 350 mvolts < 690 mvolts		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 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 **(See Supporting Tables)** 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 must stay between: 5 ≤ gps ≤ 20 and the delta Engine Airflow over 12.5msec must be : <= 5.0 gps	sActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponseIsActive = TRUE,	
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 System Voltage	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131 P0132 P0134 10.0 < Volts < 32.0	Frequency: Once per trip Note: if NaESPD_b_FastInitRespIsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponseIsActive = TRUE,	1 trip Type A EWMA

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
					Green O2S Condition	**(See Supporting Tables)** = 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 test	1100 ≤ RPM ≤ 2500
					Engine Speed range to keep test enabled (after initially enabled)	1050 ≤ RPM ≤ 2650
					Engine Airflow	3 ≤ gps ≤ 20
					Vehicle Speed to initially enable test	40.4 ≤ MPH ≤ 82.0
					Vehicle Speed range to keep test enabled (after initially enabled)	36.0 ≤ MPH ≤ 87.0 mph
					Closed loop integral	0.74 ≤ C/L Int ≤ 1.08
					Closed Loop Active	= TRUE
					Evap	not in control of purge
					Ethanol	not in estimate mode
					Post fuel cell	= Enabled. See definition of **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** in Supporting Tables tab
					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 Mode 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	The EWMA of the Pre O2 sensor normalized L2R time delay value OR	> 0.48 EWMA (sec)	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA	Frequency: Once per trip Note: if NaESPD_b	1 trip Type A EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Sensor 2		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.	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	≥ 2.00 Seconds < 350 mvolts < 690 mvolts		AmbientAirDefault 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	FastInitRespIsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponseIsActive = TRUE,	
					System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Diag Green O2S Condition O2 Heater (pre sensor) on for Learned Htr resistance Engine Coolant IAT Fuel State Number of fueled cylinders	10.0 < Volts < 32.0 = Not active = Not active = Not active = Not active = False **(See Supporting Tables)** = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria** (B1S1, B2S1) in Supporting Tables tab. ≥ 40 seconds = Valid > 50 ºC > -40 ºC = DFCO inhibit ≥ 2 cylinders		
					When above conditions are met: Fuel Enrich mode entered (Test begins)			
					During test: Engine Airflow must stay between: and the delta Engine Airflow over 12.5msec must be :	5 ≤ gps ≤ 20 <= 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 System Voltage AFM Status Heater Warm-up delay Predicted Exhaust Temp (by location)	TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA 10.0 volts < system voltage< 32.0 volts = All Cylinders active = Complete = Wamed Up	590 failures out of 740 samples. Minimum of 0 delta TPS changes required to report fail. Delta TPS is incremented when the TPS % change >= 0.0 % 100msec loop	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Engine Run Time Fuel	> 300 seconds <= 87 % Ethanol	Frequency: Once per trip for post sensors	
O2S Heater Performance Bank 2 Sensor 2	P0161	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	Measured Heater Current.	Measured Heater current < 0.3 amps -OR- Measured Heater current > 2.9 amps	No Active DTC's System Voltage Heater Warm-up delay B2S2 O2S Heater Duty Cycle O2S Heater device control	ECT_Sensor_FA 10.0 volts < system voltage< 32.0 volts = Complete > zero = Not active	8 failures out of 10 samples Frequency: 1 tests per trip 5 seconds delay between tests and 1 second execution rate	Type B 2 trips
					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 BARO Coolant Temp MAP Inlet Air Temp MAF Fuel Level	375 <rpm< 7000 > 70 kPa -40 <°C< 150 10 <kPa< 255 -20 <°C< 150 1.0 <g/s< 510.0 > 10 % or if fuel sender is faulty the diagnostic will bypass the fuel level criteria.	Frequency: 100 ms Continuous Loop	2 Trip(s) Type B
			AND					
			The filtered short-term fuel trim metric (NOTE: any value < 0.95 effectively nullifies the short-term fuel trim criteria)	>= 0.100	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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						new 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 MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR System FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSensorCircuit_FA Ethanol Composition Sensor FA FuelInjectorCircuit_FA EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit_FA MAP_EngineVacuumStatus AmbientAirDefault O2S_Bank_1_Sensor_1_FA			
Fuel System Too Rich Bank 1	P0172	Determines if the fuel control system is in a rich condition, based on the filtered long-term fuel trim metric. There are two methods to determine a Rich fault. They are Passive and Intrusive. A Passive Test decision cannot be made when Purge is enabled. The Intrusive test is described below:	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	2 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 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:	Segment Def'n:					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		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 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.	Segments can last up to 30 seconds and are separated by the lesser of 20 seconds of purge-on time or enough time to purge 16 grams of vapor. A maximum of 5 completed segments or 20 attempts are allowed for each intrusive test. After an intrusive test report is completed, another intrusive test cannot occur for 300 seconds to allow sufficient time to purge excess vapors from the canister. During this period, fuel trim will pass if the filtered Purge-on Long Term fuel trim > Purge Rich Limit Table for at least 200 seconds, indicating that the canister has been purged.					
Fuel System Too Lean Bank 2	P0174	Determines if the fuel control system is in a lean condition, based on the filtered long-term 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 -20 <°C< 150 1.0 <g/s< 510.0 > 10 % or if fuel sender is faulty the diagnostic will bypass the fuel level criteria.	Frequency: 100 ms Continuous Loop	2 Trip(s) Type B
			AND					
			The filtered short-term fuel trim metric (NOTE: any value < 0.95 effectively nullifies the short-term fuel trim criteria)	>= 0.100	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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						Please see "Closed Loop Enable Criteria" and "Long Term FT Enable Criteria" in Supporting Tables.		
					Fuel Consumed ("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 MAP_SensorFA MAF_SensorFA MAF_SensorTFTKO AIR System FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSensorCircuit_FA Ethanol Composition Sensor FA FuelInjectorCircuit_FA EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit_FA MAP_EngineVacuumStatus AmbientAirDefault O2S_Bank_2_Sensor_1_FA			
Fuel System Too Rich Bank 2	P0175	Determines if the fuel control system is in a rich condition, based on the filtered long-term fuel trim metric. There are two methods to determine a Rich fault. They are Passive and Intrusive. A Passive Test decision cannot be made when Purge is enabled. The Intrusive test is described below:	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 P0174, with the exception that fuel level is not considered.	Frequency: 100 ms Continuous Loop	2 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					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			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 <= **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.	Segment Def'n: Segments can last up to 30 seconds and are separated by the lesser of 20 seconds of purge-on time or enough time to purge 16 grams of vapor. A maximum of 5 completed segments or 20 attempts are allowed for each intrusive test. After an intrusive test report is completed, another intrusive test cannot occur for 300 seconds to allow sufficient time to purge excess vapors from the canister. During this period, fuel trim will pass if the filtered Purge-on Long Term fuel trim > Purge Rich Limit Table for at least 200 seconds, indicating that the canister has been purged.					
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	Type B 2 trips
Injector 2	P0202	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips
Injector 3	P0203	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Injector 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	Type B 2 trips
Injector 5	P0205	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips
Injector 6	P0206	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips
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	Type B 2 trips
Injector 8	P0208	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips
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 No 5 V reference #2 error No 5 V reference #2 DTC (P0651)	79 / 159 counts; 57 counts continuous; 3.125 ms /count in the primary	Trips: 1 Type: A MIL: YES
			Secondary TPS2 Voltage <	0.25			19 / 39 counts or 14 counts continuous; 12.5 ms/count in the secondary	
TPS2 Circuit High	P0223	Detects a continuous or intermittent short in TPS1 circuit on both processors or	Primary TPS2 Voltage >	4.59		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will	79 / 159 counts; 57 counts	Trips: 1 Type:

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		just the primary processor				be reported for all conditions	continuous; 3.125 ms /count in the primary	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	
Fuel Pump Primary Circuit (ODM)	P0230	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Engine Speed	11 volts ≤ Voltage ≤ 32 volts ≥ 0 RPM	8 failures out of 10 samples 250 ms /sample Continuous	Type B 2 trips
Random Misfire Detected Cylinder 1 Misfire Detected Cylinder 2 Misfire Detected Cylinder 3 Misfire Detected Cylinder 4 Misfire Detected Cylinder 5 Misfire Detected Cylinder 6 Misfire Detected Cylinder 7 Misfire Detected Cylinder 8 Misfire Detected	P0300 P0301 P0302 P0303 P0304 P0305 P0306 P0307 P0308	These DTC's will determine if a random or a cylinder specific misfire is occurring by monitoring crankshaft velocity	Deceleration index vs. Engine Speed Vs Engine load Deceleration index calculation is tailored to specific veh. Tables used are 1st tables encountered that are not max of range. Undetectable region at a given speed/load point is where all tables are max of range point. see Algorithm Description Document for additional details. 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.	**(>**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) ≥ 0.81 % P0300 ≥ 0.81 % emission >"Catalyst Damaging Misfire Percentage" Table whenever secondary conditions are met. ≤ 0 FTP rpm AND ≤ 0 FTP % load	Engine Run Time ECT If ECT at startup ECT System Voltage + Throttle delta - Throttle delta Engine Speed Engine Load Misfire counts (at low speed/loads, one cylinder may not cause cat damage)	> 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 > 1200 rpm AND > 20 % load AND < 180 counts on one cylinder	Emission Exceedence = any (5) failed 200 rev blocks out of (16) 200 rev block tests Failure reported for (1) Exceedence any Catalyst Exceedence = (1) 200 rev block as data supports for catalyst damage. Failure reported with (1 or 3) Exceedences in FTP, or (1) Exceedence outside FTP. Continuous	Type B 2 Trips (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.
					Engine Speed	375 < rpm < (Engine Speed Limit) - 400 Engine speed limit is a function of inputs like Gear and temperature typical Engine Speed Limit = 5000 rpm	4 cycle delay	
				disable conditions:	No active DTCs:	TPS_FA EnginePowerLimited MAF_SensorTFTKO MAP_SensorTFTKO IAT_SensorTFTKO ECT_Sensor_Ckt_TFTKO 5VoltReferenceB_FA CrankSensorTestFailedTKO CrankSensorFaultActive CrankIntakeCamCorrelationFA CrankExhaustCamCorrelationFA CrankCamCorrelationTFTKO AnyCamPhaser_FA AnyCamPhaser_TFTKO 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)	4 cycle delay	
					P0315 & engine speed Low Fuel Condition Diag	> 1000 rpm = TRUE **(See Supporting Tables)**	500 cycle delay	
					Cam and Crank Sensors	in sync with each other	4 cycle delay	
					Misfire requests TCC unlock	Not honored because Transmission in hot mode	4 cycle delay	
					Fuel System Status	≠ Fuel Cut	4 cycle delay	
					Active Fuel Management	Transition in progress	7 cycle delay	
					Undetectable engine speed and engine load region	invalid speed load range in **decel index** tables	4 cycle delay	
					Abusive Engine Over Speed	> 8192 rpm	0 cycle delay	
					Below zero torque (except CARB approved 3000 rpm to redline triangle.)	<" Zero torque engine load" in Supporting Tables tab	4 cycle delay	
					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		
					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		
					IF Rough Road is monitored, then ONE of the following Rough Road Sources will be used:			
					Rough Road Source = "TOSS"			
					Rough Road	detected		
					Rough Road Source = "WheelSpeedInECM"			
					ABS/TCS system	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	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
Knock Sensor (KS) Circuit Bank 1	P0325	This diagnostic checks for an open in the knock sensor circuit	Gated Low Pass Filter Voltage	> 4.0 Volts or < 1.24 Volts	Diagnostic Enabled (1 = Enabled) Engine Speed ECT 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	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 Power Take Off	= 1 > 0 Knock Detection Enabled is calculated by multiplying the following three factors: FastAttackRate FastAttackCoolGain FastAttackBaroGain (see Supporting Tables) ≥ 400 RPM ≥ 10 kPa = Not Active	31 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
Knock Sensor (KS) Circuit Low Bank 1	P0327	This diagnostic checks for an out of range low knock	Sensor Input Signal Line	> 2.86 Volts	ECT Engine Run Time	≥ -40 deg. C ≥ 2 seconds	50 Failures out of	Type: B MIL: YES

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		sensor signal	**or** Sensor Return Signal Line	< 1.48 Volts	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	63 Samples 100 msec rate	Trips: 2
Knock Sensor (KS) Circuit High Bank 1	P0328	This diagnostic checks for an out of range high knock sensor signal	Sensor Input Signal Line **or** Sensor Return Signal Line	< 2.02 Volts > 3.76 Volts	ECT Enginer Run Time Valid Oil Temp Required? (1= Yes, 0 = No) <u>If Yes:</u> Engine Oil Temp and ValidOilTemp Model or No OilTempSensor DTC's <u>If No:</u> No Eng Oil Temp enable criteria	≥ -40 deg. C ≥ 2 seconds = 0 < 256 deg. C EngOilModeledTemp Valid EngOilTempSensor CircuitFA	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
Knock Sensor (KS) Circuit Bank 2	P0330	This diagnostic checks for an open in the knock sensor circuit	Gated Low Pass Filter Voltage	> 4.0 Volts or < 1.24 Volts	Diagnostic Enabled (1 = Enabled) Engine Speed ECT 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	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? (1= Yes, 0 = No) <u>If Yes:</u> Engine Oil Temp and ValidOilTemp Model or No OilTempSensor DTC's <u>If No:</u> No Eng Oil Temp enable criteria	≥ -40 deg. C ≥ 2 seconds = 0 < 256 deg. C EngOilModeledTemp Valid EngOilTempSensor CircuitFA	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 High Bank 2	P0333	This diagnostic checks for an out of range high knock sensor signal	Sensor Input Signal Line **or** Sensor Return Signal Line	< 2.02 Volts > 3.76 Volts	ECT Engine Run Time Valid Oil Temp Required? (1= Yes, 0 = No) If Yes: Engine Oil Temp and ValidOilTemp Model or No OilTempSensor DTC's If No: No Eng Oil Temp enable criteria	≥ -40 deg. C ≥ 2 seconds = 0 < 256 deg. C EngOilModeledTemp Valid EngOilTempSensor CircuitFA	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
Crankshaft Position (CKP) Sensor A Circuit	P0335	Determines if a fault exists with the crank position sensor signal	Engine-Cranking Crankshaft Test: Time since last crankshaft position sensor pulse received Time-Based Crankshaft Test: No crankshaft pulses received Event-Based Crankshaft Test: No crankshaft pulses received	 >= 4.0 seconds >= 0.3 seconds	Engine-Cranking Crankshaft Test: Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow Time-Based Crankshaft Test: Engine is Running Starter is not engaged No DTC Active: Event-Based Crankshaft Test: Engine is Running OR Starter is engaged No DTC Active:	 = FALSE = FALSE = FALSE > 3.0 grams/second)) 5VoltReferenceB FA 5VoltReferenceA FA 5VoltReferenceB FA P0340 P0341	Engine-Cranking Crankshaft Test: Continuous every 100 msec Time-Based Crankshaft Test: Continuous every 12.5 msec Event-Based Crankshaft Test: 2 failures out of 10 samples One sample per engine revolution	Type B 2 trips
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-		Crank Re-synchronization Test: Engine Air Flow	 >= 3.0 grams/second	Crank Re-synchronization Test: Continuous	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			synchronizations occur	< 20.0 seconds	Cam-based engine speed	> 450 RPM	every 250 msec	
					No DTC Active:	5VoltReferenceB FA P0335		
			Time-Based Crankshaft Test:		Time-Based Crankshaft Test:		Time-Based Crankshaft Test:	
			No crankshaft synchronization gap found	>= 0.4 seconds	Engine is Running Starter is not engaged		Continuous every 12.5 msec	
					No DTC Active:	5VoltReferenceB FA		
			Engine Start Test during Crank:		Engine Start Test during Crank:		Engine Start Test during Crank:	
			Time since starter engaged without detecting crankshaft synchronization gap	>= 1.5 seconds	Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow	= FALSE = FALSE = FALSE > 3.0 grams/second))	Continuous every 100 msec	
			Event-Based Crankshaft Test:		Event-Based Crankshaft Test:		Event-Based Crankshaft Test:	
			Crank Pulses received in one engine revolution OR Crank Pulses received in one engine revolution	< 51 seconds > 65 seconds	Engine is Running OR Starter is engaged No DTC Active:	5VoltReferenceA FA 5VoltReferenceB FA P0340 P0341	8 failures out of 10 samples One sample per engine revolution	
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor A	P0340	Determines if a fault exists with the cam position bank 1 sensor A signal	Engine Cranking Camshaft Test:		Engine Cranking Camshaft Test:		Engine Cranking Camshaft Test:	Type B 2 trips
			Time since last camshaft position sensor pulse received OR Time that starter has been engaged without a camshaft sensor pulse	>= 5.5 seconds >= 4.0 seconds	Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow	= FALSE = FALSE = FALSE > 3.0 grams/second))	Continuous every 100 msec	
			Time-Based Camshaft Test:		Time-Based Camshaft Test:		Time-Based Camshaft	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Engine is Running Starter is not engaged No DTC Active:	5VoltReferenceA FA	Test: Continuous every 100 msec	
			Fast Event-Based Camshaft Test: No camshaft pulses received during first 24 MEDRES events (There are 24 MEDRES events per engine cycle)		Fast Event-Based Camshaft Test: Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	5VoltReferenceA FA 5VoltReferenceB FA CrankSensor FA	Fast Event-Based Camshaft Continuous every MEDRES event	
			Slow Event-Based Camshaft Test: The number of camshaft pulses received during 100 engine cycles	= 0	Slow Event-Based Camshaft Test: Crankshaft is synchronized No DTC Active:	5VoltReferenceA FA 5VoltReferenceB FA CrankSensor FA	Slow Event-Based Camshaft 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 (There are 24 MEDRES events per engine cycle)		Fast Event-Based Camshaft Test: Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	5VoltReferenceA FA 5VoltReferenceB FA CrankSensor FA	Fast Event-Based Camshaft Continuous every MEDRES event	Type B 2 trips
			Slow Event-Based Camshaft Test: The number of camshaft pulses received during 100 engine cycles OR	< 398 > 402	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	
IGNITION CONTROL #1	P0351	This diagnostic checks the circuit for electrical integrity	The ECM detects that the commanded state of the driver and the actual state of		Engine running Ignition Voltage	> 5.00 Volts	50 Failures out of	Type: B MIL: YES

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
CIRCUIT		during operation. Monitors EST for Cylinder 1 (Cylinders 1 and 4 for V6 with waste spark)	the control circuit do not match.				63 Samples 100 msec rate	Trips: 2
IGNITION CONTROL #2 CIRCUIT	P0352	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 2 (Cylinders 2 and 5 for V6 with waste spark)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	> 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #3 CIRCUIT	P0353	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 3 (Cylinders 3 and 6 for V6 with waste spark)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	> 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 CIRCUIT	P0355	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 5 (if applicable)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	> 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #6 CIRCUIT	P0356	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 6 (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	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	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.
		EST for Cylinder 7 (if applicable)					100 msec rate	
IGNITION CONTROL #8 CIRCUIT	P0358	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 8 (if applicable)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	> 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
Catalyst System Low Efficiency Bank 1	P0420	Oxygen Storage	Normalized Ratio OSC Value (EWMA filtered)	< 0.350	***Valid Idle Period Criteria***		1 test attempted per valid idle period Minimum of 1 test per trip Maximum of 8 tests per trip Frequency: Fueling Related : 12.5 ms OSC Measurements: 100 ms Temp Prediction: 1000ms	Type A 1 Trip(s)
		The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and O2 during lean A/F excursions to store the excess oxygen (I.e. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H2 to release this stored oxygen (I.e. Cerium Reduction). This is referred to as the Oxygen Storage Capacity, or OSC. CatMon's strategy is to "measure" the OSC of the catalyst through forced Lean and Rich A/F excursions. Normalized Ratio OSC Value Calculation Information and Definitions = 1. Raw OSC Calculation = (post cat O2 Resp time - pre cat O2 Resp time) 2. BestFailing OSC value from a calibration table (based on temp and exhaust gas flow) 3. WorstPassing OSC value (based on temp and exhaust gas flow) Normalized Ratio Calculation = (1-2) / (3-2) A Normalized Ratio of 1 essentially represents a good part and a ratio of 0 essentially represents a very bad part.			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 - See Supporting Tables**. This is a function of Coolant Temperature 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			
		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			Green Converter Delay: Not Active Induction Air: *-20 < ° C < 250* Intrusive test(s): Fueltrim Post O2 EVAP EGR: Not Active RunCrank Voltage: > 10.90 Volts Ethanol Estimation: NOT in Progress ECT: *40 < ° C < 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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					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			
					MAF	*4.00 < g/s < 20.00*		
					Predicted catalyst temperature	< 800 degC		
					Engine Fueling Criteria at Beginning of Idle Period			
					The following fueling related must also be met from between 4 and 7 seconds after the Catalyst Idle Conditions Met Criteria has been met for at least 4 seconds prior to allowing intrusive control			
					Number of pre-O2 switches	>= 2		
					Short Term Fuel Trim Avg	*0.960 < ST FT Avg < 1.040*		
					Rapid Step Response (RSR) feature will initiate multiple tests:			
					If the difference between current EWMA value and the current OSC Normalized Ratio value is > 0.620 and the current OSC Normalized Ratio value is < 0.100			
					Maximum of 24 RSR tests to detect failure when RSR is enabled.			
					Green Converter Delay Criteria			
					This is part of the check for the Catalyst Idle Conditions Met Criteria section			
					The diagnostic will not be enabled until the following has been met:			
					Predicted catalyst temperature > 0 ° C for 0 seconds non-continuously. Note: this feature is only enabled when the vehicle is new and cannot be enabled in service			
					PTO Not Active			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					General Enable			
					DTC's Not Set			
					MAF_SensorFA			
					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			
Catalyst System Low Efficiency Bank 2	P0430	Oxygen Storage	Normalized Ratio OSC Value (EWMA filtered)	< 0.350	***Valid Idle Period Criteria***		1 test attempted per valid idle period Minimum of 1 test per trip Maximum of 8 tests per trip Frequency: Fueling Related : 12.5 ms OSC Measurements: 100 ms Temp Prediction: 1000ms	Type A 1 Trip(s)
		The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and O2 during lean A/F excursions to store the excess oxygen (I.e. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H2 to release this stored oxygen (I.e. Cerium Reduction). This is referred to as the Oxygen Storage Capacity, or OSC. CatMon's strategy is to "measure" the OSC of the catalyst through forced Lean and Rich A/F excursions Normalized Ratio OSC Value Calculation Information and Definitions = 1. Raw OSC Calculation = (post cat O2 Resp time - pre cat O2 Resp time) 2. BestFailing OSC value from a calibration table (based on temp and exhaust gas flow) 3. WorstPassing OSC value (based on temp and exhaust gas flow) Normalized Ratio Calculation = (1-2) / (3-2) A Normalized Ratio of 1 essentially represents a good part and a ratio of 0 essentially represents a very bad part.			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 - See Supporting Tables.** This is a function of Coolant Temperture.		
					Tests attempted this trip	< 255		
					The catalyst diagnostic has not yet completed for the current trip.			
					Catalyst Idle Conditions Met Criteria			
					General Enable met and the Valid Idle Period Criteria met			
					Green Converter Delay	Not Active		
					Induction Air	*-20 < ° C < 250*		
					Intrusive test(s): Fueltrim Post O2 EVAP EGR	=Not Active		
					RunCrank Voltage	> 10.90 Volts		
					Ethanol Estimation	NOT in Progress		
		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		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Normalized Ratio value is > 0.620 and the current OSC Normalized Ratio value is < 0.100			
					Maximum of 24 RSR tests to detect failure when RSR is enabled.			
					Green Converter Delay Criteria			
					This is part of the check for the Catalyst Idle Conditions Met Criteria section			
					The diagnostic will not be enabled until the following has been met:			
					Predicted catalyst temperature > 0 ° C for 0 seconds non-continuously. Note: this feature is only enabled when the vehicle is new and cannot be enabled in service			
					PTO Not Active			
					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 Emission (EVAP) System Small Leak Detected	P0442	This DTC will 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	The total delta from peak pressure to peak vacuum during the test is normalized against a calibration pressure threshold table that is based upon fuel level and ambient temperature. (See P0442: EONV Pressure Threshold Table on Supporting Tables Tab). The normalized value is calculated by the following equation: 1 - (peak pressure - peak vacuum) / pressure threshold. The normalized value is entered into EWMA (with 0= perfect pass and 1= perfect fail).		Fuel Level Drive Time Drive length ECT Baro Odometer Time since last complete test if normalized result and EWMA is passing	10 % ≤ Percent ≤ 90 % ≥ 900 seconds ≥ 5.0 miles ≥ 70 °C ≥ 70 kPa ≥ 10.0 miles ≥ 17 hours	Once per trip, during hot soak (up to 2400 sec.). No more than 2 unsuccessful attempts between completed tests.	1 trip Type A EWMA Average run length is 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.
		flow to generate a measurable pressure differential relative to atmospheric.			OR Time since last complete test if normalized result or EWMA is failing Estimated ambient temperature at end of drive Estimate of Ambient Air Temperature Valid	≥ 10 hours 0 °C ≤ Temperature ≤ 34 °C		
		After the volatility check, the vent solenoid will close. After the vent is closed, typically a build up of pressure from the hot soak begins (phase-1). The pressure typically will peak and then begin to decrease as the fuel cools. When the pressure drops (-62.27) Pa from peak pressure, the vent is then opened for 60 seconds to normalize the system pressure. The vent is again closed to begin the vacuum portion of the test (phase-2). As the fuel temperature continues to fall, a vacuum will begin forming. The vacuum will continue until it reaches a vacuum peak. When the pressure rises 62.27 Pa from vacuum peak, the test then completes. If the key is turned on while the diagnostic test is in progress, the test will abort.	When EWMA is , the DTC light is illuminated. The DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 2 additional consecutive trips.	> 0.71 (EWMA Fail Threshold) ≤ 0.35 (EWMA Re-Pass Threshold)	**Conditions for Estimate of Ambient Air Temperature to be valid:** **1. Cold Start** Startup delta deg C (ECT-IAT) OR **2. Short Soak and Previous EAT Valid** Previous time since engine off OR **3. Not a Cold Start and Previous EAT Valid and between Short and Long Soak** Previous time since engine off AND Must expire Estimate of Ambient Temperature Valid Conditioning Time. **"P0442: Estimate of Ambient Temperature Valid Conditioning Time" in Supporting Tables Tab.**	≤ 8 °C ≤ 7200 seconds 7200 seconds < Time < 25200 seconds Vehicle Speed ≥ 9.9 mph AND Mass Air Flow ≥ 0 g/sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					OR **4. Not a Cold Start and Previous EAT Not Valid and less than Long Soak**			
					Previous time since engine off AND Must expire maximum value in Estimate of Ambient Temperature Valid Conditioning Time. **Please see "P0442: Estimate of Ambient Temperature Valid Conditioning Time" in Supporting Tables Tab.**	< 25200 seconds Vehicle Speed ≥ 9.9 mph AND Mass Air Flow ≥ 0 g/sec		
					OR **5. Long Soak** Previous time since engine off	≥ 25200 seconds		
				Abort Conditions:	**1. High Fuel Volatility** During the volatility phase, pressure in the fuel tank is integrated vs. time. If the integrated pressure is then test aborts and unsuccessful attempts is incremented. OR **2. Vacuum Refueling Detected** See P0454 Fault Code for information on vacuum refueling algorithm.	 < -5		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					OR **3. Fuel Level Refueling Detected**			
					See P0464 Fault Code for information on fuel level refueling.			
					OR **4. Vacuum Out of Range and No Refueling**			
					See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for information on fuel level refueling.			
					OR **5. Vacuum Out of Range and Refueling Detected**			
					See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for information on fuel level refueling.			
					OR **6. Vent Valve Override Failed**			
					Device control using an off-board tool to control the vent solenoid, cannot exceed during the EONV test			
						0.50 seconds		
					OR **7. Key up during EONV test**			
					No active DTCs:	FuelLevelDataFault MAF_SensorFA ECT_Sensor_FA IAT_SensorFA VehicleSpeedSensor_FA IgnitionOffTimeValid		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						AmbientAirDefault P0443 P0446 P0449 P0452 P0453 P0455 P0496		
Evaporative Emission (EVAP) Canister Purge Solenoid Valve Circuit (ODM)	P0443	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		PT Relay Voltage	11 volts ≤ Voltage ≤ 32 volts	20 failures out of 25 samples 250 ms / sample Continuous with solenoid operation	Type B 2 trips
Evaporative Emission (EVAP) Vent System Performance	P0446	This DTC will determine if a restriction is present in the vent solenoid, vent filler, vent hose or EVAP canister. This test runs with normal purge and vent valve is open.	Vent Restriction Prep Test: Vented Vacuum OR Vented Vacuum for 60 seconds Vent Restriction Test: Tank Vacuum for 5 seconds BEFORE Purge Volume After setting the DTC for the first time, 2 liters of fuel must be consumed before setting the DTC for the second time.	< -623 Pa > 1245 Pa > 2989 Pa ≥ 12 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 EnginePowerLimited P0443 P0449 P0452 P0453 P0454	Once per Cold Start Time is dependent on driving conditions Maximum time before test abort is 1000 seconds	Type B 2 trips
Evaporative Emission (EVAP) Vent Solenoid Control Circuit (ODM)	P0449	This DTC checks the circuit for electrical integrity during operation. If the P0449 is active, an intrusive test is performed with the vent solenoid commanded closed for 15 seconds.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage 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	Type B 2 trips
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 volts)		This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off	1 trip Type A EWMA Average run

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Fuel Tank Pressure (FTP) Sensor Circuit Low Voltage	P0452	This DTC will detect a fuel tank pressure sensor signal that is too low out of range.	Fuel tank pressure sensor signal The normal operating range of the fuel tank pressure sensor is 0.5 volts (~1245 Pa) to 4.5 volts (~ -3736 Pa).	< 0.15 volts (3 % of Vref or ~ 1681 Pa)	Time delay after sensor power up for sensor warm-up ECM State ≠ crank Stops 6.0 seconds after key-off	is 0.10 seconds	80 failures out of 100 samples 100 ms / sample Continuous	Type B 2 trips
Fuel Tank Pressure (FTP) Sensor Circuit High Voltage	P0453	This DTC will detect a fuel tank pressure sensor signal that is too high out of range.	Fuel tank pressure sensor signal The normal operating range of the fuel tank pressure sensor is 0.5 volts (~1245	> 4.85 volts (97% of Vref or ~ -4172 Pa)	Time delay after sensor power up for sensor warm-up	is 0.10 seconds	80 failures out of 100 samples 100 ms /	Type B 2 trips
[illegible]		or phase-2 portions of the engine-off natural vacuum small leak test.	Upper voltage threshold (voltage addition above the nominal voltage) Lower voltage threshold (voltage subtraction below the nominal voltage) The difference between tank vacuum sensor voltage and the nominal offset voltage is then normalized against the appropriate threshold listed above to produce a ratio between 0.0 and 1.0. This normalized re-zero ratio is then filtered with a EWMA (with 0= perfect pass and 1=perfect fail). When EWMA is , the DTC light is illuminated. The DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 2 additional consecutive trips.	0.2 volts 0.2 volts > 0.73 (EWMA Fail Threshold) ≤ 0.40 (EWMA Re-Pass Threshold)			natural vacuum small leak test. The number of times that it executes can range from zero to two per engine-off period. The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to	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.
			Pa) to 4.5 volts (~ -3736 Pa).		ECM State ≠ crank Stops 6.0 seconds after key-off		sample Continuous	
Fuel Tank Pressure (FTP) Sensor Circuit Intermittent	P0454	This DTC will detect intermittent tank vacuum sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event.	If an abrupt change in tank vacuum is detected the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that a refueling event occurred. If a refueling is confirmed, then the test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem. An abrupt change is defined as a change in vacuum: in the span of 1.0 seconds. But 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 %	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 The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete. The test will report a failure if 2 out of 3 samples are failures. 12.5 ms / sample Continuous when vent solenoid is closed	1 trips Type A
Evaporative Emission (EVAP) System Large Leak Detected	P0455	This DTC will detect a weak vacuum condition (large leak or purge blockage) in the EVAP system. Purge valve is controlled (to allow purge flow) and vent valve is commanded closed.	Purge volume while Tank vacuum After setting the DTC for the first time, 2 liters of fuel must be consumed before setting the DTC for the second time. Weak Vacuum Follow-up Test (fuel cap replacement test) Weak Vacuum Test failed.	> 45 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	Once per cold start Time is dependent on driving conditions Maximum time before test abort is 1000 seconds	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Passes if tank 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.	P0453 P0454 ≤ 8 °C ≤ 1000 seconds 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C	<u>Weak Vacuum Follow-up Test</u> With large leak detected, the follow-up test is limited to 1300 seconds. Once the MIL is on, the follow-up test runs indefinitely.	
Fuel Level Sensor 1 Performance (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 99 miles.	< 3 liters	Engine Running No active DTCs:	VehicleSpeedSensor_FA	250 ms / sample Continuous	Type B 2 trips
Fuel Level Sensor 1 Circuit Low Voltage	P0462	This DTC will detect a fuel sender stuck out of range low in the primary fuel tank.	Fuel level Sender % of 5V range	< 10 %	Run/Crank Voltage 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	Type B 2 trips
Fuel Level Sensor 1 Circuit High Voltage	P0463	This DTC will detect a fuel sender stuck out ofrange high in the primary fuel tank.	Fuel level Sender % of 5V range	> 60 %	Run/Crank Voltage 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	Type B 2 trips
Fuel Level Sensor 1 Circuit Intermittent	P0464	This DTC will detect intermittent fuel level sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event.	If a change in fuel level is detected, the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that an actual refueling event occurred. If a refueling event is confirmed, then the test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem.		This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period.	1 trips Type A

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			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 length of the test is determined by the refueling rationality test, which can take up to 600 seconds to 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 closed.	Tank Vacuum for 5 seconds BEFORE Test time Test time only increments when engine vacuum ≥ 10.0 kPa.	> 2491 Pa ≥ refer to "P0496: Purge Valve Leak Test Engine Vacuum Test Time (Cold Start) as a Function of Fuel Level table" in Supporting Tables Tab.	Fuel Level System Voltage BARO Startup IAT Startup ECT Engine Off Time No active DTCs:	10% ≤ Percent ≤ 90% 11 volts ≤ Voltage ≤ 32 volts ≥ 70 kPa 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C ≥ 28800.0 seconds MAP SensorFA TPS_FA VehicleSpeedSensor_FA IAT SensorCircuitFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454	Once per cold start Cold start: max time is 1000 seconds	Type B 2 trips
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 run	Type B 2 trips
			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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						Off-vehicle device control (service bay control) must not be active.		
					Low Fuel Condition Diag	=FALSE **(See Supporting Tables)**		
					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		
						Clutch Sensor FA		
					All of the above met for Idle time	> 10 sec		
High Engine Speed Idle System	P0507	This DTC will determine if a high idle exists	Filtered Engine Speed Error	> -182.00 rpm	Baro	> 70 kPa	Diagnostic run	Type B 2 trips
			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.		
					Low Fuel Condition Diag	= FALSE **(See Supporting Tables)**		
					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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						TPS_FA		
						TPS_Performance_FA		
						VehicleSpeedSensor_FA		
						FuelLevelDataFault		
						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.):	< -45.0 kPa OR > 45.0 kPa	Diagnostic enabled/disabled	Enabled	Performed every 100 msec	2 trip(s) Type B
					Oil Pressure Sensor In Use	Present		
					Filtered engine oil pressure test weighting (function of engine speed, engine oil temperature, predicted oil pressure, and engine load stability). Details on Supporting Tables Tab (P0521 Section)	>= 0.30 weighting		
			To pass a currently failing test: The filtered, weighted difference between measured EOP and predicted EOP (a function of engine speed and engine oil temp.):	> -42.0 kPa AND < 42.0 kPa	No active DTC's	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/disabled	= 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/disabled	= 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
Air Conditioning Refrigerant Pressure Sensor Circuit Low Voltage	P0532	Determines if the Air Conditioning Refrigerant Pressure circuit voltage is too low	(AC Pressure Sensor Voltage) / 5 Volts	< 2.0 percent	AC Pressure Sensor diagnostic enabled	Enabled	80 failures	1 Trip(s) Type C
					AC pressure sensor present	CAN message from BCM or Not Present in ECM	Performed every 25 msec	
Air Conditioning Refrigerant Pressure Sensor Circuit High Voltage	P0533	Determines if the Air Conditioning Refrigerant Pressure circuit voltage is too high	(AC Pressure Sensor Voltage) / 5 Volts	> 90.0 percent	AC Pressure Sensor diagnostic enabled	Enabled	80 failures	1 Trip(s) Type C
					AC pressure sensor present	CAN message from BCM or Not Present in ECM	Performed every 25 msec	
Cruise Control Mutil-Functon Switch Circuit	P0564	Detect when cruise control multi-function switch circuit (analog) voltage is in an illegal range	Cruise Control analog circuit voltage must be in an "illegal range" for greater than a calibratable period of time for cruise switch states that are received over serial data		CAN cruise switch diagnostic enable in ECM	TRUE	fail continuously for greater than 0.750 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 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	fail continuously for greater than 90.000 seconds	Type: C MIL: NO Trips: 1
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	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	10 / 16 counts	Type: C MIL: No Trips: 1
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if the calibration check sum is incorrect	Output state invalid		PCM State	= crank or run	Diagnostic runs continuously in the background Diagnostic reports a fault if 1 failure occurs on the first pass. Diagnostic reports a fault if 5 failures occur after the first pass is complete.	Type A 1 trips
Control Module Not Programmed	P0602	This DTC will be stored if the PCM is a service PCM that has not been programmed.	Output state invalid		PCM State	= crank or run PCM is identified through	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.
						calibration as a Service PCM		
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up does not match checksum at power-down				Diagnostic runs at powerup Diagnostic reports a fault if 1 failure occurs	Type A 1 trips
ECM RAM Failure	P0604	Indicates that the ECM is unable to correctly read data from or write data to RAM	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 pattern written doesn't match the pattern read consecutive times				Will finish within 30 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 executed or were not executed in the correct order.	0.2500 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	0.2500 sec continuous	
			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	360.0000 sec continuous		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced	360.0000 sec continuous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			completed > the amount of time			power is false, else the failure will be reported for all 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 initialization detected by the Secondary Processor or loss or invalid message of SPI communication from the Primary Processor after a valid message was recieved by the Secondary Processor			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	In the secondary processor 0.4750 sec at 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 clock is outside the threshold	27.85 kHz and 37.68 kHz		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	100 ms continuous	
			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	12.5 ms continuous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						be reported for all conditions		
			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 compute the expected result	Two Consecutive Times		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	
			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 indicated accelerator pedal position and secondary indicated accelerator pedal position is >	5		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions Primary processor Pedal Sync	44 / 40 counts or 39 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.
						Error is FALSE	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 Diagnostic runs once at powerup	Type B 2 trips
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	
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	Type B 2 trip 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	
Powertrain Relay Control (ODM)	P0685	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	8 failures out of 10 samples 250 ms / sample Continuous	Type B 2 trips
Powertrain Relay Feedback Circuit High	P0690	This DTC is a check to determine if the Powertrain relay is functioning properly.	PT Relay feedback voltage is Stuck Test:	≥ 18 volts	Powertrain relay commanded “ON” No active DTCs:		5 failures out of 6 samples 1 second /	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			PT Relay feedback voltage is when commanded 'OFF'	> 3 volts		PowertrainRelayStateOn_FA	sample Stuck Test: 100 ms/ sample Continous failures ≥ 4 seconds	
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 trip 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 MAP – MAP Model 1) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered	<= 230 kPa*(g/s) > 12 grams/sec > 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) No Active DTCs:	>= 450 RPM <= 4600 RPM > -7 Deg C < 129 Deg C > -20 Deg C < 125 Deg C >= 0.00 Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Estimate MAP Model 1 multiplied by MAP1 Residual Weight Factor based on RPM MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM See table "IFRD Residual Weighting Factors". MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensorFA ECT_sensor_FA ECT_Sensor_FP IAT_SensorFA IAT_SensorCircuitFP CylDeacSystemTFTKO	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.
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 trip Type A
ABS Rough Road malfunction	P1380	This diagnostic detects if the ABS controller is indicating a fault, and misfire is present. When this occurs, misfire will continue to run.	GMLan Message: "Wheel Sensor Rough Road Magnitude Validity"	= FALSE	Vehicle Speed Engine Speed Engine Load RunCrankActive Active DTC	VSS ≥ 5 mph rpm < 8192 load < 60 = TRUE P0300, MIL Request	40 failures out of 80 samples 250 ms /sample Continuous	1 Trips Type C "Special Type C"
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 = Enabled)	1	Diagnostic runs in 12.5 ms loop	Type B 2 trips
			Transmission engine speed protection	not equal to 2's complement of transmission engine speed request + Transmission alive rolling count	Engine run time	0.50 sec		
					# of Protect Errors	10 protect errors out of 10 samples		
					# of Alive Rolling Errors	6 rolling count errors out of 10 samples		
					No idle diagnostic 506/507 code	IAC_SystemRPM_FA		
					No Serial communication loss to TCM	(U0101)		
					Engine Running	= TRUE		
					Power mode	Run Crank Active		
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) and TPS minimum learn is not active Ignition voltage failure is false (P1682)	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions 11 5.4	0.1875 sec in the secondary processor	Trips: 1 Type: A MIL: YES
		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	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	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Reduce Engine Power is Active			
		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 Fault (SPI is not set) and TPS minimum learn is not active Ignition voltage failure is false (P1682)	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions 11 5.4	0.4875 sec continuous on secondary processor	
Ignition Voltage Correlation	P1682	Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage & the Powertrain Relay Ignition Voltage	|Run/Crank – PT Relay Ignition| >	3.00 Volts	Powertrain commanded on and (Run/crank voltage > or PT Relay Ignition voltage > and Run/crank voltage >	Table, f(IAT). See supporting tables 5.5 5.5	240 / 480 counts or 0.1750 sec continuous; 12.5 msec/count in main processor	Trips: 1 Type: A MIL: YES
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	Type B 2 Trips
					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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Induction air temperature	>= -20 °C and <= 45 °C		
					Start up coolant temperature	> -20 °C		
					NO ACTIVE DTCs: AmbientAirDefault, AIR System FA, 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			
		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 Rich Thresh**		
			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).			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		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 diagnostic will temporarily stop evaluation. When the HV condition subsides, evaluation will resume.	Canister purging is active and Long term fuel correction 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.	
					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 threshold is reached before a fail is reported, a pass is reported, the counters are reset to 0, and evaluation starts again.	> 300 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	Type B 2 Trips
		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) 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		Frequency: Continuous Monitoring in 100ms loop	Type B 2 Trips
		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 diagnostic will temporarily stop evaluation. When the HV condition subsides, evaluation will resume.	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.	
					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		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 2 (Too Lean)	P2099	Same as bank 1 lean fault (see P2097)	Lean Fail Counts: Note: Same as bank 1 lean fault (see P2097)	> 300 out of 1000 samples Note: 10 sample counts = 1 second	Same enable conditions for P2096, P2097, P2098, P2099 (see P2096 enable conditions) 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		Frequency: Continuous Monitoring in 100ms loop	Type B 2 trips
		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	P2101	Detect a throttle positioning	The throttle model and actual Throttle			Run/crank voltage or Powertrain	15 / 15	Trips:

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Control - Position Performance		error	position differ by >	7.568 %.		relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	counts; 12.5 msec/count in the primary processor	1
			or The actual Throttle position and throttle model differ by >	7.568 %.	Engine Running or Ignition Voltage > and Ignition Voltage >	11 5.5		Type: A
					and Throttle is being Controlled			MIL: YES
					and Communication Fault (SPI is not set)			
					and TPS minimum learn is not active			
					Ignition voltage failure is false (P1682)			
		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			
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 processor	Secondary APP1 Voltage <	0.463		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	19 / 39 counts or 14 counts continuous; 12.5 msec/count in the secondary processor	Trips: 1
			or Secondary APP1 Voltage >	4.75				Type: A
						No 5 V reference #2 error		MIL: YES
						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	Trips: 1
			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	Type: A MIL: YES
APP1 Circuit High	P2123	Detects a continuous or	Primary APP1 Voltage >			Run/crank voltage or Powertrain	19 / 39	Trips:

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		intermittent short in APP1 circuit on both processors or just the primary processor		4.75		relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	counts or 14 counts continuous; 12.5 ms/count in the primary	1 Type: A MIL: YES
			Secondary APP1 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	
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	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the primary	Trips: 1 Type: A MIL: YES
			Secondary APP2 Voltage <	0.325		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	
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	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	
Throttle Position	P2135	Detects a continuous or	Difference between TPS1 displaced and	6.998 % offset at min. throttle		Run/Crank voltage or Powertrain	79 / 159	Trips:

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
(TP) Sensor 1-2 Correlation		intermittent correlation fault between TPS sensors #1 and #2 on primary or secondary processor	TPS2 displaced >	position with a linear threshold to 9.698 % at max. throttle position		relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	counts or 58 counts continuous; 3.125 ms/count in the primary processor	1 Type: A MIL: YES
			Difference between (normalized min TPS1) and (normalized min TPS2) >	4.999 % Vref		No TPS sensor faults (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 (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, 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, P0651)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Minimum Throttle Position Not Learned	P2176	TP sensors were not in the minmum learn window after multiple attempts to learn the minimum.	During TPS min learn on the Primary processor, TPS Voltage >	0.935		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
			or					
			During TPS min learn on the Secondary processor, TPS Voltage >	0.935	No TPS circuit errors No TPS circuit 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 > AND TPS2 Voltage > On the Secondary processor	1.689 1.789	PT Relay Voltage >	5.5		
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	Type B 2 trips
			Engine total airgrams is accumulated when 17 ≤ AirFlow ≤ 450 grams per second.				Once per ignition key cycle	
			Ratio Definition: Current temp difference between ECT and RCT minus PwrUp difference divided by total airgrams. Note: Minimum total airgrams is 500.0 grams		THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA Engine not run time Engine run time Fuel Condition ECT at Power Up IAT min Airflow	≥ 1800 seconds 90 ≤ Time ≤ 1370 seconds Ethanol ≤ 87% -7.0 ≤ ECT ≤ 70.0 °C -7°C ≤ IAT ≤ 55°C. 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 characteristics.	Bank 1 Filtered Length Ratio variable	> 1.90 at any time during the trip	System Voltage ECT Engine Run Time Engine speed	*10 <= V <= 32 for >= 4 seconds* > -20 degC >= 10 seconds *1250 <= rpm <= 3750*	Frequency: Continuous Monitoring of O2 voltage signal in 12.5ms loop	Type B 2 trips
			OR					
			Bank 1 AFM (DoD) Filtered Length Ratio variable (AFM applications only)	> 1.00 at any time during the trip	Engine speed change during the current 3.13 sec sample period is <=	*8192 rpm*	The AFIM Filtered Length Ratio	
		To improve S/N, pre-catalyst	**AND**		Mass Airflow	*10.0 <= g/s <= 510.0*		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		O2 voltages between 1000 and 0 millivolts are ignored. This feature is enabled at Air Per Cylinder values <= 0 mg/cylinder. Note: If the first voltage value is >= the second voltage value, AND/OR the Air Per Cylinder value is equal to zero, the feature is not used on this application and the full pre-catalyst O2 voltage range is utilized.	Bank 1 Filtered 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	*120 <= mg/cylinder <= 680*	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.	
					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 Negative (falling) 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	>= 1 times during current 3.13 second sample period		
		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 to filter out signal noise (to avoid false failures), the Length Ratio is filtered using a common first-order lag filter. The result is the AFIM Filtered Length Ratio.	The Quality Factor (QF) calibrations are located in a 17x17 lookup table versus engine speed and load (see Supporting Tables). A QF of "1" is an indication that we were able to achieve at least 4sigma/2sigma robustness in that speed/load region. QF values less than "1" indicate that we don't have 4sigma/2sigma robustness in that region. The quality of the data is determined via statistical analysis of String Length data. QF values less than 0.74 identify regions where diagnosis is not possible.	Quality Factor	>= 0.74 in the current operating region		
					No EngineMisfireDetected_FA			
					No MAP_SensorFA			
					No MAF_SensorFA			
					No ECT_Sensor_FA			
					No Ethanol Composition Sensor FA			
					No TPS_ThrottleAuthorityDefaulted			
					No FuelInjectorCircuit_FA			
					No AIR System FA			
					No O2S_Bank_1_Sensor_1_FA			
					No O2S_Bank_2_Sensor_1_FA			
					No EvapPurgeSolenoidCircuit_FA			
					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.**		
					Cumulative (absolute) delta MAF during the current 3.13 second sample period is	*< 500 g/s* *Note: This protects against false*		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Note: This protects against false diagnosis during severe transient maneuvers	*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	> 1.90 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 The AFIM Filtered Length Ratio variable is updated after every 3.13 seconds of valid data. The first report is delayed for 150 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.	Type B 2 trips
					ECT	> -20 oC		
					Engine Run Time	>= 10 seconds		
					Engine speed	*1250 <= rpm <= 3750*		
			OR					
			Bank 2 AFM (DoD) Filtered Length Ratio variable (AFM applications only)	> 1.00 at any time during the trip	Engine speed change during the current 3.13 sec sample period is <=	*8192 rpm*		
		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	*120 <= 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 Negative (falling) 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	>= 1 times during current 3.13 second sample period		
					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	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	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	No EngineMisfireDetected_FA			
					No MAP_SensorFA			
					No MAF_SensorFA			
					No ECT_Sensor_FA			
					No Ethanol Composition Sensor FA			
					No TPS_ThrottleAuthorityDefaulted			
					No FuelInjectorCircuit_FA			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		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.	current operating region). The reason we use a ratio of the String Lengths is so that we can normalize the failure metric over various engine speed and load regions since engine speed and load directly impact pre-O2 String Length, especially when AFIM failures are present. In order to filter out signal noise (to avoid false failures), the Length Ratio is filtered using a common first-order lag filter. The result is the AFIM Filtered Length Ratio.	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 identify regions where diagnosis is not possible.	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.**		
					Cumulative (absolute) delta MAF during the current 3.13 second sample period is Note: This protects against false diagnosis during severe transient maneuvers	*< 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		
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	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA		
					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 **(See Supporting Tables)**		
					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		
					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. See definition of **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** in Supporting Tables tab		
					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		
O2 Sensor Signal Stuck Rich Bank 1 Sensor 2	P2271	This DTC determines if the post catalyst O2 sensor is stuck in a normal rich voltage range and thereby can no longer be used for post oxygen sensor fuel control or for catalyst monitoring. The diagnostic is an intrusive test which requests the DFCO mode to achieve the required lean	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	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		threshold.					NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	
						MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013B, P013E, P013F or P2270		
					B1S2 Failed this key cycle			
					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		
						(See Supporting Tables)		
					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. See definition of **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** in Supporting Tables tab.		
					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))		
					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).			
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	Post O2 sensor cannot achieve the rich threshold voltage.	1) Post O2S signal < 830 mvolts AND	No Active DTC's	TPS_ThrottleAuthorityDefaulted	Frequency: Once per trip	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		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.	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.	2) Accumulated air flow during stuck lean test > 230 grams.		ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA	Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	
					B2S2 Failed this key cycle	P013C, P013D, P014A, 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 **(See Supporting Tables)**		
					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		
					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. See definition of **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** in Supporting Tables tab.		
					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	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 = Not Valid = Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria** (B1S2, B2S2) in Supporting Tables tab. = False **(See Supporting Tables)** 1100 <= RPM <= 2500 3 gps <= Airflow <= 20 gps 40.4 mph <= Veh Speed <= 82.0 mph 0.74 <= C/L Int <= 1.08 = TRUE not in control of purge not in estimate mode = Enabled. See definition of **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** in Supporting Tables tab = not active = not active = not active >= 80.0 sec 550 ºC <= Cat Temp <= 900 ºC = DFCO possible = P2270 (and P2272 (if applicable)) = P013E (and P014A (if applicable)) = P013A (and P013C (if applicable))	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).			
Transmission Control Torque Request Circuit	P2544	Determines if the torque request from the TCM is valid	**Protect error** - Serial Communication message - ($199 - PTEI3)	Message <> two's complement of message	Diagnostic enabled/disabled Power Mode Engine Running Run/Crank Active	Enabled = Run = True > 0.50 Sec	>= 16 Protect errors during key cycle	Type B 2 trips
			OR					
			Rolling count error - Serial Communication message ($199 - PTEI3) rolling count value	Message <> previous message rolling count value + one			>= 6 Rolling count errors out of ten samples	
			OR					
			RAM Error - Internal ECU fault	Transmission torque request value or request type dual store not equal			>= 3 RAM errors during key cycle	
			OR					
			Range Error - Serial Communication message - ($199 - PTEI3) TCM Requested Torque Increase	> 450 Nm			>= 3 out of 10 samples	
			OR					
			Multi-transition error - Trans torque intervention type request change	Requested torque intervention type toggles from not increasing request to increasing request			>= 3 multi-transitions out of 5	
							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	< 0 seconds	ECM is powered down IAT Temperature	-40 °C ≤ Temperature ≤ 125 °C	Initial value test: 3 failures 1.375 sec / sample	Type B 2 trips DTC sets on next key cycle if failure detected
			OR Initial ignition off timer value	> 10 seconds			Clock rate test: 8 failures out of 10 samples	
			Clock rate test: Time between ignition off timer increments	< 0.8 seconds			1 second / sample	
			Time between ignition off timer increments	> 1.2 seconds			test runs once each key-off	
			Time since last ignition off timer increment	≥ 1.375 seconds				
			Current ignition off time < old ignition off time					
			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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Incompatible (OBD_HD >14K only)								
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	Type B 2 trips
			out of these samples	≥ 5 counts	Diagnostic enable timer	> 3.0000 seconds		
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.	Type B 2 trips
			out of these samples	12 counts	Power mode is RUN			
					Communication bus is not OFF			
					or is typed as a C code			
					Normal Communication is enabled			
					Normal Transmit capability is TRUE			
					The diagnostic system is not disabled			
					The bus has been on for	> 3.0000 seconds		
					A message has been selected to monitor.			
Lost Communication With 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) Special Type C
			out of these samples	12 counts	Power mode is RUN			
					Communication bus is not OFF			
					or is typed as a C code			
					Normal Communication is enabled			
					Normal Transmit capability is TRUE			
					The diagnostic system is not disabled			
					The bus has been on for	> 3.0000 seconds		
					A message has been selected to monitor.			

17 OBDG05 Diagnostic Supporting Tables

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]	130	130	380	380	380

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]	670	670	670	670	670	670	670	670	670	670

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]	820	820	820	820	800	800	810	810	810	810

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

17 OBDG05 Diagnostic Supporting Tables

P0068: MAP / MAF / TPS Correlation

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

X-axis	5.0003	10.0006	14.9994	19.9997	25.0000	30.0003	35.0006	39.9994	99.9985
Data	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 Correlation

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

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

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

17 OBDG05 Diagnostic Supporting Tables

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	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000
80	90000	90000	90000	90000	90000	12480	12480	11408	11408	90000	90000	90000	90000	90000	90000	90000	90000
120	90000	90000	90000	90000	13968	13216	12480	11408	11408	17968	17968	90000	90000	90000	90000	90000	90000
160	90000	90000	90000	11536	12752	13968	14512	14464	15728	17968	19328	21792	21792	90000	90000	90000	90000
200	90000	90000	90000	11536	11536	13024	15632	12960	14768	20128	20672	21792	24176	26576	90000	90000	90000
240	90000	90000	90000	11552	11552	12688	16384	17728	15312	17856	16592	18768	26576	26576	90000	90000	90000
280	90000	90000	90000	11552	12992	14448	19216	18208	15024	13600	14256	21776	31008	31008	90000	90000	90000
320	90000	90000	90000	90000	14608	14608	17776	17056	14672	14912	14432	26032	32592	32592	90000	90000	90000
360	90000	90000	90000	90000	16752	16752	18656	20704	15952	16688	14752	30560	32240	32240	90000	90000	90000
400	90000	90000	90000	90000	17808	17808	18384	22112	15280	21360	16560	35408	37696	37696	90000	90000	90000
440	90000	90000	90000	90000	17840	17840	20336	24464	19712	20240	18000	35136	37536	37536	90000	90000	90000
480	90000	90000	90000	90000	18416	18416	19744	25120	18224	17984	21616	30448	44272	44272	90000	90000	90000
520	90000	90000	90000	90000	20528	20528	21648	24736	17136	19808	22464	34464	45344	45344	90000	90000	90000
560	90000	90000	90000	90000	20528	20528	23664	25696	17728	21312	23040	32880	39104	45344	90000	90000	90000
640	90000	90000	90000	90000	90000	90000	32576	32576	26832	27392	25216	32880	32880	90000	90000	90000	90000
720	90000	90000	90000	90000	90000	90000	32576	32576	26832	27392	27392	90000	90000	90000	90000	90000	90000
800	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000

P219B

KtOXYD_cmp_AFIM_LngthThrsh2

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000
80	90000	90000	90000	90000	9664	9664	11520	11264	8640	11008	14352	14352	90000	90000	90000	90000	90000
120	90000	90000	90000	90000	9664	9664	11520	11264	8640	11008	14352	16720	19088	90000	90000	90000	90000
160	90000	90000	90000	10848	11968	13088	12976	13216	13376	14096	16560	19088	19088	90000	90000	90000	90000
200	90000	90000	90000	10848	10848	13168	13264	12288	13472	15216	17856	22752	24080	25424	90000	90000	90000
240	90000	90000	90000	11568	11568	13120	12224	13760	14016	16832	17888	26384	25424	25424	90000	90000	90000
280	90000	90000	90000	11568	12928	14288	15248	12720	15408	15504	16208	28304	32672	32672	90000	90000	90000
320	90000	90000	90000	90000	16336	16336	17392	14496	14304	17184	17248	27344	37760	37760	90000	90000	90000
360	90000	90000	90000	90000	16160	16160	15008	14800	14576	18864	20288	29136	39904	39904	90000	90000	90000
400	90000	90000	90000	90000	20512	20512	19328	15760	15952	20464	21232	35424	49088	49088	90000	90000	90000
440	90000	90000	90000	90000	23728	23728	22192	16816	16160	22752	22304	41856	42000	42000	90000	90000	90000
480	90000	90000	90000	90000	32912	32912	22704	18384	17760	23840	24608	43072	47744	47744	90000	90000	90000
520	90000	90000	90000	90000	40288	40288	31920	17552	19504	26320	25760	44192	46432	46432	90000	90000	90000
560	90000	90000	90000	90000	40288	40288	26592	21264	21936	28464	29904	52192	49312	46432	90000	90000	90000
640	90000	90000	90000	90000	90000	90000	28656	28656	30464	40080	34992	52192	52192	90000	90000	90000	90000
720	90000	90000	90000	90000	90000	90000	28656	28656	30464	40080	40080	90000	90000	90000	90000	90000	90000
800	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000

P219A

KtOXYD_K_AFIM_QualFactor1

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
120	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.90	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	0.00	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
200	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.85	0.90	0.90	0.00	0.00	0.00	0.00	0.00
240	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.85	0.00	0.00	0.00	0.00
280	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.90	0.00	0.00	0.00	0.00
320	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.00	0.00	0.00	0.00
360	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
400	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
440	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
480	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
520	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
560	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	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	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
720	0.00	0.00	0.00	0.00	0.00	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

17 OBDG05 Diagnostic Supporting Tables

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	0.80	0.75	0.85	0.90	0.80	0.80	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	0.90	0.85	0.85	0.80	0.00	0.00	0.00	0.00	0.00
200	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.95	0.75	0.80	0.00	0.00	0.00	0.00	0.00
240	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.80	0.80	0.00	0.00	0.00	0.00
280	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	0.80	0.00	0.00	0.00	0.00
320	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.75	0.00	0.00	0.00	0.00
360	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
400	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
440	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
480	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
520	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00
560	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	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	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
720	0.00	0.00	0.00	0.00	0.00	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

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)

P0171, 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_S	CeFADD_e_S	CeFADD_e_S	CeFADD_e_S	CeFADD_e_S	CeFADD_e_S	CeFADD_e_S	CeFADD_e_S	CeFADD_e_S	CeFADD_e_S	CeFADD_e_S	CeFADD_e_S	CeFADD_e_S	CeFADD_e_S	CeFADD_e_S	CeFADD_e_S	CeFADD_e_NonSelectedCell
FASD Enabled In Cell?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NO

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	1.000	1.000	0.782	0.770	0.669	0.581	0.540	0.537	0.527	0.527	0.556	1.000	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
	0.763	0.756	0.699	0.679	0.628	0.620	0.592	0.553	0.537	0.534	0.531	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	0.705	0.679	0.699	0.845	0.787	0.795	0.833	0.688	0.714	0.709	0.787	0.755	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	0.929	0.762	0.743	0.833	0.787	0.744	0.870	0.894	0.938	0.642	0.769	1.000	1.000	1.000	1.000	1.000

17 OBDG05 Diagnostic Supporting Tables

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 Time for IAT and Start-up ECT conditions

Z axis is the accumulated time failure threshold (seconds)
(For applications with a two coolant sensors) 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	950	865	780	695	610	525	440	355	270	185	100
Alternate	-7.0 ° C	10.0 ° C	870	785	700	615	530	445	360	275	190	105	20

Multiple DTC Use - Response Cell Enable Table

KaEOSD_RespCellEnbl - Block learn cells in which to enable the Oxygen Sensor Response test
Note: When Table column headings match, that individual cell is enabled

Adaptive Block Learn Cells:	Post Oxygen Sensor Enable Cells:	
CeFADR_e_Cell00_PurgOnAirMode5	CeFADR_e_Cell00_PurgOnAirMode5	Enabled
CeFADR_e_Cell01_PurgOnAirMode4	CeFADR_e_Cell01_PurgOnAirMode4	Enabled
CeFADR_e_Cell02_PurgOnAirMode3	CeFADR_e_Cell02_PurgOnAirMode3	Enabled
CeFADR_e_Cell03_PurgOnAirMode2	CeFADR_e_Cell03_PurgOnAirMode2	Enabled
CeFADR_e_Cell04_PurgOnAirMode1	CeFADR_e_Cell04_PurgOnAirMode1	Enabled
CeFADR_e_Cell05_PurgOnAirMode0	CeFADR_e_Cell05_PurgOnAirMode0	Enabled
CeFADR_e_Cell06_PurgOnIdle	CeFADR_e_Cell06_PurgOnIdle	Enabled
CeFADR_e_Cell07_PurgOnDecel	CeFADR_e_Cell07_PurgOnDecel	Enabled
CeFADR_e_Cell08_PurgOffAirMode5	CeFADR_e_Cell08_PurgOffAirMode5	Enabled
CeFADR_e_Cell09_PurgOffAirMode4	CeFADR_e_Cell09_PurgOffAirMode4	Enabled
CeFADR_e_Cell10_PurgOffAirMode3	CeFADR_e_Cell10_PurgOffAirMode3	Enabled
CeFADR_e_Cell11_PurgOffAirMode2	CeFADR_e_Cell11_PurgOffAirMode2	Enabled
CeFADR_e_Cell12_PurgOffAirMode1	CeFADR_e_Cell12_PurgOffAirMode1	Enabled
CeFADR_e_Cell13_PurgOffAirMode0	CeFADR_e_Cell13_PurgOffAirMode0	Enabled
CeFADR_e_Cell14_PurgOffIdle	CeFADR_e_Cell14_PurgOffIdle	Enabled
CeFADR_e_Cell15_PurgOffDecel	CeFADR_e_Cell15_PurgOffDecel	Enabled

Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests

KaPOPD_PostCellEnbl - A table of adaptive (Block Learn) cells in which to enable the post oxygen sensor tests.
Note: When Table columns match, the cell is enabled.

Adaptive Block Learn Cells:	Post Oxygen Sensor Enable Cells:	
CeFADR_e_Cell00_PurgOnAirMode5	CeFADR_e_Cell07_PurgOnDecel	Disabled
CeFADR_e_Cell01_PurgOnAirMode4	CeFADR_e_Cell07_PurgOnDecel	Disabled
CeFADR_e_Cell02_PurgOnAirMode3	CeFADR_e_Cell07_PurgOnDecel	Disabled
CeFADR_e_Cell03_PurgOnAirMode2	CeFADR_e_Cell07_PurgOnDecel	Disabled
CeFADR_e_Cell04_PurgOnAirMode1	CeFADR_e_Cell07_PurgOnDecel	Disabled
CeFADR_e_Cell05_PurgOnAirMode0	CeFADR_e_Cell07_PurgOnDecel	Disabled
CeFADR_e_Cell06_PurgOnIdle	CeFADR_e_Cell07_PurgOnDecel	Disabled
CeFADR_e_Cell07_PurgOnDecel	CeFADR_e_Cell07_PurgOnDecel	Enabled
CeFADR_e_Cell08_PurgOffAirMode5	CeFADR_e_Cell15_PurgOffDecel	Disabled
CeFADR_e_Cell09_PurgOffAirMode4	CeFADR_e_Cell15_PurgOffDecel	Disabled
CeFADR_e_Cell10_PurgOffAirMode3	CeFADR_e_Cell15_PurgOffDecel	Disabled
CeFADR_e_Cell11_PurgOffAirMode2	CeFADR_e_Cell15_PurgOffDecel	Disabled
CeFADR_e_Cell12_PurgOffAirMode1	CeFADR_e_Cell15_PurgOffDecel	Disabled
CeFADR_e_Cell13_PurgOffAirMode0	CeFADR_e_Cell15_PurgOffDecel	Disabled
CeFADR_e_Cell14_PurgOffIdle	CeFADR_e_Cell15_PurgOffDecel	Disabled
CeFADR_e_Cell15_PurgOffDecel	CeFADR_e_Cell15_PurgOffDecel	Enabled

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	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

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

P0300-P0308: Cyl Mode (Continued…)

	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2600	2800
54	2200	2000	1800	1600	1200	900	800	750	650	280	230	180	140	115	85	65	50
61	2200	2000	1800	1600	1200	1000	850	800	750	400	270	200	155	120	90	70	65

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

load

Load	3000	3500	4000	4500	5000	5500	6000	6500	7000
8	10	7	6	6	6	6	6	6	6
9	9	6	5	5	5	5	5	5	5
11	8	5	5	5	5	5	5	5	5
12	8	5	4	5	5	5	5	5	5
13	8	5	4	4	4	4	4	4	4
15	9	6	5	4	4	4	4	4	4
17	10	6	5	4	4	4	4	4	4
19	12	7	6	4	3	3	3	3	3
22	15	9	6	5	4	3	3	3	3
25	17	10	7	5	4	4	4	4	4
29	19	12	8	5	4	4	4	4	4
33	22	14	9	6	4	4	4	4	4
38	27	16	10	6	5	5	5	5	5
42	30	18	12	7	6	5	5	5	5
48	35	20	14	9	7	6	6	6	6
54	40	22	16	11	10	8	8	8	8
61	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
8	1800	1400	1000	600	350	280	200	170	110	70	45	30	15	25	16	11	10
9	1700	1300	900	550	300	250	150	150	110	65	35	30	20	15	18	10	10
11	1550	1200	850	550	350	275	200	150	120	70	40	35	30	25	20	13	10
12	1350	1100	850	500	350	280	200	150	110	75	50	35	26	20	16	13	10
13	1250	1000	750	500	375	300	200	175	115	80	50	35	28	22	20	15	12
15	1800	1300	800	600	450	375	200	215	140	85	60	40	30	25	24	18	14
17	1800	1350	900	750	600	450	225	250	175	90	75	45	35	30	25	20	15
19	1500	1400	1300	900	625	475	275	300	200	130	90	55	45	40	30	25	20
22	1650	1500	1350	1000	850	550	425	350	250	150	100	65	55	45	40	30	22
25	1850	1600	1350	1100	950	675	500	400	300	180	120	80	60	50	45	35	25
29	2050	1700	1350	1150	1000	700	650	450	325	200	150	100	75	60	50	40	30
33	2100	1800	1500	1200	1000	750	700	580	350	225	160	110	80	70	60	45	35
38	2000	1800	1600	1400	1100	800	750	600	400	250	180	120	100	80	60	50	40
42	2200	2000	1800	1600	1200	850	800	650	450	275	200	140	100	90	70	60	43
48	2200	2000	1800	1600	1200	900	850	750	550	300	220	170	135	100	80	65	50
54	2200	2000	1800	1600	1200	1000	900	800	650	325	250	180	140	115	90	70	55
61	2200	2000	1800	1600	1200	1100	950	850	750	400	270	200	155	120	100	80	70

P0300-P0308: Cyl Mode ddt (Continued…)

load

	3000	3500	4000	4500	5000	5500	6000	6500	7000
8	**9**	**0**	0	0	0	0	0	0	0
9	8	0	0	0	0	0	0	0	0
11	9	0	0	0	0	0	0	0	0
12	10	0	0	0	0	0	0	0	0
13	10	0	0	0	0	0	0	0	0
15	10	0	0	0	0	0	0	0	0
17	11	0	0	0	0	0	0	0	0
19	15	0	0	0	0	0	0	0	0
22	18	0	0	0	0	0	0	0	0
25	22	0	0	0	0	0	0	0	0
29	25	0	0	0	0	0	0	0	0
33	30	0	0	0	0	0	0	0	0
38	33	0	0	0	0	0	0	0	0
42	36	0	0	0	0	0	0	0	0
48	40	0	0	0	0	0	0	0	0
54	45	0	0	0	0	0	0	0	0
61	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

P0300-P0308: Rev Mode Table (Continued…)

	1100	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3500	4000	4500	5000	5500	6000	6500	7000
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: 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

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	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049
-4.3750	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049
1.2500	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049
6.8750	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049
12.5000	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049
18.1250	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049
23.7500	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049
29.3750	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049
35.0000	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049
40.6250	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049
46.2500	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049
51.8750	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049
57.5000	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049
63.1250	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049
68.7500	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049
74.3750	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049
80.0000	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049	-486.5049

P0442: Estimate of Ambient Temperature Valid Conditioning Time

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

Axis	Curve
0	200
600	200
1200	200
1800	200
2400	200
3000	200
3600	200
4200	200
4800	200
5400	200
6000	200
6600	200
7200	200
7800	200
8400	200
9000	200
9600	200
10200	200
10800	200
11700	200
12600	200
13500	200
14400	200
15300	200
16200	200
17100	200
18000	200
19200	200
20400	200
21600	200
22800	200
24000	200
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	58
6	57
12	55
19	53
25	52
31	50
37	48
44	46
50	45
56	43
62	41
69	40
75	38
81	36
87	34
94	33
100	31

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_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

17 OBDG05 Diagnostic Supporting Tables

Closed Loop Enable Criteria

Coolant greater than
KtFULC_T_AF_ClosedLoopTemp

Start-Up Coolant	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Coolant	-40.0	-40.0	-40.0	-40.0	-40.0	-40.0	-40.0	-40.0	-40.0	-40.0	-40.0	-40.0	-40.0	-40.0	-40.0	-40.0	-40.0

and engine run time greater than
KtFULC_t_AF_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	16.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0

and pre converter 02 sensor voltage greater than
KfFULC_U_O2_SensorReadyThrshHi

	> 550
Voltage	*milliVolts*

or less than
KfFULC_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 CylnderDeacDriverTFTKO = False

Long Term FT Enable Criteria

Closed Loop Enable and
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
KtFSTA_T_ClosedLoopTime

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

	> 39 Celcius
Coolant	

or less than
KfFCLL_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
KfFCLP_U_O2ReadyThrshLo

	< 350
Voltage	*milliVolts*

for
KcFCLP_Cnt_O2RdyCyclesThrsh

(events * 12.5 milliseconds)	*> 10 events*

Long Term Secondary Fuel Trim Enable Criteria

KtFCLP_t_PostIntglDisableTime

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_PostIntglRamplnTime

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

	< 950
Modeled Catalyst Temperat	*Celcius*

and
KeFCLP_T_IntegrationCatalystMin

	> 450
Modeled Catalyst Temperat	*Celcius*

and
KfFCLP_T_CoolantThrsh

	> 74 Celcius
Coolant	

and
(KeFCLP_Pct_CatAccuSlphrPostDsbl

	< 38 Percent
Modeled converter sulfur pe	

and
Post Integral < KaFCLP_U_SlphrIntglOfst_Thrsh)

X axis: Post O2 Sensor		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

P0521

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

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

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

Axis	-10	-5	60	80	90	100	120	130	140
Curve	0.00	0.70	0.70	0.70	0.70	0.70	0.70	0.70	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	0	170	250	275	360	375	400	500	600
Curve	0.00	0.10	1.00	1.00	1.00	1.00	1.00	0.75	0.00

DFCO Enable Conditions

COOLANT ENABLE CRITERIA
Coolant temperature > 30.0 °C and will disable if drops below 25.0 °C
RUN TIME ENABLE CRIETRIA
Engine run time > 2 seconds + Supporting Table DFCO_DelayAfterStart_Time
ENGINE SPEED ENABLE CRITERIA
TORQUE CONVERETR CLUTCH UNLOCKED
P2270 Test not requested (POPD OFF):
i) enabled when engine speed > 1500 + supporting table values DFCO_Engine Speed Enables
ii) once enabled continue to be enabled until engine speed < 1100 + supporting table values DFCO_Engine Speed Enables
P2270 Test requested (POPD ON):
i) enabled when engine speed > 1000.0
ii) once enabled continue to be enabled until engine speed < 900.0
TORQUE CONVERETR CLUTCH LOCKED
P2270 Test not requested (POPD OFF):
i) enabled when engine speed > 1500 + supporting table values DFCO_Engine Speed Enables
ii) once enabled continue to be enabled until engine speed < 1100 + supporting table values DFCO_Engine Speed Enables
P2270 Test requested (POPD ON):
i) enabled when engine speed > 1000.0
ii) once enabled continue to be enabled until engine speed < 900.0

VEHICLE SPEED CRITERIA:
i) enabled when vehicle speed > 40 + supporting table value DFCO_Vehicle Speed enables
ii) once enabled continue to be enabled until vehicle speed < 35 + supporting table values DFCO_Vehicle Speed enables

LOAD CRITERIA :
i) enabled when air per cylinder is < 107.0 + supporting table values DFCO Load Criteria
ii) once enabled, disabled if < 125.0 + supporting table values DFCO Load Criteria

% THROTTLE POSITION CRITERIA:
i) enabled when TPS % is < (0.101 + supporting table values TPS % DFCO Enables)
ii) once enabled, disabled if TPS % > (0.201 and supporting table valuesTPS % DFCO Enables)

CATALYST TEMPERATURE
i) once enabled, disables if Catalyst temperature exceeds 1000.0
ii) once disabled for Catalyst temperature, re-enables when Catalyst temperature < 900.0
OTHER CONDITIONS:
a) Transmission is not about to unlock
b) Engine not about to stall
c) Transmission is not shifting if already not in DFCO
d) P2270 (POPD) requesting DFCO or inhibit DFCO
e) EVAP does not inhibit DFCO
f) Throttle is not in default mode

DFCO_DelayAfterStart_Time

Axis: Gear State	TGRR_Gear1	TGRR_Gear2	TGRR_Gear3	TGRR_Gear4	TGRR_Gear5	TGRR_Gear6
Curve: time(s)	1.5	1.5	1.5	1.5	1.5	1.5

DFCO_Engine Speed Enables

Torque Converter Clutch UNLOCK and P2270 test not requested (POPD OFF): DFCO enables above RPM

Axis: Gear State	1st Gear	2nd Gear	3rd Gear	4th Gear	5thGear	6th Gear	Neutral	Reverse	Park
Curve: RPM	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0

Torque Converter Clutch UNLOCK and P2270 test not requested (POPD OFF): DFCO disables if RPM drops below

Axis: Gear State	1st Gear	2nd Gear	3rd Gear	4th Gear	5thGear	6th Gear	Neutral	Reverse	Park
Curve: RPM	1100.0	1100.0	1100.0	1100.0	1100.0	1100.0	1100.0	1100.0	1100.0

Torque Converter Clutch LOCK and P2270 test not requested (POPD OFF): DFCO enables above RPM

Axis: Gear State	1st Gear	2nd Gear	3rd Gear	4th Gear	5thGear	6th Gear	Neutral	Reverse	Park
Curve: RPM	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0

Torque Converter Clutch LOCK and P2270 test not requested (POPD OFF): DFCO disables if RPM drops below

Axis: Gear State	1st Gear	2nd Gear	3rd Gear	4th Gear	5thGear	6th Gear	Neutral	Reverse	Park
Curve: RPM	1100.0	1100.0	1100.0	1100.0	1100.0	1100.0	1100.0	1100.0	1100.0

DFCO_Vehicle Speed enables

Vehicle speed above which DFCO enables

Axis: Gear State	1st Gear	2nd Gear	3rd Gear	4th Gear	5thGear	6th Gear
Curve: KPH	30.0	35.0	40.0	40.0	40.0	40.0

Vehicle speed drops below DFCO disables

Axis: Gear State	1st Gear	2nd Gear	3rd Gear	4th Gear	5thGear	6th Gear
Curve: KPH	25.0	30.0	35.0	35.0	35.0	35.0

17 OBDG05 Diagnostic Supporting Tables

DFCO Load Criteria

Air Per Cylinder must be less than

Axis: RPM	0	512	1024	1536	2048	2560	3072	3584	4096	4608	5120	5632	6144	6656	7168	7680	8192
Curve: APC	107.3	106.9	106.0	110.0	109.0	107.0	104.5	102.3	98.3	95.0	93.0	91.8	91.8	91.8	91.8	91.8	91.8

Continues unless APC is greater than

Axis: RPM	0	512	1024	1536	2048	2560	3072	3584	4096	4608	5120	5632	6144	6656	7168	7680	8192
Curve: APC	121.6	121.3	121.3	128.0	127.0	125.0	122.5	120.3	116.3	113.0	111.0	109.8	109.8	109.8	109.8	109.8	109.8

TPS % DFCO Enables

Enabled if TPS % is less than

Axis: RPM	0	512	1024	1536	2048	2560	3072	3584	4096	4608	5120	5632	6144	6656	7168	7680	8192
Curve: TPS %	0.10	0.10	0.10	0.10	0.10	0.10	0.22	0.42	0.61	0.90	1.24	1.54	1.80	1.80	1.80	1.80	1.80

Continues unless TPS % is greater than

Axis: RPM	0	512	1024	1536	2048	2560	3072	3584	4096	4608	5120	5632	6144	6656	7168	7680	8192
Curve: TPS %	0.20	0.20	0.20	0.20	0.20	0.20	0.37	0.57	0.76	1.05	1.39	1.69	1.95	1.95	1.95	1.95	1.95

Low Fuel Condition Diag

Flag set to TRUE if fuel level < 10.0 %
AND
No Active DTCs: FuelLevelDataFault
P0462
P0463
for at least 30 seconds.

Dilution Definitions

Exhaust Cam Phsr Enable

Exhaust Cam Phsr Enable = TRUE if:
Exhaust Cam Phaser is Present: **NotPresent**
AND
DTCs not set: **CrankSensorTestFailedTKO, ExhaustCamSensor_TFTKO, CrankExhaustCamCorrFA**
AND
Engine Power Limited = FALSE
AND
ExhRunTime is Enabled (see below)
AND
ExhEngineSpeed is Enabled (see below)
AND
ExhOilPressure is Enabled (see below)
AND
ExhEngineOilTemp is Enabled (see below)

ExhRunTime is Enabled when:

Cold Start Enable Engine Run Time > 60.00 sec
AND
Engine RPM > 7000.0
AND
Engine RPM > 8000.0

OR

Engine Run time

Axis: Coolant Temp	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve: Seconds	300.0	250.0	200.0	100.0	40.0	15.0	9.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0

ExhEngineSpeed:

Enabled when:

RPM Greater than

Axis: Coolant Temp	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve: RPM	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0

and Less than

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

Disables when:

Less than

Axis: Coolant Temp	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve: RPM	750.0	750.0	750.0	750.0	750.0	750.0	750.0	750.0	750.0	750.0	750.0	750.0	750.0	750.0	750.0	750.0	750.0

or Greater

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

17 OBDG05 Diagnostic Supporting Tables

ExhOilPressure is Enabled:
If an oil pressure sensor is present: **Present**
AND
is being used: **InUse**
then use oil pressure.
Oil Press greater than

Axis: Coolant Temp	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve: kPa	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0

for

Axis: Coolant Temp	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve: Seconds	300.0	250.0	200.0	100.0	40.0	15.0	9.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0

and Disables if less than

Axis: Coolant Temp	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve: kPa	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0

If an oil pressure sensor is Not Present: **Present**
OR
is Not Being Used: **InUse**
then use RPM.
RPM greater than

Axis: Coolant Temp	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve: RPM	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0

for

Axis: Coolant Temp	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve: Seconds	300.0	250.0	200.0	100.0	40.0	15.0	9.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0

ExhEngineOilTemp:
If an oil temperature sensor is present: **NotPresent**
AND
is being used: **NotInUse**
OR
Oil temperature is modeled: **Modeled**
then use Oil Temperature.
Enabled when:
Oil Temp greater than -10.0 degC
and Less than 135.0 degC
Disables when:
Less than -12.0 degC
or Greater 140.0 degC

Intake Cam Phsr Enable

Intake Cam Phsr Enable = TRUE if:
Intake Cam Phaser is Present: **Present**
AND
DTCs not set: **CrankSensorTestFailedTKO, IntakeCamSensor_TFTKO, CrankIntakeCamCorrFA**
AND
Engine Power Limited = FALSE
AND
IntRunTime is Enabled (see below)
AND
IntEngineSpeed is Enabled (see below)
AND
IntOilPressure is Enabled (see below)
AND
IntEngineOilTemp is Enabled (see below)

IntRunTime is Enabled when:
Cold Start Enable Engine Run Time > 60.00 sec
AND
Engine RPM > 7000.0
AND
Engine RPM > 8000.00
OR
Engine Run time

Axis: Coolant Temp	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve: Seconds	300.0	250.0	200.0	100.0	60.0	60.0	60.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0

IntEngineSpeed:
Enabled when
RPM Greater than

Axis: Coolant Temp	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve: RPM	900.0	900.0	900.0	900.0	875.0	875.0	875.0	875.0	875.0	875.0	875.0	875.0	950.0	1000.0	1250.0	1400.0	1900.0

and Less than

Axis: Coolant Temp	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve: RPM	6800.0	6800.0	6800.0	6800.0	6800.0	6800.0	6800.0	6800.0	6800.0	6800.0	6800.0	6800.0	6800.0	6800.0	6800.0	6800.0	6800.0

17 OBDG05 Diagnostic Supporting Tables

Disables when:

Less than

Axis: Coolant Temp	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve: RPM	800.0	800.0	800.0	800.0	750.0	750.0	750.0	750.0	750.0	750.0	750.0	750.0	750.0	750.0	800.0	800.0	800.0

or Greater

Axis: Coolant Temp	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve: RPM	7000.0	7000.0	7000.0	7000.0	7000.0	7000.0	7000.0	7000.0	7000.0	7000.0	7000.0	7000.0	7000.0	7000.0	7000.0	7000.0	7000.0

IntOilPressure is Enabled:

If an oil pressure sensor is present: **Present**
AND
and is being used: **InUse**
then ues oil pressure.

Oil Press greater than

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

for

Axis: Coolant Temp	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve: Seconds	300.0	250.0	200.0	100.0	60.0	60.0	60.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0

and Disables if less than

Axis: Coolant Temp	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve: kPa	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0

If an oil pressure sensor is Not Present: **Present**
OR is not being used: **InUse**
then use RPM.

RPM greater than

Axis: Coolant Temp	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve: RPM	900.0	900.0	900.0	900.0	875.0	875.0	875.0	875.0	875.0	875.0	875.0	875.0	950.0	1000.0	1250.0	1400.0	1900.0

for

Axis: Coolant Temp	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Curve: Seconds	300.0	250.0	200.0	100.0	60.0	60.0	60.0	5.0	5.0	5.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0

IntEngineOilTemp:

If an oil temperature sensor is present: **NotPresent**
AND
and is being used: **NotInUse**
OR
Oil temperature is modeled: **Modeled**
then use Oil temperature.
Enabled when:
Oil Temp greater than 0.0 degC
and Less than 160.0 degC
Disables when:
Less than -2.0 degC
or Greater 170.0 degC

17 OBDG05 Diagnostic Summary Table - ECM

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
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 Engines with no Baro Sensor: P0106 P0107 P0108
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
MAF_SensorPerfFA	P0101
MAF_SensorPerfTFTKO	P0101
MAP_SensorPerfFA	P0106
MAP_SensorPerfTFTKO	P0106
ThrottlePositionSnsrPerfFA	P0121
ThrottlePositionSnsrPerfTFTKO	P0121

17 OBDG05 Diagnostic Summary Table - ECM

Cert Doc Bundle Name	Pcodes
MAF_SensorFA	P0101 P0102 P0103
MAF_SensorTFTKO	P0101 P0102 P0103
MAF_SensorFP	P0102 P0103
MAF_SensorCircuitFA	P0102 P0103
MAF_SensorCircuitTFTKO	P0102 P0103
MAP_SensorTFTKO	P0106 P0107 P0108
MAP_SensorFA	P0106 P0107 P0108
SCIAP_SensorFA	P012B P012C P012D
SCIAP_SensorTFTKO	P012B P012C P012D
SCIAP_SensorCircuitFP	P012C P012D
AfterThrottlePressureFA_NA	P0106 P0107 P0108
AfterThrottlePressureFA_SC	P012B P012C P012D
AfterThrottleVacuumTFTKO_NA	P0106 P0107 P0108
AfterThrottleVacuumTFTKO_SC	P012B P012C P012D
SCIAP_SensorCircuitFA	P012C P012D
AfterThrottlePressTFTKO_NA	P0106 P0107 P0108
AfterThrottlePressTFTKO_SC	P012B P012C P012D
MAP_SensorCircuitFA	P0107 P0108
MAP_EngineVacuumStatus	MAP_SensorFA OR P0107, P0108 Pending
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
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

17 OBDG05 Diagnostic Summary Table - ECM

Cert Doc Bundle Name	Pcodes											
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						
IntakeCamSensor_FA	P0016	P0018	P0340	P0341	P0345	P0346						
IntakeCamSensor_TFTKO	P0016	P0018	P0340	P0341	P0345	P0346						
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
FuelTankPressureSnsrCkt_FA	P0452 P0453

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.

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				

17 OBDG05 Diagnostic Summary Table - ECM

Cert Doc Bundle Name	Pcodes
EngOilPressureSensorCktFA	P0522 P0523
EngOilPressureSensorFA	P0521 P0522 P0523

EngineTorqueEstInaccurate	EngineM FuelInjec FuelInjec 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
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