Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Intake Camshaft Actuator Solenoid Circuit – Bank 1	P0010	Detects a VVT system error by monitoring the circuit for electrical integrity	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		System supply voltage is within limits Output driver is commanded on, Ignition switch is in crank or run position	> 11 Volts, and < 32 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Trips 2 B Type
Intake Camshaft System Performance – Bank 1	P0011	Detects a VVT system error by comparing the desired and actual cam positions when VVT is activated	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive	(Intake cam Bank 1)Cam Position Error > KtPHSD_phi_CamPosErrorLimIc1 Deg (see Supporting Table)	The following DTC's are NOT active: P0010 IntkCMP B1 Circuit P0340, P0341, Intake B1 Cam sensors P0335, P0336, Crank sensors P0016, P0017, P0018, P0019 Cam to crank rationality 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	Trips 2 B Type
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	2 trips Type B
O2S Heater Control Circuit Bank 1 Sensor 2	P0036	This DTC checks the Heater Output Driver circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit) or voltage high during driver closed state (indicates short to voltage).		Ign Switch position Ignition Voltage Engine Speed	= Crank or Run position 11.0 volts < Ign Voltage < 32.0 volts > 400 RPM	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
O2S Heater Control Circuit	P0050	This DTC checks the Heater Output Driver circuit for	Voltage low during driver open state (indicates short-to-ground or open circuit)		Ign Switch position	= Crank or Run position	20 failures out of 25	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Bank 2 Sensor 1		electrical integrity.	or voltage high during driver closed state (indicates short to voltage).		Ignition Voltage Engine Speed	11.0 volts < Ign Voltage < 32.0 volts > 400 RPM	samples 250 ms /sample Continuous	
HO2S Heater Resistance Bank 1 Sensor 1	P0053	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Learned Heater Resistance.	Calculated Heater Resistance < 3.1 ohms -OR- Calculated Heater Resistance > 9.8 ohms	No Active DTC's Coolant – IAT Coolant Temp Ignition Voltage Engine Soak Time Engine Run Time	ECT_Sensor_FA P2610 IAT_SensorFA < 8.0 ºC -30.0 ºC ≤ Coolant ≤ 45.0 ºC < 32.0 volts > 28800 seconds < 3.00 seconds	Once per valid cold start	2 trips Type B
HO2S Heater Resistance Bank 1 Sensor 2	P0054	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Learned Heater Resistance.	Calculated Heater Resistance < 4.1 ohms -OR- Calculated Heater Resistance > 10.8 ohms	No Active DTC's Coolant – IAT Coolant Temp Ignition Voltage Engine Soak Time Engine Run Time	ECT_Sensor_FA P2610 IAT_SensorFA < 8.0 ºC -30.0 ºC ≤ Coolant ≤ 45.0 ºC < 32.0 volts > 28800 seconds < 3.00 seconds	Once per valid cold start	2 trips Type B
O2S Heater Control Circuit Bank 2 Sensor 2	P0056	This DTC checks the Heater Output Driver circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit) or voltage high during driver closed state (indicates short to voltage).		Ign Switch position Ignition Voltage Engine Speed	= Crank or Run position 11.0 volts < Ign Voltage < 32.0 volts > 400 RPM	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
HO2S Heater Resistance Bank 2 Sensor 1	P0059	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Learned Heater Resistance.	Calculated Heater Resistance < 3.1 ohms -OR- Calculated Heater Resistance > 9.8 ohms	No Active DTC's Coolant – IAT Coolant Temp Ignition Voltage Engine Soak Time Engine Run Time	ECT_Sensor_FA P2610 IAT_SensorFA < 8.0 ºC -30.0 ºC ≤ Coolant ≤ 45.0 ºC < 32.0 volts > 28800 seconds < 3.00 seconds	Once per valid cold start	2 trips Type B
HO2S Heater Resistance Bank 2 Sensor 2	P0060	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Learned Heater Resistance.	Calculated Heater Resistance < 4.1 ohms -OR- Calculated Heater Resistance > 10.8 ohms	No Active DTC's Coolant – IAT Coolant Temp Ignition Voltage Engine Soak Time Engine Run Time	ECT_Sensor_FA P2610 IAT_SensorFA < 8.0 ºC -30.0 ºC ≤ Coolant ≤ 45.0 ºC < 32.0 volts > 28800 seconds < 3.00 seconds	Once per valid cold start	2 trips Type B
MAP / MAF / Throttle Position Correlation	P0068	Detect when MAP and MAF do not match estimated engine airflow as established by the TPS	1) Difference between measured MAP and estimated MAP exceeds threshold (kPa), or P0651 (5 Volt Ref), or P0107 (MAP circuit low), or P0108 (MAP circuit	Table, f(TPS). See supporting tables	Engine Speed	> 800 RPM	Continuously fail MAP and MAF portions of diagnostic	Trips: 1 Type: A

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		by the VTG	(MAP circuit low), or P0108 (MAP circuit high) have failed this key cycle, then MAP portion of diagnostic fails				of diagnostic for 0.1875 sec	MIL: YES
						Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	Continuous in primary processor	
			2) Absolute difference between MAF and estimated MAF exceed threshold (grams/sec), or P0102 (MAF circuit low), or P0103 (MAF circuit hi) have failed this key cycle, or maximum MAF versus RPM (Table) is greater than or equal to maximum MAF versus battery voltage, then MAF portion of diagnostic fails	Table, f(TPS). See supporting tables Table, f(RPM). See supporting tables Table, f(Volts). See supporting tables				
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	2 trips Type B
Radiator Coolant Temp Sensor Circuit High Voltage	P00B4	Circuit Continuity This DTC detects a short to high or open in the RCT signal circuit or the RCT sensor.	RCT Resistance (@ -60ºC)	> 419000 Ohms	Engine run time Or IAT min	> 10.0 seconds ≥ -7.0 °C	5 failures out of 25 samples 1 sec /sample Continuous	2 trips Type B
Radiator Coolant Temp - Engine Coolant Temp (ECT) Correlation	P00B6	This DTC detects a difference between ECT and RCT after a soak condition.	A failure will be reported if any of the following occur:		No Active DTC's	VehicleSpeedSensor_FA IAT_SensorCircuitFA RCT_Sensor_Ckt_FA ECT_Sensor_Ckt_FA	1 failure 500 msec /sample	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			1) Absolute difference between ECT at power up & RCT at power up is ≥ an IAT based threshold table lookup value(fast fail).	See "P00B6: Fail if power up ECT exceeds RCT by these values" in the Supporting tables section		IgnitionOffTimeValid TimeSinceEngineRunningValid	Once per valid cold start	
			2) Absolute difference between ECT at power up & RCT at power up is > by 19.3 C and a block heater has not been detected.		Engine Off Soak Time Non-volatile memory initization	> 28800 seconds = Not occurred		
			3) ECT at power up > IAT at power up by 19.3 C and the time spent cranking the engine without starting is greater than 10.0 seconds with the LowFuelConditionDiag	= False **(See Supporting Tables)**	Test complete this trip Test aborted this trip IAT LowFuel Condition Diag **(See Supporting Tables)**	= False = 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	> 400 Seconds with > 14.9 MPH and		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is below 1b as follows: 1d) IAT drops from power up IAT	0.00 times the seconds with vehicle speed below 1b ≥ 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 4) Minimum IAT during test	> 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) 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 2 multiplied by MAP2 Residual Weight Factor based on RPM See table "IFRD Residual Weighting Factors". MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA ECT Sensor Ckt FA IAT SensorFA IAT SensorFP CylDeacSystemTFTKO	Continuous Calculation are performed every 12.5 msec	Type B 2 trips
Mass Air Flow	P0102	Detects a continuous short to	MAF Output	<= 1500 Hz	Engine Run Time		400 failures	Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Sensor Circuit Low Frequency		low or a open in either the signal circuit or the MAF sensor		(~ 1.58 gm/sec)	Engine Speed Ignition Voltage Above criteria present for a period of time	> 1.0 seconds >= 300 RPM >= 8.0 Volts >= 1.0 seconds	out of 500 samples 1 sample every cylinder firing event	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) 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 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 Calculations are performed every 12.5 msec	Type B 2 trips
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	P0108	Detects an open sensor	MAP Voltage	> 90.0 % of 5 Volt Range (4.5	Continuous		320 failures	Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Pressure Sensor Circuit High		ground or continuous short to high in either the signal circuit or the MAP sensor.		Volts = 115.1 kPa)			out of 400 samples 1 sample every 12.5 msec	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 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	See "P0116: Fail if power up ECT exceeds IAT by these values" in the Supporting tables section. = False **(See Supporting Tables)**	No Active DTC's Non-volatile memory initization Test complete this trip Test aborted this trip IAT LowFuelCondition Diag **(See Supporting Tables)**	VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA IgnitionOffTimeValid TimeSinceEngineRunningValid = Not occurred = False = False ≥ -7 ºC = False	1 failure 500 msec /sample Once per valid cold start	2 trips Type B

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					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 4) Minimum IAT during test	> 1800 Seconds ≤ -7 ºC		
Engine Coolant Temp Sensor Circuit Low	P0117	This DTC detects a short to ground in the ECT signal circuit or the ECT sensor.	ECT Resistance (@ 150ºC)	< 45 Ohms			5 failures out of 6 samples 1 sec /sample Continuous	2 trips Type B
Engine Coolant Temp Sensor Circuit High	P0118	Circuit Continuity This DTC detects a short to high or open in the ECT signal circuit or the ECT sensor.	ECT Resistance (@ -60ºC)	> 419000 Ohms	Engine run time Or IAT min	> 10.0 seconds ≥ -7.0 °C	5 failures out of 6 samples 1 sec /sample Continuous	2 trips Type B
TPS1 Circuit	P0120	Detects a continuous or intermittent short or open in TPS1 circuit on the secondary processor but sensor is in range on the primary processor	Secondary TPS1 Voltage < or Secondary TPS1 Voltage >	0.325 4.75		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions No 5 V reference #2 error No 5 V reference #2 DTC (P0651)	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the secondary processor	Trips: 1 Type: A MIL: YES
Throttle Position Sensor Performance (naturally aspirated)	P0121	Determines if the Throttle Position Sensor input is stuck within the normal operating range	Filtered Throttle Model Error AND ABS(Measured Flow – Modeled Air Flow) Filtered	> 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)	>= 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	Continuous Calculation are performed every 12.5 msec	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Estimate See table "IFRD Residual Weighting Factors".		
					No Active DTCs:	MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensorFA ECT_sensor_FA ECT Sensor FP IAT SensorFA IAT SensorCircuitFP CylDeacSystemTFTKO		
TPS1 Circuit 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 circuit on both processors or just the primary processor	Primary TPS1 Voltage >	4.75		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	79 / 159 counts; 57 counts continuous; 3.125 ms /count in the primary	Trips: 1 Type: A MIL: YES
			Secondary TPS1 Voltage >	4.75		No 5 V reference #2 error No 5 V reference #2 DTC (P0651)	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the secondary	
Engine Coolant Temperature Below Stat Regulating Temperature	P0128	This DTC detects if the engine coolant temperature rises too slowly due to an ECT or Cooling system fault	Actual accumulated airflow is > predicted accumulated airflow before:	See "**P0128: Maximum Accumulated Airflow for IAT and Start-up ECT conditions**" in	No Active DTC's	MAP_SensorFA MAF_SensorFA TPS_Performance_FA TPS_FA TPS_ThrottleAuthorityDefaulted	30 failures to set DTC 1 sec /sample	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
				the Supporting tables section.		IAT_SensorFA ECT_Sensor_Ckt_FA ECT_Sensor_Perf_FA VehicleSpeedSensor_FA	Once per ignition key	
					Engine not run time Engine run time Fuel Condition	≥ 1800 seconds ≥ 120 seconds Ethanol ≤ 87%		
			Range #1 (Primary) ECT reaches 75.0 °C when IAT min is ≤ 54.5°C and ≥ 10.0°C.		**Range #1 (Primary) Test** ECT at start run Average Airflow Vehicle speed	 ≤ 70.0 °C ≥ 5 gps > 5 mph for at least 1.5 miles		
			Range #2 (Alternate) ECT reaches 55.0 °C when IAT min is < 10.0°C and ≥ -7.0°C.		**Range #2 (Alternate) Test** ECT at start run Average Airflow Vehicle speed	 ≤ 50.0 °C ≥ 5 gps > 5 mph for at least 1.5 miles		
					Accumulated Airflow Adjustments 1) Max. airflow amount added when accumulating airflow is 2) Zero Airflow accumulated when airflow is 3) With AFM active Airflow added to acculmulated is multiplyed by 4) With Decel Fuel Cut Off active, acculmulated airflow is reduced by multiplying actual airflow by	 50 gps < 12.0 gps 50.00% 1.00 times		
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)	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	MAF_SensorFA IAT_SensorFA THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA ≥ 1800 seconds 10 ≤ Eng Run Tme ≤ 1370 seconds	1 failure to set DTC 1 sec /sample Once per ignition key cycle	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			ECT reaches target temperature of 65.0 °C when IAT min is < 10.0°C and ≥ -7.0°C.		Fuel Condition	Ethanol ≤ 87%		
					Range #1 (Primary) Test			
					ECT at start run	-7.0 ≤ ECT ≤ 70.0 °C		
					Average Airflow	≥ 17.0 gps		
					Range #2 (Alternate) Test			
					ECT at start run	-7.0 ≤ ECT ≤ 60.0 °C		
					Average Airflow	≥ 17.0 gps		
O2S Circuit Low Voltage Bank 1 Sensor 1	P0131	This DTC determines if the O2 sensor circuit is shorted to low.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is < 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	2 trips Type B
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					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 %		
					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	2 trips Type B
					AIR intrusive test	= Not active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					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 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.	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA EthanolCompositionSensor_FA EngineMisfireDetected_FA	Sample time is 60 seconds Frequency: Once per trip	2 trips Type B
					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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					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	2 trips Type B
					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 Predicted Exhaust Temp (by location)	= Complete = Wamed Up	100msec loop	
					Engine Run Time Fuel	> 300 seconds <= 87 % Ethanol		
O2S Heater Performance Bank 1 Sensor 1	P0135	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	Measured Heater Current.	Measured Heater current < 0.3 amps -OR- Measured Heater current > 3.1 amps	No Active DTC's	ECT_Sensor_FA	8 failures out of 10 samples	2 trips Type B
					System Voltage	10.0 volts < system voltage< 32.0 volts	Frequency: 1 tests per trip	
					Heater Warm-up delay	= Complete	5 seconds delay between tests and 1 second execution rate	
					B1S1 O2S Heater Duty Cycle O2S Heater device control	> zero = Not active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					All of the above met for			
					Time	> 120 seconds		
O2S Circuit Low Voltage Bank 1 Sensor 2	P0137	This DTC determines if the O2 sensor circuit is shorted to low.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is < 50 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA	320 failures out of 400 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					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 %		
					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	100 failures out of 125 samples	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						MAF_SensorFA	Frequency: Continuous in 100 milli - second loop	
						EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA		
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 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 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	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank	1 trips Type A EWMA
						ECT_Sensor_FA IAT_SensorFA	OR 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	P013B, P013E, P013F, P2270 or P2271		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					System Voltage	10.0 volts < system voltage< 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 EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013E, P013F, P2270 or P2271	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	1 trips Type A EWMA
					B1S2 Failed this key cycle			
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay	= Not Valid		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Green O2S Condition	= Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria** (B1S2, B2S2) in Supporting Tables tab.		
					Green Cat System Condition	is Not Valid, System is not valid until accumulated airflow is greater than 720000.0 grams. Airflow accumulation is only enabled when estimated Cat temperature is above 600 Deg C. (Note: This feature is only enabled when the vehicle is new and cannot be enabled in service.)		
					Low Fuel Condition Diag	= False **(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 MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	1 trips Type A EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					B2S2 Failed this key cycle	P013D, P014A, P014B, P2272 or P2273		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria** (B1S2, B2S2) in Supporting Tables tab.		
					Low Fuel Condition Diag	= False **(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 FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	1 trips Type A EWMA
					B2S2 Failed this key cycle	P013C, P014A, P014B, P2272 or P2273		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **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))		
					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 MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013B, P013F, P2270 or P2271	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	2 trips Type B
					B1S2 Failed this key cycle			
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					Learned heater resistance	= Valid		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria** (B1S2, B2S2) in Supporting Tables tab.		
					Low Fuel Condition Diag	= False **(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 EngineMisfireDetected_FA EthanolCompositionSensor_FA	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	2 trips Type B
					B1S2 Failed this key cycle	P013A, P013B, P013E, 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.		

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 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.	2 trips Type B
						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	100msec loop	
					Heater Warm-up delay	= Complete		
					Predicted Exhaust Temp (by location)	= Wamed Up	Frequency: Once per trip for post sensors	
					Engine Run Time	> 300 seconds		
					Fuel	<= 87 % Ethanol		
O2S Heater Performance Bank 1 Sensor 2	P0141	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit	Measured Heater Current.	Measured Heater current < 0.3 amps -OR- Measured Heater current > 2.9 amps	No Active DTC's	ECT_Sensor_FA	8 failures out of 10 samples	2 trips Type B
					System Voltage	10.0 volts < system voltage< 32.0 volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		through the heater circuit.		amps	Heater Warm-up delay	= Complete	Frequency: 1 tests per trip 5 seconds delay between tests and 1 second execution rate	
					B1S2 O2S Heater Duty Cycle	> zero		
					O2S Heater device control	= Not active		
					All of the above met for			
					Time	> 120 seconds		
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	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	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	2 trips Type B
					B2S2 Failed this key cycle	10.0 volts < system voltage< 32.0 volts		
					System Voltage	= Valid		
					Learned heater resistance	= Not Valid		
					ICAT MAT Burnoff delay	= Not Valid, See definition of **Multiple DTC Use_Green Sensor Delay Criteria** (B1S2, B2S2) in Supporting Tables tab.		
					Green O2S Condition	= False **(See Supporting Tables)**		
					Low Fuel Condition Diag	= Enabled. See definition of **Multiple DTC Use - Block learn cells to enable Post oxygen sensor tests** in Supporting Tables tab		
					Post fuel cell	= P2270 and P2272 (if applicable)		
					DTC's Passed	≤ 8 cylinders		
					Number of fueled cylinders			
					After above conditions are met: DFCO mode is entered			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					(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_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	2 trips Type B
						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, 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))		
					Number of fueled cylinders	≥ 0 cylinders		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					After above conditions are met: Fuel Enrich mode 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	2 trips Type B
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					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 %		
					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 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	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
						(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 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 calculated separately	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA EthanolCompositionSensor_FA EngineMisfireDetected_FA	Sample time is 60 seconds Frequency: Once per trip	2 trips Type B

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					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 MAF_SensorFA EthanolCompositionSensor_FA	400 failures out of 500 samples. Minimum of 0 delta TPS changes required to report fail	2 trips Type B
					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 2 Sensor 1	P0155	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	Measured Heater Current.	Measured Heater current < 0.3 amps -OR- Measured Heater current > 3.1 amps	No Active DTC's	ECT_Sensor_FA	8 failures out of 10 samples	2 trips Type B
					System Voltage	10.0 volts < system voltage< 32.0 volts	Frequency: 1 tests per trip	
					Heater Warm-up delay	= Complete	5 seconds delay between tests and 1 second execution rate	
					B2S1 O2S Heater Duty Cycle	> zero		
					O2S Heater device control	= Not active		
					All of the above met for			
					Time	> 120 seconds		
O2S Circuit Low Voltage Bank 2 Sensor 2	P0157	This DTC determines if the O2 sensor circuit is shorted to low.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is < 50 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA	320 failures out of 400 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False **(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_FastInitResplsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponseIsActive = TRUE,	1 trips 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		
					Idle Device Control	= Not active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Fuel Device Control	= Not active
					AIR Device Control	= Not active
					Low Fuel Condition Diag	= False
					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 1 Sensor 1	P015B	This DTC determines if the pre catalyst O2 sensor has an initial delayed response to an A/F change from Lean to Rich. The diagnostic is an intrusive test which runs in an enriched fuel mode to achieve the required	The EWMA of the Pre O2 sensor normalized L2R time delay value OR [The Accumulated time monitored during the L2R Delayed Response Test (Gross failure)	> 0.48 EWMA (sec)	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA	Frequency: Once per trip Note: if NaESPD_b_FastInitResplsActive = TRUE for the given Fuel	1 trips Type A EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		achieve the required response.	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		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	given Fuel Bank OR NaESPD_b_RapidResponseIsActive = TRUE, multiple tests per trip are allowed	
					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		
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	The EWMA of the Pre O2 sensor normalized R2L time delay value OR [The Accumulated time monitored during	> 0.45 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_FastInitRespIsActive =	1 trips 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 a DFCO mode to achieve the required response.	[The Accumulated time monitored during the R2L Delayed Response Test (Gross failure).			EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EthanolCompositionSensor_FA EngineMisfireDetected_FA P0131 P0132 P0134	sActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponseIsActive = TRUE,	
			AND	≥ 1.80 Seconds				
			Pre O2 sensor voltage is above]					
				> 550 mvolts				
					System Voltage	10.0 < Volts < 32.0		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Green O2S Condition	**(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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested.			
					Pre O2S voltage B1S1 at end of Cat Rich stage Fuel State Number of fueled cylinders	≥ 690 mvolts = DFCO active ≤ 6 cylinders		
					After above conditions are met: DFCO 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 to Rich. The diagnostic is an intrusive test which runs in an enriched fuel mode to achieve the required response.	The EWMA of the Pre O2 sensor normalized L2R time delay value OR [The Accumulated time monitored during the L2R Delayed Response Test (Gross failure). AND Pre O2 sensor voltage is below] OR At end of Cat Rich stage the Pre O2 sensor output is	> 0.48 EWMA (sec) ≥ 2.00 Seconds < 350 mvolts < 690 mvolts	No Active DTC's 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	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 = 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	Frequency: Once per trip Note: if NaESPD_b_FastInitRespIsActive = TRUE for the given Fuel Bank OR NaESPD_b_RapidResponseIsActive = TRUE, multiple tests per trip are allowed	1 trips Type A EWMA

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Number of fueled cylinders	≥ 2 cylinders		
					When above conditions are met: Fuel Enrich mode entered (Test begins)			
					During test: Engine Airflow must stay between:	5 ≤ gps ≤ 20		
					and the delta Engine Airflow over 12.5msec must be :	<= 5.0 gps		
O2S Circuit Insufficient Activity Bank 2 Sensor 2	P0160	This DTC determines if the O2 sensor circuit is open.	Measure Oxygen Sensor Signal.	380 mvolts < Oxygen Sensor signal < 520 mvolts	No Active DTC's	TPS_ThrottleAuthorityDefaulted MAF_SensorFA EthanolCompositionSensor_FA	590 failures out of 740 samples. Minimum of 0 delta TPS changes required to report fail	2 trips Type B
					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	100msec loop	
					Heater Warm-up delay	= Complete		
					Predicted Exhaust Temp (by location)	= Wamed Up	Frequency: Once per trip for post sensors	
					Engine Run Time	> 300 seconds		
					Fuel	<= 87 % Ethanol		
O2S Heater Performance Bank 2 Sensor 2	P0161	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	Measured Heater Current.	Measured Heater current < 0.3 amps -OR- Measured Heater current > 2.9 amps	No Active DTC's	ECT_Sensor_FA	8 failures out of 10 samples	2 trips Type B
					System Voltage	10.0 volts < system voltage< 32.0 volts	Frequency: 1 tests per trip	
					Heater Warm-up delay	= Complete	5 seconds delay between tests and 1 second execution rate	
					B2S2 O2S Heater Duty Cycle	> zero		
					O2S Heater device control	= Not active		
					All of the above met for			
					Time	> 120 seconds		
Fuel System Too Lean Bank 1	P0171	Determines if the fuel control system is in a lean condition,	The filtered long-term fuel trim metric	>= **Long Term Trim Lean Table**	Engine speed	375 <rpm< 7000	Frequency: 100 ms	2 Trip(s) Type B
					BARO	> 70 kPa		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		based on the filtered long-term and short-term fuel trim.			Coolant Temp MAP Inlet Air Temp MAF Fuel Level	-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.	Continuous Loop	
			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 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			

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

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSensorCircuit_FA Ethanol Composition Sensor FA FuelInjectorCircuit_FA EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit_FA MAP_EngineVacuumStatus AmbientAirDefault 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					
			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 ERAU	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					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		affect EVAP and EFAM emissions, and the execution frequency of other diagnostics.	seconds, indicating that the canister has been purged.					
Fuel Composition Sensor Circuit Low	P0178	Detects Out of Range Low Frequency Signal The ethanol sensor is designed to measure ethanol concentrations from E0 (50Hz) to E100 (150Hz), with a specified accuracy of 5% ethanol (i.e. 5Hz). Therefore, values less than 45Hz or greater than 155Hz are considered as faults.	Flex Fuel Sensor Output Frequency	< 45 Hertz	Powertrain Relay	> 11.0 Volts < 32.0 Volts	50 failures out of 63 samples 100 ms loop Continuous	1 trip(s) Type A
Fuel Composition Sensor Circuit High	P0179	Detects Out of Range High Frequency Signal The ethanol sensor is designed to measure ethanol concentrations from E0 (50Hz) to E100 (150Hz), with a specified accuracy of 5% ethanol (i.e. 5Hz). Therefore, values less than 45Hz or greater than 155Hz are considered as faults.	Flex Fuel Sensor Output Frequency and	> 155 Hertz <= 185 Hertz	Powertrain Relay	> 11.0 Volts < 32.0 Volts	50 failures out of 63 samples 100 ms loop Continuous	1 trip(s) Type A

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Injector 1	P0201	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
Injector 2	P0202	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
Injector 3	P0203	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
Injector 4	P0204	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
Injector 5	P0205	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
Injector 6	P0206	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
Injector 7	P0207	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
Injector 8	P0208	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 5 seconds	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
TPS2 Circuit	P0220	Detects a continuous or intermittent short or open in TPS2 circuit on the secondary processor but sensor is in range on the primary processor	Secondary TPS2 Voltage < or Secondary TPS2 Voltage >	0.25 4.59		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions No 5 V reference #2 error No 5 V reference #2 DTC (P0651)	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the secondary processor	Trips: 1 Type: A MIL: YES
TPS2 Circuit Low	P0222	Detects a continuous or intermittent short or open in TPS2 circuit on both	Primary TPS2 Voltage <	0.25		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.
		processors or just the primary processor				be reported for all conditions	continuous; 3.125 ms /count in the primary	A MIL: YES
			Secondary TPS2 Voltage <	0.25		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	
TPS2 Circuit High	P0223	Detects a continuous or intermittent short in TPS1 circuit on both processors or just the primary processor	Primary TPS2 Voltage >	4.59		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	79 / 159 counts; 57 counts continuous; 3.125 ms /count in the primary	Trips: 1 Type: A MIL: YES
			Secondary TPS2 Voltage >	4.59		No 5 V reference #2 error No 5 V reference #2 DTC (P0651)	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the secondary	
Fuel Pump Primary Circuit (ODM)	P0230	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Engine Speed	11 volts ≤ Voltage ≤ 32 volts ≥ 0 RPM	8 failures out of 10 samples 250 ms /sample Continuous	2 trips Type B
Random Misfire Detected Cylinder 1 Misfire Detected Cylinder 2 Misfire Detected Cylinder 3 Misfire Detected Cylinder 4 Misfire Detected Cylinder 5 Misfire Detected Cylinder 6 Misfire Detected Cylinder 7 Misfire Detected	P0300 P0301 P0302 P0303 P0304 P0305 P0306 P0307	These DTC's will determine if a random or a cylinder specific misfire is occurring by monitoring crankshaft velocity	Deceleration index vs. Engine Speed Vs Engine load Deceleration index calculation is tailored to specific veh. Tables used are 1st tables encountered that are not max of range. Undetectable region at a given speed/load point is where all tables are max of range point. see Algorithm Description Document for additional details.	**(>**Idle SCD AND > Idle SCD ddt Tables) **OR** (>SCD Delta AND > SCD Delta ddt Tables) **OR** (>Idle Cyl Mode AND > Idle Cyl Mode ddt Tables) **OR** (>Cyl Mode AND > Cyl Mode ddt Tables) **OR** (>Rev Mode Table) **OR** (> AFM Table in Cyl Deact mode)	Engine Run Time ECT If ECT at startup ECT System Voltage + Throttle delta - Throttle delta	> 2 crankshaft revolutions -7 ºC < ECT < 130 ºC < -7 ºC 21 ºC < ECT < 130 ºC 9.00 <volts< 32.00 < 75.00 % per 25 ms < 75.00 % per 25 ms	Emission Exceedence = any (5) failed 200 rev blocks out of (16) 200 rev block tests Failure reported for (1) Exceedence in 1st (16) 200 rev block tests, or (4) Exceedences thereafter. any Catalyst Exceedence = (1) 200 rev block as data	2 Trips Type B (Mil Flashes with Catalyst Damaging Misfire)

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Detected								
Cylinder 8 Misfire Detected	P0308						supports for catalyst damage.	
			Misfire Percent Emission Failure Threshold	≥ 0.81 % P0300 ≥ 0.81 % emission			Failure reported with (1 or 3) Exceedences in FTP, or (1) Exceedence outside FTP.	
			Misfire Percent Catalyst Damage	>"Catalyst Damaging Misfire Percentage" Table whenever secondary conditions are met.	Engine Speed Engine Load Misfire counts (at low speed/loads, one cylinder may not cause cat damage)	> 1200 rpm AND > 20 % load AND < 180 counts on one cylinder		
			When engine speed and load are less than the FTP cals (3) catalyst damage exceedences are allowed.	≤ 0 FTP rpm AND ≤ 0 FTP % load				
							Continuous	
					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	4 cycle delay	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						If Monitor Rough Road=1 and RoughRoadSource="TOSS" Trans_Gear_Defaulted(TCM) (Auto Trans only) Clutch Sensor FA (Manual Trans only) Trans_Gear_Defaulted(TCM) (Auto Trans only)		
					P0315 & engine speed	> 1000 rpm		
					Low Fuel Condition Diag	= 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	Clutch shift	4 cycle delay	
					Throttle Position AND Automatic transmission shift	> 95.00 %	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: Abnormal engine speed oscillations: (Rough road etc) Off Idle, number of consecutive decelerating cylinders after accelerating,: (Number of decels can vary with misfire detection equation) TPS Engine Speed Veh Speed SCD Cyl Mode Rev Mode Rough Road Section: Monitor Rough Road RoughRoadSource IF Rough Road is monitored, then ONE of the following Rough Road Sources will be used: Rough Road Source = "TOSS" Rough Road	 4 engine cycles after misfire 3 Engine cycles after misfire > 3 % > 950 rpm > 3 mph = 4 consecutive cyls = 4 consecutive cyls = 4 consecutive cyls 1 (1=Yes) FromABS detected		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Rough Road Source = "WheelSpeedInECM" ABS/TCS system RoughRoad VSES Rough Road Source = "FromABS" ABS/TCS system RoughRoad VSES	 active detected active detected		
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	= 1 > 0 Knock Detection Enabled is calculated by multiplying the	31 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						calculated by multiplying the following three factors: FastAttackRate FastAttackCoolGain FastAttackBaroGain (see Supporting Tables)	rate	
					Engine Speed MAP	≥ 400 RPM ≥ 10 kPa		
					Power Take Off	= Not Active		
Knock Sensor (KS) Circuit Low Bank 1	P0327	This diagnostic checks for an out of range low knock sensor signal	Sensor Input Signal Line **or** Sensor Return Signal Line	> 2.86 Volts < 1.48 Volts	ECT Engine Run Time	≥ -40 deg. C ≥ 2 seconds	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
					Valid Oil Temp Required? (1= Yes, 0 = No) <u>If Yes:</u> Engine Oil Temp and ValidOilTemp Model or No OilTemp Sensor DTC's <u>If No:</u> No Eng Oil Temp enable criteria	= 0 < 256 deg. C EngOilModeledTemp Valid EngOilTempSensor CircuitFA		
Knock Sensor (KS) Circuit High Bank 1	P0328	This diagnostic checks for an out of range high knock sensor signal	Sensor Input Signal Line **or** Sensor Return Signal Line	< 2.02 Volts > 3.76 Volts	ECT Enginer Run Time	≥ -40 deg. C ≥ 2 seconds	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
					Valid Oil Temp Required? (1= Yes, 0 = No) <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	= 0 < 256 deg. C EngOilModeledTemp Valid EngOilTempSensor CircuitFA		
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	= 1 ≥ 400 RPM ≥ -40 deg. C ≥ 2 seconds	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.
					Power Take Off	= Not Active		
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	≥ -40 deg. C ≥ 2 seconds	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
					Valid Oil Temp Required? (1= Yes, 0 = No) <u>If Yes:</u> Engine Oil Temp and ValidOilTemp Model or No OilTempSensor DTC's <u>If No:</u> No Eng Oil Temp enable criteria	= 0 < 256 deg. C EngOilModeledTemp Valid EngOilTempSensor CircuitFA		
Knock Sensor (KS) Circuit High Bank 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	≥ -40 deg. C ≥ 2 seconds	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
					Valid Oil Temp Required? (1= Yes, 0 = No) <u>If Yes:</u> Engine Oil Temp and ValidOilTemp Model or No OilTempSensor DTC's <u>If No:</u> No Eng Oil Temp enable criteria	= 0 < 256 deg. C EngOilModeledTemp Valid EngOilTempSensor CircuitFA		
Crankshaft Position (CKP) Sensor A Circuit	P0335	Determines if a fault exists with the crank position sensor signal	<u>Engine-Cranking Crankshaft Test:</u> Time since last crankshaft position sensor pulse received <u>Time-Based Crankshaft Test:</u>	>= 4.0 seconds	<u>Engine-Cranking Crankshaft Test:</u> Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow <u>Time-Based Crankshaft Test:</u>	 = FALSE = FALSE = FALSE > 3.0 grams/second))	<u>Engine-Cranking Crankshaft Test:</u> Continuous every 100 msec <u>Time-Based</u>	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			No crankshaft pulses received	>= 0.3 seconds	Engine is Running Starter is not engaged No DTC Active:	5VoltReferenceB FA	Crankshaft Test: Continuous every 12.5 msec	
			Event-Based Crankshaft Test: No crankshaft pulses received		Event-Based Crankshaft Test: Engine is Running OR Starter is engaged No DTC Active:	5VoltReferenceA FA 5VoltReferenceB FA P0340 P0341	Event-Based Crankshaft Test: 2 failures out of 10 samples One sample per engine revolution	
Crankshaft Position (CKP) Sensor A Performance	P0336	Determines if a performance fault exists with the crank position sensor signal	Crank Re-synchronization Test: Time in which 25 or more crank re-synchronizations occur	< 20.0 seconds	Crank Re-synchronization Test: Engine Air Flow Cam-based engine speed No DTC Active:	>= 3.0 grams/second > 450 RPM 5VoltReferenceB FA P0335	Crank Re-synchronization Test: Continuous every 250 msec	Type B 2 trips
			Time-Based Crankshaft Test: No crankshaft synchronization gap found	>= 0.4 seconds	Time-Based Crankshaft Test: Engine is Running Starter is not engaged No DTC Active:	5VoltReferenceB FA	Time-Based Crankshaft Test: Continuous every 12.5 msec	
			Engine Start Test during Crank: Time since starter engaged without detecting crankshaft synchronization gap	>= 1.5 seconds	Engine Start Test during Crank: Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow	= FALSE = FALSE = FALSE > 3.0 grams/second))	Engine Start Test during Crank: Continuous every 100 msec	
			Event-Based Crankshaft Test: Crank Pulses received in one engine revolution OR	< 51 seconds	Event-Based Crankshaft Test: Engine is Running OR Starter is engaged		Event-Based Crankshaft Test: 8 failures out of 10 samples	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Crank Pulses received in one engine revolution	> 65 seconds	No DTC Active:	5VoltReferenceA FA 5VoltReferenceB FA P0340 P0341	One sample per engine revolution	
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor A	P0340	Determines if a fault exists with the cam position bank 1 sensor A signal	Engine Cranking Camshaft Test: Time since last camshaft position sensor pulse received OR Time that starter has been engaged without a camshaft sensor pulse	 >= 5.5 seconds >= 4.0 seconds	Engine Cranking Camshaft Test: Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow	 = FALSE = FALSE = FALSE > 3.0 grams/second))	Engine Cranking Camshaft Test: Continuous every 100 msec	Type B 2 trips
			Time-Based Camshaft Test: Fewer than 4 camshaft pulses received in a time	 > 3.0 seconds	Time-Based Camshaft Test: Engine is Running Starter is not engaged No DTC Active:	 5VoltReferenceA FA	Time-Based Camshaft Test: Continuous every 100 msec	
			Fast Event-Based Camshaft Test: No camshaft pulses received during first 24 MEDRES events (There are 24 MEDRES events per engine cycle)		Fast Event-Based Camshaft Test: Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	 5VoltReferenceA FA 5VoltReferenceB FA CrankSensor FA	Fast Event-Based Camshaft 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		Fast Event-Based Camshaft Test: Crankshaft is synchronized		Fast Event-Based Camshaft Continuous every	Type B 2 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			than 2 or greater than 8 (There are 24 MEDRES events per engine cycle) <u>Slow Event-Based Camshaft Test:</u> The number of camshaft pulses received during 100 engine cycles OR	< 398 > 402	Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active: <u>Slow Event-Based Camshaft Test:</u> Crankshaft is synchronized No DTC Active:	5VoltReferenceA FA 5VoltReferenceB FA CrankSensor FA 5VoltReferenceA FA 5VoltReferenceB FA CrankSensor FA	MEDRES event <u>Slow Event-Based</u> Camshaft 8 failures out of 10 samples Continuous every engine cycle	
IGNITION CONTROL #1 CIRCUIT	P0351	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 1 (Cylinders 1 and 4 for V6 with waste spark)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	> 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #2 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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
IGNITION CONTROL #5 CIRCUIT	P0355	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 5 (if applicable)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	> 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 EST for Cylinder 7 (if applicable)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	> 5.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #8 CIRCUIT	P0358	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 8 (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:	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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
							Prediction:	
					Green Converter Delay	Not Active		
					Induction Air	*-20 < ° C < 250*		
					Intrusive test(s): Fueltrim Post O2 EVAP EGR	Not Active		
					RunCrank Voltage	> 10.90 Volts		
					Ethanol Estimation	NOT in Progress		
		The Catalyst Monitoring Test is done during idle. Several conditions must be meet in order to execute this test. These conditions and their related values are listed in the secondary parameters area of this document.			ECT	*40 < ° C < 129*		
					Barometric Pressure	> 70 KPA		
					Idle Time before going intrusive is	< 50 Seconds		
					Idle time is incremented if Vehicle speed	< 1.24 MPH and the throttle position < 2.00 % as identified in the Valid Idle Period Criteria section.		
					Short Term Fuel Trim	*0.90 < ST FT < 1.10*		
					Predicted catalyst temp > MinCatTemp table (degC) (refer to "Supporting Tables" tab) AND Engine Airflow > MinAirflowToWarmCatalyst table (g/s) (refer to "Supporting Tables" tab) (Based on engine coolant at the time the WarmedUpEvents counter resets to 0.) for at least 30 seconds with a closed throttle time < 180 seconds consecutively (closed throttle consideration involves having the TPS < the value as stated in the Valid Idle Period Criteria Section) . Also, in order to increment the WarmedUpEvents counter (counter must exceed 30 cal value), either the vehicle speed must exceed the vehicle speed cal or the TPS must exceed the TPS cal as stated in the Valid Idle Period Criteria section above.			
					Closed loop fueling Enabled **Please see "Closed Loop Enable Criteria" section of the "Supporting Tables" tab for details.**			
					PRNDL is in Drive Range on an Auto Transmission vehicle.			
					Idle Stable Criteria :: Must hold true from after Catalyst Idle Conditions Met to the end of test			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					MAF	*4.00 < g/s < 20.00*		
					Predicted catalyst temperature	< 800 degC		
					Engine Fueling Criteria at Beginning of Idle Period			
					The following fueling related must also be met from between 4 and 7 seconds after the Catalyst Idle Conditions Met Criteria has been met for at least 4 seconds prior to allowing intrusive control			
					Number of pre-O2 switches	>= 2		
					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			
					General Enable			
					DTC's Not Set			
					MAF_SensorFA			
					AmbPresDfltdStatus			
					IAT_SensorCircuitFA			
					ECT_Sensor_FA			
					O2S_Bank_1_Sensor_1_FA			
					O2S_Bank_1_Sensor_2_FA			
					O2S_Bank_2_Sensor_1_FA			
					O2S_Bank_2_Sensor_2_FA			
					FuelTrimSystemB1_FA			
					FuelTrimSystemB2_FA			
					EngineMisfireDetected_FA			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					EvapPurgeSolenoidCircuit_FA			
					IAC_SystemRPM_FA			
					EGRValvePerformance_FA			
					EGRValveCircuit_FA			
					CamSensor_FA			
					CrankSensorFaultActive			
					TPS_Performance_FA			
					EnginePowerLimited			
					VehicleSpeedSensor_FA			
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		
					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.		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					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			
					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	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	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.
		volatility fuel creates enough flow to generate a measurable pressure differential relative to atmospheric.			if normalized result and EWMA is passing OR			
					Time since last complete test if normalized result or EWMA is failing	≥ 10 hours		
					Estimated ambient temperature at end of drive	0 °C ≤ Temperature ≤ 34 °C		
					Estimate of Ambient Air Temperature Valid			
			When EWMA is	> 0.71 (EWMA Fail Threshold)	**Conditions for Estimate of Ambient Air Temperature to be valid:**			
			, the DTC light is illuminated.					
		After the volatility check, the vent solenoid will close. After the vent is closed, typically a build up of pressure from the hot soak begins (phase-1). The pressure typically will peak and then begin to decrease as the fuel cools. When the pressure drops (-62.27) Pa from peak pressure, the vent is then opened for 60 seconds to normalize the system pressure. The vent is again closed to begin the vacuum portion of the test (phase-2). As the fuel temperature continues to fall, a vacuum will begin forming. The vacuum will continue until it reaches a vacuum peak. When the pressure rises 62.27 Pa from vacuum peak, the test then completes. If the key is turned on while the diagnostic test is in progress, the test will abort.	The DTC light can be turned off if the EWMA is	≤ 0.35 (EWMA Re-Pass Threshold)	**1. Cold Start** Startup delta deg C (ECT-IAT)	≤ 8 °C		
			and stays below the EWMA fail threshold for 2 additional consecutive trips.		OR **2. Short Soak and Previous EAT Valid**			
					Previous time since engine off	≤ 7200 seconds		
					OR **3. Not a Cold Start and Previous EAT Valid and between Short and Long Soak**			
					Previous time since engine off	7200 seconds < Time < 25200 seconds		
					AND Must expire Estimate of Ambient Temperature Valid Conditioning Time. **"P0442: Estimate of Ambient Temperature Valid Conditioning Time" in Supporting Tables Tab.**	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.	< -5		
					OR **2. Vacuum Refueling Detected**			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					See P0454 Fault Code for information on vacuum refueling algorithm. OR **3. Fuel Level Refueling Detected** See P0464 Fault Code for information on fuel level refueling. OR **4. Vacuum Out of Range and No Refueling** See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for information on fuel level refueling. OR **5. Vacuum Out of Range and Refueling Detected** See P0451 Fault Code for information on vacuum sensor out of range and P0464 Fault Code for information on fuel level refueling. OR **6. Vent Valve Override Failed** Device control using an off-board tool to control the vent solenoid, cannot exceed during the EONV test	0.50 seconds		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					OR **7. Key up during EONV test** No active DTCs:	 FuelLevelDataFault MAF_SensorFA ECT_Sensor_FA IAT_SensorFA VehicleSpeedSensor_FA IgnitionOffTimeValid AmbientAirDefault P0443 P0446 P0449 P0452 P0453 P0455 P0496		
Evaporative Emission (EVAP) Canister Purge Solenoid Valve Circuit (ODM)	P0443	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		PT Relay Voltage	11 volts ≤ Voltage ≤ 32 volts	20 failures out of 25 samples 250 ms / sample Continuous with solenoid operation	2 trips Type B
Evaporative Emission (EVAP) Vent System Performance	P0446	This DTC will determine if a restriction is present in the vent solenoid, vent filler, vent hose or EVAP canister. This test runs with normal purge and vent valve is open.	Vent Restriction Prep Test: Vented Vacuum OR Vented Vacuum for 60 seconds Vent Restriction Test: 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	2 trips Type B
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	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	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		commanded closed for 15 seconds.					with solenoid operation	
Fuel Tank Pressure (FTP) Sensor Circuit Performance	P0451	The DTC will be set if the fuel tank vacuum sensor is out of range when it tries to re-zero prior to the phase-1 or phase-2 portions of the engine-off natural vacuum small leak test.	The tank vacuum sensor voltage is compared to a window about the nominal sensor voltage offset (~1.5 volts) Upper voltage threshold (voltage addition above the nominal voltage) Lower voltage threshold (voltage subtraction below the nominal voltage) The difference between tank vacuum sensor voltage and the nominal offset voltage is then normalized against the appropriate threshold listed above to produce a ratio between 0.0 and 1.0. This normalized re-zero ratio is then filtered with a EWMA (with 0= perfect pass and 1=perfect fail). When EWMA is , the DTC light is illuminated. The DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 2 additional consecutive trips.	 0.2 volts 0.2 volts > 0.73 (EWMA Fail Threshold) ≤ 0.40 (EWMA Re-Pass Threshold)	This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off natural vacuum small leak test. The number of times that it executes can range from zero to two per engine-off period. The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to	1 trip Type A EWMA Average run length: 6 Run length is 2 trips after code clear or non-volatile reset
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	< 0.15 volts (3 % of Vref or ~ 1681 Pa)	Time delay after sensor power up for sensor warm-up	 is 0.10 seconds	80 failures out of 100 samples	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			tank pressure sensor is 0.5 volts (~1245 Pa) to 4.5 volts (~ -3736 Pa).		ECM State ≠ crank Stops 6.0 seconds after key-off		100 ms / sample Continuous	
Fuel Tank Pressure (FTP) Sensor Circuit High Voltage	P0453	This DTC will detect a fuel tank pressure sensor signal that is too high out of range.	Fuel tank pressure sensor signal The normal operating range of the fuel tank pressure sensor is 0.5 volts (~1245 Pa) to 4.5 volts (~ -3736 Pa).	> 4.85 volts (97% of Vref or ~ -4172 Pa)	Time delay after sensor power up for sensor warm-up ECM State ≠ crank Stops 6.0 seconds after key-off	is 0.10 seconds	80 failures out of 100 samples 100 ms / sample Continuous	2 trips Type B
Fuel Tank Pressure (FTP) Sensor Circuit Intermittent	P0454	This DTC will detect intermittent tank vacuum sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event.	If an abrupt change in tank vacuum is detected the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that a refueling event occurred. If a refueling is confirmed, then the test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem. 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	P0455	This DTC will detect a weak vacuum condition (large leak or purge blockage) in the	Purge volume while Tank vacuum	> 45 liters ≤ 2740 Pa	Fuel Level System Voltage	10 % ≤ Percent ≤ 90 % 11 volts ≤ Voltage ≤ 32 volts	Once per cold start	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Detected		EVAP system. Purge valve is controlled (to allow purge flow) and vent valve is commanded closed.	After setting the DTC for the first time, 2 liters of fuel must be consumed before setting the DTC for the second time. <u>Weak Vacuum Follow-up Test</u> (fuel cap replacement test) Weak Vacuum Test failed. Passes if tank vacuum Note: Weak Vacuum Follow-up Test can only report a pass.	≥ 2740 Pa	BARO No active DTCs: <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.	≥ 70 kPa MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454 ≤ 8 °C ≤ 1000 seconds 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C	Time is dependent on driving conditions Maximum time before test abort is 1000 seconds <u>Weak Vacuum Follow-up Test</u> With large leak detected, the follow-up test is limited to 1300 seconds. Once 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	2 trips Type B
Fuel Level Sensor 1 Performance (For use on vehicles with mechanical transfer pump dual fuel tanks)	P0461	This DTC will detect a fuel sender stuck in range in the primary fuel tank.			Engine Running No active DTCs:	VehicleSpeedSensor_FA	250 ms / sample Continuous	2 trips Type B
			Fuel Level in Primary Tank Remains in an Unreadable Range too Long					
			If fuel volume in primary tank is AND Fuel volume in secondary tank	>= 21.5 liters < 4.0 liters				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			and remains in this condition for OR	87 miles.				
			After Refuel Event					
			If the secondary fuel volume changes by 14.0 liters from engine “off” to engine “on” the primary volume should change by 3.0 liters. OR		The shutdown primary tank volume + 3.0 liters must be	< 21.5 liters		
			Distance Traveled without a Primary Fuel Level Change					
			Delta Fuel Volume change over an accumulated 50 miles.	< 3 liters				
Fuel Level Sensor 1 Circuit Low Voltage	P0462	This DTC will detect a fuel sender stuck out of range low in the primary fuel tank.	Fuel level Sender % of 5V range	< 10 %	Run/Crank Voltage Run/Crank voltage goes to 0 volts at key off	11 volts ≤ Voltage ≤ 32 volts	100 failures out of 125 samples 100 ms / sample Continuous	2 trips Type B
Fuel Level Sensor 1 Circuit High Voltage	P0463	This DTC will detect a fuel sender stuck out ofrange high in the primary fuel tank.	Fuel level Sender % of 5V range	> 60 %	Run/Crank Voltage Run/Crank voltage goes to 0 volts at key off	11 volts ≤ Voltage ≤ 32 volts	100 failures out of 125 samples 100 ms / sample Continuous	2 trips Type B
Fuel Level Sensor 1 Circuit Intermittent	P0464	This DTC will detect intermittent fuel level sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event.	If a change in fuel level is detected, the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that an actual refueling event occurred. If a refueling event is confirmed, then the test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem.		This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period. The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to	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 test will report a failure if 2 out of 3 samples are failures. 100 ms / sample	
Cooling Fan 1 Relay Control Circuit (ODM)	P0480	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Engine Speed	11 volts ≤ Voltage ≤ 32 volts ≥ 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous with fan operation	2 trips Type B Not used on systems with Mechanical Fan)
Evaporative Emission (EVAP) System Flow During Non-Purge	P0496	This DTC will determine if the purge solenoid is leaking to engine manifold vacuum. This test will run with the purge valve closed and the vent valve closed.	Tank Vacuum for 5 seconds BEFORE Test time 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	2 trips Type B
Transmission Output Speed Sensor (TOSS)	P0502	No activity in the TOSS circuit	TOSS Raw Speed	<= 60 RPM	Maximum Engine Torque Minimum Engine Torque Maximum Engine Torque in Park or Neutral Minimum Engine Torque in Park or Neutral Minimum Throttle opening	 <= 8191.8 N-m >= 68.0 N-m <= 8191.9 N-m >= 90 N-m >= 3.5 %	>= 4.50 sec	Type A 1 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Minimum Engine Speed when there is a Brake DTC: P0572, P0573, P0703. **Cal Out if matches threshold with below. **	>= 1500 RPM		
					Minimum Engine Speed when there is no Brake DTC :P0572, P0573, P0703. **Cald Out by matched threshold with above. **	>= 1500 RPM		
					Maximum Engine Speed	<= 6500 RPM		
					Minimum Transmission Fluid Temperature	>= -40.0 º C.		
					Disable P0502 if PTO Active	Enabled		
					Engine Speed	<= 7500 RPM >= 200 RPM for >= 5.0 sec		
					Vehicle Speed	<= 320 MPH for >= 5.0 sec		
					Ignition Voltage Ignition Voltage	<= 32.0 volts >= 11.0 volts		
					No Active DTCs:	EngineTorqureInaccurate AcceleratorEffectivePstnValid P0503 Active this Key On		
Transmission Output Speed Sensor (TOSS)	P0503	TOSS Signal Intermittent	Loop-to-Loop change in TOSS	>= 350 RPM	Disable P0502 if PTO Active	Enabled	>= 3.25 sec	Type A 1 trips
					Engine Speed	<= 7500 RPM >= 200 RPM for >= 5.0 sec		
					Vehicle Speed	<= 320 MPH for >= 5.0 sec		
					Ignition Voltage Ignition Voltage Time since Selected Gear Range Change	<= 32.0 volts >= 11.0 volts >= 6 sec		
					Time since 4WD Range change	>= 6 sec		
					Loop-to-Loop Input Speed Change	<= 500 RPM For >= 2 Sec.		
					Raw Output Speed	> 300 RPM for >= 2 Sec.		
					Output Speed change	<= 150 RPM for >= 2 Sec.		
					Disabled For Following DTCS:	ShiftSolenoidFaults (TCM)		
Low Engine Speed Idle System	P0506	This DTC will determine if a low idle exists	Filtered Engine Speed Error	< 91.00 rpm	Baro	> 70 kPa	Diagnostic runs in	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			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		
						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 runs in	2 trips Type B
			filter coefficient	0.003	Coolant Temp	> 60 °C and < 125 °C	every 12.5 ms loop	
					Engine run time	≥ 60 sec	Diagnostic reports	
					Ignition voltage	32 ≥ volts ≥ 11	pass or fail in	
					Time since gear change	≥ 3 sec	10 sec	
					Time since a TCC mode change	> 3 sec	once all enable	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					IAT	> -20 °C	conditions are met	
					Vehicle speed	≤ 1.24 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		
						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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						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	
Brake Booster Pressure Sensor Performance	P0556	Determines if the Brake Booster Vacuum Sensor is stuck or skewed within the normal operating range by comparing the engine vacuum to the brake booster vacuum when the engine is producing a large amount of vacuum	Engine vs brake booster vacuum sensor values are compared when % throttle < value for a time period. When throttle once again > calibrated value, min and max vacuum sensor values are normalized and subtracted from a 1st order lag filter value of 1. A properly operating vacuum sensor would have a normalized result of 1 or greater. If the normalized result is greater than 1 it is considered 1. The 1st order lag filter value would be 0 in a passing system.		Throttle Area (with idle included) for time period of Ignition Voltage BrkBoostVacDiff For time period of AND Vacuum Delta Diagnostic enabled/disabled No active DTC's	<= 1.2 Percent for > 3 seconds <= 32.0 V and >= 11.0 V > 0.3 kPa >= 0.2 Seconds >= 15 kPa Enabled Fault bundles: MAP_SensorFA GetTPSR_FaultActive_TPS	Pass counter incremented when enable conditions are met, pass achieved when counter Performed every 100 msec	2 trip(s) Type B
			1st order lag fail threshold	> 0.57031				
			1st order lag re-pass threshold	< 0.65625				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Brake Booster Pressure Sensor Circuit Low Voltage	P0557	Determines if the Brake Booster Pressure Sensor circuit voltage is too low	(Brake Booster Pressure Sensor Voltage) / 5 Volts	< 2.0 percent	Brake booster diagnostic enabled/disabled Brake booster pressure sensor present	Enabled Yes	320 failures out of 400 samples Performed every 12.5 msec	2 trip(s) Type B
Brake Booster Pressure Sensor Circuit High Voltage	P0558	Determines if the Brake Booster Pressure Sensor circuit voltage is too high	(Brake Booster Pressure Sensor Voltage) / 5 Volts	> 87.0 percent	Brake booster diagnostic enabled/disabled Brake booster pressure sensor present	Enabled Yes	2000 failures out of 2400 samples Performed every 12.5 msec	2 trip(s) Type B
Cruise Control Mutil-Functon Switch Circuit	P0564	Detect when cruise control multi-function switch circuit (analog) voltage is in an illegal range	Cruise Control analog circuit voltage must be in an "illegal range" for greater than a calibratable period of time for cruise switch states 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
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	Type: C MIL: NO

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
							fail continuously for greater than 90.000 seconds	Trips: 1
Cruise Control Input Circuit	P0575	Detects rolling count or protection value errors in Cruise Control Switch Status serial data signal	If x of y rolling count / protection value faults occur, disable cruise for duration of fault		Cruise Control Switch Serial Data Error Diagnostic Enable	TRUE	10 / 16 counts	Type: C MIL: NO Trips: 1
Brake Pedal Position Sensor Circuit Range/Performance	P057B	This diagnostic monitors the Brake Pedal Position Sensor for a stuck in range failure	**DTC Fail:** Calculated brake pedal position delta and resulting filtered EWMA calculation(supporting table) is less than a value for a calibratable number of complete EWMA tests):	0.4 threshold / 2 counts	Brake Pedal Position Range Diagnostic Enable	TRUE	Performed every 25 msec	Type: A MIL: YES Trips: 1
					Ignition voltage	> 10 volts		
					EWMA Filter Value	0.3		
			DTC Pass: Calculated brake pedal position delta and resulting filtered EWMA calculation(supporting table) is greater than a value for a calibratable number of EWMA tests):	0.8 threshold / 20 counts				
					No active DTC's **Criteria to Run Complete Test:**	P057C / P057D		
					shift lever	In park at least once this key on		
					shift lever position	≠ park		
					vehicle speed accelerator pedal position	> 20 < 5		
					calculated brake pedal position delta samples	1000 samples	Each calculated difference test is a minimum of 25 seconds (1000 counts @ 25ms)	
					Fast Test To Pass Criteria:			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					calculated brake pedal position delta samples	50 samples	Each calculated difference test is a minimum of seconds (1000 counts @ 25ms)	
Brake Pedal Position Sensor Circuit Low	P057C	Detects low circuit failure when brake pedal position is below calibratable value	If x of y faults occur, default brake pedal position to zero for duration of fault	5	Brake Pedal Position Diagnostic Enable	TRUE	20 / 32 counts	Type: A MIL: YES Trips: 1
Brake Pedal Position Sensor Circuit High	P057D	Detects high circuit failure when brake pedal position is above calibratable value	If x of y faults occur, default brake pedal position to zero for duration of fault	95	Brake Pedal Position Diagnostic Enable	TRUE	20 / 32 counts	Type: A MIL: YES Trips: 1
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if the calibration check sum is incorrect	Output state invalid		PCM State	= crank or run	Diagnostic runs continuously in the Diagnostic reports a fault if 1 failure occurs on the first Diagnostic reports a fault if 5 failures occur after the first pass in	Type A 1 trips
Control Module Not Programmed	P0602	This DTC will be stored if the PCM is a service PCM that has not been programmed.	Output state invalid		PCM State	= crank or run PCM is identified through calibration as a Service PCM	Diagnostic runs at powerup	Type A 1 trips
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up does not match checksum at power-down				Diagnostic runs at powerup Diagnostic	Type A 1 trips

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
							reports a fault if 1	
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	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		
			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		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Loss or invalid message of SPI communication from the 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 be reported for all conditions	12.5 ms continuous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			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 Error is FALSE	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.
							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	2 trip Type B NO MIL
5 Volt Reference #2 Circuit	P0651	Detects a continuous or intermittent short on th 5 volt reference circuit #2	Primary Processor Vref2 < or Primary Processor Vref2 > or the difference between Primary filtered Vref2 and Primary Vref2 >	4.875 5.125 0.05		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	19 / 39 counts or 0.1875 sec continuous; 12.5 ms/count in primary processor	Trips: 1 Type: A MIL: YES
			Secondary Processor Vref2 < or Secondary Processor Vref2 >	4.875 5.125			19 / 39 counts or 15 counts continuous; 12.5 ms/count in secondary	
Powertrain Relay Control (ODM)	P0685	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	8 failures out of 10 samples 250 ms / sample Continuous	2 trips Type B
Powertrain Relay Feedback Circuit High	P0690	This DTC is a check to determine if the Powertrain relay is functioning properly.	PT Relay feedback voltage is Stuck Test:	≥ 18 volts	Powertrain relay commanded “ON” No active DTCs:	PowertrainRelayStateOn_FA	5 failures out of 6 samples 1 second / sample	2 trips Type B

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			Stuck Test: 100 ms/ sample Continous failures ≥ 4 seconds	
Fuel Pump Control Module (FPCM) Requested MIL Illumination	P069E	Monitors the FPCM MIL request line to determine when the FPCM has detected a MIL illuminating fault.	Fuel Pump Control Module Emissions-Related DTC set			Time since power-up > 3 seconds	Continuous	1 trips Type A (No MIL)
Transmission Control Module (TCM) Requested MIL Illumination	P0700	Monitors the TCM MIL request line to determine when the TCM has detected a MIL illuminating fault.	Transmission Control Module Emissions-Related DTC set			Time since power-up > 3 seconds	Continuous	1 trips Type A (No MIL)
Clutch Pedal Position Sensor Circuit Range / Performance	P0806	Detects if Clutch Pedal Position Sensor is Stuck in a range indicative of a vehicle NOT in gear, when the vehicle is determined to be in gear. Gear determination is made by verifying that engine RPM/ Vehicle Speed (N/V) ratio represents a valid gear.	Filtered Clutch Pedal Position Error when the vehicle is determined to be in gear	> 1 %	N/V Ratio Transfer Case vehicle speed Engine Torque Clutch Pedal Position **OR** Clutch Pedal Position **No Active DTCs:** ClutchPositionSensorCktLo FA ClutchPositionSensorCktHi FA CrankSensorFA VehicleSpeedSensor_FA	Must match actual gear (i.e. vehicle in gear) Not in 4WD Low range > 0.0 MPH > **EngTorqueThreshold** Table < **ResidualErrEnableLow** Table > ***ResidualErrEnableHigh*** *Table*	25 ms loop Continuous	1 Trip(s) Type A
Clutch Pedal Position Sensor Circuit Low	P0807	Detects Continuous Circuit Short to Low or Open	Clutch Position Sensor Circuit for	< 4 % of Vref 200 counts out of 250 samples	Engine Not Cranking System Voltage	> 9.0 Volts	25 ms loop Continuous	1 Trip(s) Type A
Clutch Pedal Position Sensor Circuit High	P0808	Detects Continuous Circuit Short to High	Clutch Position Sensor Circuit for	> 96 % of Vref 200 counts out of 250 samples	Engine Not Cranking System Voltage	> 9.0 Volts	25 ms loop Continuous	1 Trip(s) Type A

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
Clutch Pedal Position Not Learned	P080A	Monitor for Valid Clutch Pedal Fully Applied Learn Position values	Fully Applied Learn Position	< 9.0 %	OBD Manufacturer Enable Counter	= 0	250 ms loop Continuous	1 Trip(s) Type A
			OR					
			Fully Applied Learn Position	> 30.0 %				
Skip Shift Solenoid Control Circuit Low (Manual Transmission Only)	P080C	This DTC checks for an open and shorted low circuit while the device is commanded off.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	5 failures out of 6 samples	2 trips Type B
					Engine Speed	> 600 RPM	250 ms / sample	
							Continuous with device off	
Skip Shift Solenoid Control Circuit High (Manual Transmission Only)	P080D	This DTC checks for a shorted high circuit while the device is commanded on.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	5 failures out of 6 samples	2 trips Type B
					Engine Speed	> 600 RPM	250 ms / sample	
							Continuous with device	
Traction Control Torque Request Circuit	P0856	Determines if torque request from the EBTCM is valid	**With GMLAN:**		**With GMLAN:**		**With GMLAN:**	1 trip Type C
			Serial Communication 2's complement message - ($140 for PPEI2 or $1C7/$1C9 for PPEI3 engine torque or $1CA for PPEI3 axle torque)	Message <> 2's complement of message	Serial communication to EBTCM (U0108)	No loss of communication	Count of 2's complement values not equal >= 10	
					Power Mode Engine Running	= Run = True		
			OR		Status of traction in GMLAN message ($380 for PPEI2 or $4E9 for PPEI3)	= Traction Present	**OR** 6 rolling count failures out of 10 samples	
			Serial Communication message ($140 for PPEI2 or $1C7/$1C9 for PPEI3 engine torque or $1CA for PPEI3 axle torque) rolling count value	Message rolling count value <> previous message rolling count value plus one				
			OR					
			Too many minimum limit torque request transitions occur from TRUE to FALSE to TRUE within a time period	Requested torque intervention type toggles from not increasing request to increasing request			>= 3 multi-transitions out of 5 samples	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Torque request greater than allowed				>= 6 out of 10 samples above 200 Nm Performed every 25	
			With PWM: PWM Duty cycle **OR** PWM Duty cycle	 < 5 Pct > 95 Pct	**With PWM:** Traction Status for PWM ($2B3C Class2 message) Engine Run Time	 = Traction Present > 2 Seconds	**With PWM:** 12 failures out of 30 Performed every 50 msec	
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	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.
						MAF_SensorCircuitFA CrankSensorFA ECT_sensor_FA ECT Sensor FP IAT SensorFA IAT SensorCircuitFP CylDeacSystemTFTKO		
EngineMetal OvertempActive	P1258	The objective of the algorithm is to protect the engine in the event of engine metal overtemperature, mainly due to loss of coolant	Engine Coolant For	≥ 129 °C ≥ 10 seconds	Engine Run Time If feature was active and it set the coolant sensor fault then feature will be enabled on coolant sensor fault pending on the next trip	≥ 10 Seconds	Fault present for ≥ 0 seconds	1 trips Type A
ABS Rough Road malfunction	P1380	This diagnostic detects if the ABS controller is indicating a fault, and misfire is present. When this occurs, misfire will continue to run.	GMLan Message: "Wheel Sensor Rough Road Magnitude Validity"	= FALSE	Vehicle Speed Engine Speed Engine Load RunCrankActive 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"
ABS System Rough Road Detection Communication Fault	P1381	This diagnostic detects if the rough road information is no longer being received from the ABS controller, and misfire is present. When this occurs, misfire will continue to run.	Loss of GMLan Message: "Wheel Sensor Rough Road Magnitude"	= FALSE	Vehicle Speed Engine Speed Engine Load RunCrankActive Active DTC	VSS ≥ 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"
Cold Start Emissions Reduction System Fault	P1400	Model based test computes power from exhaust flow and thermal energy resulting from elevated idle speed and retarded spark advance. Detects if the cold start emission reduction system has failed resulting in the delivered power being out of range.	Average desired accumulated exhaust power - Average estimated accumulated exhaust power OR Average desired accumulated exhaust power - Average estimated accumulated exhaust power (EWMA filtered)	< -32.00 KJ/s (high RPM failure mode) > 1.60 KJ/s (low RPM failure mode)	Cold Start Emission Reduction Strategy Is Active. The strategy is considered active if either the Spark cat light off or Idle cat light off strategies are considered active. Spark CLO is considered active when the CatLightOffDesiredSparkRetard (function of idle RPM and air per cylinder and scaled based on coolant and engine run time) <= 11.00 degrees of Spark Idle CLO is considered active if the desired RPM exceeds a base RPM value (function of coolant) plus an RPM offset. The amount of RPM offset to be considered catalyst light off is also a function of coolant temperature and gear state. Refer to "Supporting Tables" for details.		Runs once per trip when the cold start emission reduction strategy is active Frequency: 100ms Loop Test completes after 10 seconds of accumulated qualified data	Type A 1 Trip(s)
					Vehicle Speed	< 1.24 MPH		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					OBD Manufacturer Enable Counter	0		
					Throttle Position	< 1.0 percent		
					A change in throttle position (tip-in/tip-out) will initiate a delay in the calculation of the average qualified residual value. When the delay timer > 5.00 seconds the diagnostic will continue the calculation.			
					For Manual Transmission vehicles, the clutch must be fully engaged. Clutch Pedal Position < 15% OR The clutch must be fully disengaged. Clutch Pedal Position > 88%			
					General Enable			
					DTC's Not Set			
					MAF_SensorFA			
					MAP_SensorFA			
					IAT_SensorCircuitFA			
					IAT2_SensorCircuitFA			
					ECT_Sensor_FA			
					CrankSensorFaultActive			
					IAC_SystemRPM_FA			
					TPS_FA			
					VehicleSpeedSensor_FA			
					EngineMisfireDetected_FA			
					IgnitionOutputDriver_FA			
					ControllerProcessorPerf_FA			
					5VoltReferenceA_FA			
					5VoltReferenceB_FA			
					FuelInjectorCircuit_FA			
					TransmissionEngagedState_FA			
					Clutch Sensor FA			
					P050A (ColdStrt_IAC_SysPerf)			
					P050B (ColdStrtIgnTmngPerf)			
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	2 trips Type B
			Transmission engine speed protection	not equal to 2's complement of transmission engine speed request + Transmission alive rolling count	Engine run time	0.50 sec		
					# of Protect Errors	10 protect errors out of 10 samples		
					# of Alive Rolling Errors	6 rolling count errors out of 10 samples		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					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 >	7.568 %.		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
			or The actual Throttle position and throttle model differ by >	7.568 %.				Type: A
					Engine Running or Ignition Voltage > and Ignition Voltage >	11 5.4		MIL: YES
					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)			
		Detect throttle control is driving the throttle in the incorrect direction	Thottle Position >	39.761 %.	(Throttle is being Controlled and	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	0.1375 sec continuous	
					TPS minimum learn is active) or			
					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 %			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 on secondary processor	
					Engine Running or Ignition Voltage > and Ignition Voltage >	11 5.4		
					and Throttle is being Controlled			
					and Communication Fault (SPI is not set)			
					and TPS minimum learn is not active			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Ignition voltage failure is false (P1682)			
Ignition Voltage Correlation	P1682	Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage & the Powertrain Relay Ignition Voltage	|Run/Crank – 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
Fuel Level Sensor 2 Performance (For use on vehicles with mechanical transfer pump dual fuel tanks)	P2066	This DTC will detect a fuel sender stuck in range in the secondary fuel tank.			Engine Running No active DTCs:	VehicleSpeedSensor_FA	250 ms / sample Continuous	2 trips Type B
			Fuel Level in Secondary Tank Remains in an Unreadable Range too Long					
			If fuel volume in primary tank is AND Fuel volume in secondary tank and remains in this condition for OR	>= 21.5 liters < 4.0 liters 100 miles				
			Fuel Level is in a Readable Range for both Primary and Secondary Tanks too Long					
			Volume in Primary Tank AND Volume in Secondary Tank and remains in this condition for OR	< 21.5 liters > 4 liters 2400 seconds				
			Distance Traveled without a Secondary Fuel Level Change					
			If the vehicle is driven a distance of 100 miles without the secondary fuel level changing by 3 liters, then the sender must		Volume in Secondary Tank	>= 4.0 liters		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			be stuck.					
Fuel Level Sensor 2 Circuit Low Voltage	P2067	This DTC will detect a fuel sender stuck out of range low in the secondary fuel tank.	Fuel level Sender % of 5V range	< 10 % Run/Crank voltage goes to 0 volts at key off	Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	100 failures out of 125 samples 100 ms / sample Continuous	2 trips Type B
Fuel Level Sensor 2 Circuit High Voltage	P2068	This DTC will detect a fuel sender stuck out of range low in the secondary fuel tank.	Fuel level Sender % of 5V range	> 60 % Run/Crank voltage goes to 0 volts at key off	Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	100 failures out of 125 samples 100 ms / sample Continuous	2 trips Type B
Post Catalyst Fuel Trim System Low Limit Bank 1 (Too Rich)	P2096	Determines if the post catalyst O2 sensor based fuel control system has been unable to adapt to a rich exhaust gas condition that results in an emissions correlated failure.	Rich Fail Counts: Note: If the fail count threshold is reached, a fail is reported and the diagnostic will not report again until the next trip. If the sample count threshold is reached before a fail is reported, a pass is reported, the counters are reset to 0, and evaluation starts again.	> 500 out of 1000 samples Note: 10 sample counts = 1 second	The following must be true for:	> 0.0 sec	Frequency: Continuous Monitoring in 100ms loop	2 Trip(s) Type B
					PTO:	NOT active		
					Intrusive diagnostic fuel control:	FALSE (i.e. catalyst monitor diagnostic)		
					Long Term Secondary Fuel Trim Enabled	Please see "**Long Term Secondary Fuel Trim Enable Criteria**" in Supporting Tables		
					Ambient air pressure	>= 70 kPa		
					Engine air flow	>= 0 g/s and <= 10000 g/s		
					Intake manifold air pressure	>= 0 kPa and <= 200 kPa		
					Induction air temperature	>= -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			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					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).			
		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		Note: When either the filtered post O2 voltage or the integral offset returns to the above defined windows, the diagnostic will		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			If HV has caused the diagnostic to stop evaluation, evaluation will resume when the purge valve closes for	>= 20.0 sec		[illegible] immediately resume evaluation.		
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	2 Trip(s) Type B
		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**		
		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		Frequency: Continuous Monitoring in 100ms loop	2 Trip(s) Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					O2S_Bank_2_Sensor_1_FA O2S_Bank_2_Sensor_2_FA			
		Additional notes, strategy and enable requirements: same as bank 1 rich fault (see P2096)						
		Re-Pass Feature: same for P2096, P2097, P2098, P2099 (see P2096 for details)						
		High Vapor (HV) Delay Feature						
		The diagnostic is at risk of reporting a false fail when excessively High Vapor (HV) conditions that impact the fuel control system are present. This HV condition is indicated when the criteria to the right are met. In this situation, the 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)		Frequency: Continuous Monitoring in 100ms loop	2 Trip(s) Type B
					NOTE: The Bank1 faults listed in the P2096 section are replaced by:			
					A/F Imbalance Bank2 O2S_Bank_2_Sensor_1_FA O2S_Bank_2_Sensor_2_FA			
		Additional notes, strategy and enable requirements: same as bank 1 lean fault (see P2097)						
		Re-Pass Feature: same for P2096, P2097, P2098, P2099 (see P2096 for details)						
		High Vapor (HV) Delay Feature: same as rich fault for bank 2 (see P2098)						
Throttle Actuator Control - Position Performance	P2101	Detect a throttle positioning error	The throttle model and actual Throttle position differ by >	7.568 %.		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	15 / 15 counts; 12.5 msec/count in the primary processor	Trips: 1 Type: A MIL: YES
			or The actual Throttle position and throttle model differ by >	7.568 %.				
					Engine Running or Ignition Voltage > and Ignition Voltage >	11 5.5		
					and Throttle is being Controlled			
					and Communication Fault (SPI is not set)			
					and TPS minimum learn is not active			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					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 < or Secondary APP1 Voltage >	0.463 4.75		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions No 5 V reference #2 error No 5 V reference #2 DTC (P0651)	19 / 39 counts or 14 counts continuous; 12.5 msec/count in the secondary processor	Trips: 1 Type: A MIL: YES
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 Type: A MIL: YES
			Secondary APP1 Voltage <	0.463		No 5 V reference #2 error No 5 V reference #2 DTC (P0651)	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the secondary	
APP1 Circuit High	P2123	Detects a continuous or intermittent short in APP1 circuit on both processors or just the primary processor	Primary APP1 Voltage >	4.75		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	19 / 39 counts or 14 counts continuous; 12.5 ms/count in the primary	Trips: 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 APP2 Voltage < or Secondary APP2 Voltage >	0.325		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will	19 / 39 counts or 14 counts	Trips: 1 Type:

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		secondary processor but sensor is in range on the primary processor		2.6		be reported for all conditions No 5 V reference #1 error No 5 V reference #1 DTC (P0641)	continuous; 12.5 msec/count in the secondary processor	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 (TP) Sensor 1-2 Correlation	P2135	Detects a continuous or intermittent correlation fault between TPS sensors #1 and #2 on primary or secondary processor	Difference between TPS1 displaced and TPS2 displaced >	6.998 % offset at min. throttle position with a linear threshold to 9.698 % at max. throttle position		Run/Crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	79 / 159 counts or 58 counts continuous; 3.125 ms/count in the primary processor	Trips: 1 Type: A MIL: YES
			Difference between (normalized min TPS1) and (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;	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			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)	continuous; 12.5 ms/count in the secondary processor	
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)		
Cooling System Performance	P2181	This DTC detects thermostat malfunction (i.e. stuck open)	Engine Coolant Temp (ECT) is ≤ target temperature of 75 Deg C and normalized ratio is ≤ than 2. When above is present for more than 5 seconds, fail counts start.		No Active DTC's	MAF_SensorFA IAT_SensorFA	30 failures out of 90 samples 1 sec /sample	2 trips Type B
			Engine total airgrams is accumulated when 17 ≤ AirFlow ≤ 450 grams per second.			THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA	Once per ignition key cycle	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
			Ratio Definition: Current temp difference between ECT and RCT minus PwrUp difference divided by total airgrams. Note: Minimum total airgrams is 500.0 grams.		Engine not run time 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		
Minimum Throttle Position Not Learned	P2176	TP sensors were not in the minmum learn window after multiple attempts to learn the minimum.	During TPS min learn on the Primary processor, TPS Voltage > or During TPS min learn on the Secondary processor, TPS Voltage > and Number of learn attempts > AND TPS2 Voltage > On the Primary processor OR TPS1 Voltage > AND TPS2 Voltage > On the Secondary processor	0.935 0.935 10 counts 1.789 1.689 1.789	No TPS circuit errors No TPS circuit faults P1682 is not active Minimum TPS learn active Throttle de-energized No TPS circuit faults PT Relay Voltage >	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions 5.5	2.0 secs continuous	Trips: 1 Type: A MIL: YES
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. Engine total airgrams is accumulated when 17 ≤ AirFlow ≤ 450 grams per second.		No Active DTC's	MAF_SensorFA IAT_SensorFA THMR_RCT_Sensor_Ckt_FA	30 failures out of 90 samples 1 sec /sample Once per ignition key cycle	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						THMR_ECT_Sensor_Ckt_FA		
			Ratio Definition: Current temp difference between ECT and RCT minus PwrUp difference divided by total airgrams. Note: Minimum total airgrams is 500.0 grams.		Engine not run time	≥ 1800 seconds		
					Engine run time	90 ≤ Time ≤ 1370 seconds		
					Fuel Condition	Ethanol ≤ 87%		
					ECT at Power Up	-7.0 ≤ ECT ≤ 70.0 °C		
					IAT min	-7°C ≤ IAT ≤ 55°C.		
					Airflow	17.0 ≤ Airflow ≤ 450.0 GPS		
Air Fuel Imbalance Bank 1	P219A	Determines if the air-fuel delivery system is imbalanced by monitoring the pre and post catalyst O2 sensor voltage characteristics.	Bank 1 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 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.	2 Trip(s) Type B
					ECT	> -20 degC		
					Engine Run Time	>= 10 seconds		
					Engine speed	*1250 <= rpm <= 3750*		
			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*		
		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 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*		
					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	The AFIM Filtered Length Ratio is the difference between the measured String Length and a 17x17 table lookup	The Quality Factor (QF) calibrations are located in a 17x17 lookup table versus engine speed	No EngineMisfireDetected_FA			
					No MAP_SensorFA			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		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.	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.	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.	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 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		
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. To improve S/N, pre-catalyst O2 voltages between 1000 and 0 millivolts are ignored.	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	2 Trip(s) Type B
					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*		
			AND		Mass Airflow	*10.0 <= g/s <= 510.0*		
			Bank 2 Filtered Post catalyst O2 voltage is NOT between		Air Per Cylinder	*120 <= mg/cylinder <= 680*		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		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.	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 change during the current 3.13 sec sample period is	*8192 mg/cylinder*	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.	
					% 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 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.	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 Note: This protects against false diagnosis during severe transient	*< 500 g/s* *Note: This protects against false diagnosis during severe transient maneuvers*		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					diagnosis during severe transient maneuvers.	maneuvers.		
					Data collection is suspended under the following circumstances:	- for 0.5 seconds after AFM transitions - for 0.5 seconds after Closed Loop transitions from Off to On - for 0.5 seconds after purge transitions from Off to On or On to Off - for 0.5 seconds after the AFIM diagnostic transitions from Disabled to Enabled		
Fuel Conductivity Out Of Range (water in fuel)	P2269	Detects the presence of High Conductivity Fuel (e.g. water in fuel) via a specific range of sensor frequency. High conductivity in the fuel causes a significant upward shift in the sensor's output frequency.	Flex Fuel Sensor Output Frequency	> 185 Hertz	Powertrain Relay	> 11.0 Volts < 32.0 Volts	50 failures out of 63 samples 100 ms loop Continuous	1 trip(s) Type A
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 B1S2 Failed this key cycle System Voltage	TPS_ThrottleAuthorityDefaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013B, P013E, P013F, P2270 or P2271 10.0 volts < system voltage< 32.0 volts	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	2 trips Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					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 1 Sensor 2	P2271	This DTC determines if the post catalyst O2 sensor is stuck in a normal rich voltage range and thereby can no longer be used for post oxygen sensor fuel control or for catalyst monitoring. The diagnostic is an intrusive test which requests the DFCO mode to achieve the required lean threshold.	Post O2 sensor cannot achieve the lean threshold voltage. AND The Accumulated mass air flow monitored during the Stuck Rich Voltage Test is greater than the threshold before the above voltage threshold is met.	1) Post O2S signal > 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	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	2 trips Type B
					B1S2 Failed this key cycle	P013A, P013B, P013E, P013F or P2270		
					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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					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 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	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed	2 trips Type B
						ECT_Sensor_FA IAT_SensorFA		
						MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA		
						EngineMisfireDetected_FA		
						EthanolCompositionSensor_FA		
					B2S2 Failed this key cycle	P013C, P013D, P014A, P014B, P2272 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		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		achieve the required lean 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		
					B2S2 Failed this key cycle	P013C, P013D, P014A, P014B or P2272		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid, See definition of **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))		

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	Enabled	>= 16 Protect errors during key cycle	2 trip(s) Type B
			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		Power Mode	= Run		
			RAM Error - Internal ECU fault	Transmission torque request value or request type dual store not equal	Engine Running Run/Crank Active	= True > 0.50 Sec	>= 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	
Torque Management Request Input Signal B	P2548	Determines if the performance launch torque request is valid	**Protect error** - Serial Communication message - ($1C8 Message)	Message <> two's complement of message	Diagnostic enabled/disabled	Enabled		2 trip(s) Type B
					Run/Crank Active and Above minimum voltage threshold	> 0.50 Sec	>= 10 Protection errors during key cycle	
			OR					
			Rolling count error - Serial Communication message ($1C8) rolling count value	Message <> previous message rolling count value + one	Voltage No serial communication loss to EBTCM (U0121)	> 6.00 Volts	>= 3 Rolling count errors out of 10 samples	
							Performed every 100 msec	
ECM/PCM Internal Engine Off Timer Performance	P2610	This DTC determines if the engine off timer does not initialize or count properly. Clock rate test: Checks the accuracy of the 1 second timer by comparing it	Initial value test: Initial ignition off timer value	< 0 seconds	ECM is powered down		Initial value test: 3 failures 1.375 sec / sample	2 trips Type B
			OR Initial ignition off timer value	> 10 seconds	IAT Temperature	-40 °C ≤ Temperature ≤ 125 °C		DTC sets on next key cycle if

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
		second timer by comparing it with the 12.5 ms timer	Clock rate test: Time between ignition off timer increments Time between ignition off timer increments Time since last ignition off timer increment Current ignition off time < old ignition off time Current ignition off timer minus old ignition off timer	< 0.8 seconds > 1.2 seconds ≥ 1.375 seconds ≠ 1			Clock rate test: 8 failures out of 10 samples 1 second / sample test runs once each key-off	failure detected
Engine Serial Number (ESN) Not Programmed or Incompatible (OBD_HD >14K only)	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
Deactivation System Performance	P3400	Detects a "failed to deactivate" condition when Deactivation Mode allowed:	ABS(Measured MAP – MAP Model 2) Filtered **AND** ((Measured MAP – MAP Model 2) filtered) (*stored from previous all-Cylinder mode event*) - ((Measured MAP – MAP Model 2) filtered) (*current*)	< -8 kPa > 10 kPa	**DIAGNOSTIC ENABLE CONDITIONS** Total filtered residual weight factors ECT IAT Engine RPM **CYLINDER DEACTIVATION ENABLE CONDITIONS** (Conditions below must be met for >= 0.25 seconds before cylinder deactivation will begin) Engine running Engine RPM Engine coolant Ignition voltage Pedal Commanded Throttle Area Brake booster vacuum Engine oil temp	>= 0.1 factor > -7 and < 125 Deg C > -20 and < 125 Deg C > 450 and < 8000 RPM MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM. See table IFRD Residual Weighting Factors > 60.0 seconds > **EngSpeedLwrLimitEnableTable** AND < **EngSpeedUprLimitEnableTable** - Details on Supporting Tables Tab (P3400 Section) >= 78.0 and <= 126.5 Deg C >= 11.0 and <= 32.0 Volts < 6 Percent >= 45.0 kPa >= 18 and <= 130 Deg C	100 cylinder deactivation lag residual failures out of 200 samples Performed once every 100 msec	2 trip(s) Type B

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					Transmission gear	HalfCylDisabledTransGr and HalfCylDisabledTransGrDeviceControl (when in device control) - See details on Supporting Tables Tab (P3400 Section)		
					Vehicle speed	>= 14 MPH		
					FCO not active for	>= 3.0 Seconds		
					Time since last cylinder deac mode event	>= 3.0 Seconds		
					Gear shift	Not currently in progress		
					AC Clutch transition	Not currently in progress		
					Tip In Bump	Not active		
					Accelerator pedel delta	<= 50.0 Percent in 12.5 ms		
					Engine oil pressure	>= 172 and <= 470 kPa		
					Filtered engine vacuum	> AllCylToHalfCylVacuum or EcoAllCylToHalfCylVacuum (in Eco mode) - See details on Supporting Tables Tab (P3400 Section) for 0.0 sec.		
					PRNDL state	HalfCylDisabledPRNDL and HalfCylDisabledPRNDLDeviceControl tables (when in device control) - See details on Supporting Tables Tab (P3400 Section)		
					Oil aeration present	Aeration enabled by engine RPM > 3100 for 10 seconds, disabled by engine RPM < 3000 for 50 seconds		
					After exiting deac mode, must be in all cylinder mode for	>= 60 seconds		
					DFCO mode	Not currently in DFCO		
					Fuel shut off mode other than DFCO	Not currently in fuel shut-off		
					ETC Power management mode	Not active		
					Heater performance	Not in Heater Performance Mode		
					POSD Intrusive	POSD diagnostic not active		
					POPD Intrusive	POPD diagnostic not active		
					Low range 4WD	Not in Low Range 4WD		
					AFM is disabled at high percent ethanol	Ethanol concentration > 95 % disables AFM. Once disabled, ethanol concentration must be <		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						85 % to re-enable		
					If feature is enabled, AFM is allowed only when percent ethanol learn is not in progress			
						Feature is Disabled		
					IF DEACTIVATED, ANY OF THE CONDITIONS BELOW WILL FORCE CYLINDER REACTIVATION			
					If deactivation mode is active for	>= 480 seconds		
					then reactivation will occur if:			
						>= 600 seconds		
					Deac mode active			
					OR			
					Delta vacuum	> 5 or < -5 kPa		
					Engine RPM	> **EngSpeedLwrLimitDisableTable** AND < **EngSpeedUprLimitDisableTable** - Details on Supporting Tables Tab (P3400 Section)		
					Engine power limited mode	Active		
					Pedal Commanded Throttle Area	> 6 Percent		
					Piston protection	Active		
					Engine oil temperature	< 18 or > 130 Deg C		
					Engine oil pressure	< 172 or > 470 kPa		
					Oil aeration present	Aeration enabled by engine RPM > 3100 for 10 seconds, disabled by engine RPM < 3000 for 50 seconds		
					Engine metal overtemp protection	Active		
					Accelerator pedel delta	<= 50.0 percent in 12.5 ms		
					In device control only, if PNDRL in Park or Neutral, vehicle speed	<= 5.0 MPH		
					Transmission gear	HalfCylDisabledTransGr and HalfCylDisabledTransGrDeviceControl (when in device control) - See details on Supporting Tables Tab (P3400 Section)		
					PRNDL state	HalfCylDisabledPRNDL and HalfCylDisabledPRNDLDeviceControl tables (when in device control) - See details on		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						control). See details on Supporting Tables Tab (P3400 Section)		
					Ignition voltage	< 11.0 or > 32.0 Volts		
					Engine coolant	>= 78.0 and <= 126.5 Deg C		
					Vehicle speed	< 5 MPH		
					Brake booster vacuum	< 40.0 kPa		
					Filtered engine vacuum	> HalfCylToAllCylVacuum or EcoHalfCylToAllCylVacuum (in Eco mode) - See details on Supporting Tables Tab (P3400 Section) for 0 sec.		
					ETC Power management mode	Active		
					Converter overtemp protect	Active		
					Hot coolant mode	Active		
					Engine running	= False		
					Engine overspeed protection	Active		
					Engine metal overtemp protect	Active		
					Cat. temp low	Active		
					POSD Intrusive	Active		
					FWD	In low range		
					Engine misfire	Detected		
					Heater performance	Active		
					POPD Intrusive	Active		
					No active DTC's	Fault bundles: Map_SensorFA VehicleSpeedSensorError ECT_Sensor_FA EOP_Sensor_FA PowertrainRelayFault BrakeBoosterSensorFA CrankSensorFA CamSensorFA IAT_SensorFA CylnderDeacDriverTFTKO FourWheelDriveLowStateValid EngineTorqueEstInaccurate TransmissionGearDefaulted EnginePowerLimited		
Cylinder 1 Deactivation Solenoid Control Circuit	P3401	Checks the Solenoid Control Circuit electrical integrity for cylinder #1	The ECM detects that commanded state of driver and actual state of the control circuit do not match. (Short to ground, short to voltage, open circuit)		Engine RPM	>= 400.0 RPM	20 failures out of 25 samples	2 trip(s)
					Ignition Voltage	<= 32.0 and >= 11.0 Volts		Type B
					Diagnostic enabled/disabled			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
						Enabled	Performed every 250 msec	
Cylinder 4 Deactivation Solenoid Control Circuit	P3425	Checks the Solenoid Control Circuit electrical integrity for cylinder #4	The ECM detects that commanded state of driver and actual state of the control circuit do not match. (Short to ground, short to voltage, open circuit)		Engine RPM Ignition Voltage Diagnostic enabled/disabled	>= 400.0 RPM <= 32.0 and >= 11.0 Volts Enabled	254 failures out of 25 samples Performed every 250 msec	2 trip(s) Type B
Cylinder 6 Deactivation Solenoid Control Circuit	P3441	Checks the Solenoid Control Circuit electrical integrity for cylinder #6	The ECM detects that commanded state of driver and actual state of the control circuit do not match. (Short to ground, short to voltage, open circuit)		Engine RPM Ignition Voltage Diagnostic enabled/disabled	>= 400.0 RPM <= 32.0 and >= 11.0 Volts Enabled	254 failures out of 25 samples Performed every 250 msec	2 trip(s) Type B
Cylinder 7 Deactivation Solenoid Control Circuit	P3449	Checks the Solenoid Control Circuit electrical integrity for cylinder #7	The ECM detects that commanded state of driver and actual state of the control circuit do not match. (Short to ground, short to voltage, open circuit)		Engine RPM Ignition Voltage Diagnostic enabled/disabled	>= 400.0 RPM <= 32.0 and >= 11.0 Volts Enabled	254 failures out of 25 samples Performed every 250 msec	2 trip(s) Type B
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures	≥ 5 counts	CAN hardware is bus OFF for	> 0.1125 seconds	Diagnostic runs in 12.5 ms loop	2 Trip(s)
			out of these samples	≥ 5 counts	Diagnostic enable timer	> 3.0000 seconds		Type B
Lost Communication With TCM	U0101	This DTC monitors for a loss of communication with the transmission control module	Message is not received from controller for this many counts	12 counts	Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	The fail diagnostic runs in the 6.25 ms loop with pass conditions reported to the DFIR in the 1000ms	2 Trip(s)
			out of these samples	12 counts	Power mode is RUN			Type B
					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		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL illum.
					A message has been selected to monitor.			
Lost Communication With Fuel Pump Control Module	U0109	This DTC monitors for a loss of communication with the fuel pump control module	Message is not received from controller for this many counts	12 counts	Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	The fail diagnostic runs in the 6.25 ms loop with pass conditions reported to the DFIR in the 1000ms	2 Trip(s)
			out of these samples	12 counts	Power mode is RUN			Type B
					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	> 5 seconds		
					A message has been selected to monitor.			
Lost Communication With Anti-Lock Brake System (ABS) Control Module	U0121	This DTC monitors for a loss of communication with the ABS control module.	Message is not received from controller for this many counts	12 counts	Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	The fail diagnostic runs in the 6.25 ms loop with pass conditions reported to the DFIR in the 1000ms	1 Trip(s)
			out of these samples	12 counts	Power mode is RUN			Type C
					Communication bus is not OFF			**Special Type C**
					or is typed as a C code			
					Normal Communication is enabled			
					Normal Transmit capability is TRUE			
					The diagnostic system is not disabled			
					The bus has been on for	> 5 seconds		

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

16 OBDG06 Diagnostic Supporting Tables - ECM

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_Filt LoThresh		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_Filt HiThresh		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_Int OffLoThresh		-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_Int OffHiThresh		105	105	105	105	355	355	355	355	355	355

P2096, P2097, P2098, P2099 Post O2 Filt Coefficient

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

P0068: MAP / MAF / TPS 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

16 OBDG06 Diagnostic Supporting Tables - ECM

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

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

16 OBDG06 Diagnostic Supporting Tables - ECM

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

P219B — **KtOXYD_K_AFIM_QualFactor2 (Continued…)**

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

Tables supporting Brake Pedal Position Sensor Diagnostic

P057B

CmpltTestPointWeight

Axis	0.00	0.05	0.08	0.25	0.35	0.45	0.55	0.75	1.00
Curve	0.0	0.1	0.4	1.0	1.0	1.0	1.0	1.0	1.0

FastTestPointWeight

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

Tables supporting Clutch Diagnostics:

P0806

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

Axis	0	6.2485	12.497	18.7455	24.994	31.2425	37.491	43.7395	49.988	56.2365	62.485	68.7335	74.982	81.2305	87.479	93.7275	99.976
Curve	30.0	30.0	30.0	30.0	30.0	38.0	68.0	80.0	80.0	85.0	-8192.0	-8192.0	-8192.0	-8192.0	-8192.0	-8192.0	-8192.0

P0806

ResidualErrorEnableLow Table — **axis is Gear**

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

P0806

ResidualErrorEnableHigh Table — **axis is Gear**

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

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_Cell00_PurgOnAirMode5	CeFADR_e_Cell01_PurgOnAirMode4	CeFADR_e_Cell02_PurgOnAirMode3	CeFADR_e_Cell03_PurgOnAirMode2	CeFADR_e_Cell04_PurgOnAirMode1	CeFADR_e_Cell05_PurgOnAirMode0	CeFADR_e_Cell06_PurgOr	CeFADR_e_Cell07_PurgOr	CeFADR_e_Cell08_PurgOffAirMode5
FASD Cell Usage	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurgeCell	CeFADD_e_SelectedPurge	CeFADD_e_SelectedPurge	CeFADD_e_SelectedNonPurgeCell
FASD Enabled In Cell?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Cell I.D.	CeFADR_e_Cell09_PurgOffAirMode4	CeFADR_e_Cell10_PurgOffAirMode3	CeFADR_e_Cell11_PurgOffAirMode2	CeFADR_e_Cell12_PurgOffAirMode1	CeFADR_e_Cell13_PurgOffAirMode0	CeFADR_e_Cell14_PurgOffIdle	CeFADR_e_Cell15_PurgOffDecel
FASD Cell Usage	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_SelectedNonPurgeCell	CeFADD_e_NonSelectedCell
FASD Enabled In Cell?	Yes	Yes	Yes	Yes	Yes	Yes	NO

P1400 Detail

KnIDLC_T_ECT_Axis

Coolant Temperature	-11	-10	5	7	8	17	38	39	100

KaIDLC_n_CLO_ThrshOfst[CilDLR_DR]

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

KaIDLC_n_CLO_ThrshOfst[CilDLR_PN]

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

KaIDLC_n_EngDsrdBase[CilDLR_PN]

Coolant Temperature	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Base RPM	850	850	850	850	850	825	780	650	650	600	550	550	550	550	550	550	550

KaIDLC_n_EngDsrdBase[CilDLR_DR]

Coolant Temperature	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Base RPM	850	850	850	850	850	825	780	650	650	600	550	550	550	550	550	550	550

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

SCIAP1 Residual Weight Factor based on RPM

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

SCIAP2 Residual Weight Factor based on RPM

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

Boost Residual Weight Factor based on % of Boost

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

Supercharger Intake Flow Rationality Diagnostic Failure Matrix

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

Supercharger Intake Flow Rationality Diagnostic Failure Matrix (Continued....)						
DTC Set	TPS Model Failure	MAF Model Failure	MAP 1 Model Failure	MAP 2 Model Failure	SCIAP 1 Model Failure	SCIAP 2 Model Failure
P1101	T	T	F	T	T	F
P1101	T	T	F	T	T	T
P0121	T	T	T	F	F	F
P1101	T	T	T	F	F	T
P0121	T	T	T	F	T	F
P1101	T	T	T	F	T	T

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

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

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

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

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

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

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

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

	IAT Range Low	Hi	-40	-28	-16	-4	8	20	32	44	56	68	80
Primary	10.0 ° C	54.5 ° C	11149	11149	11149	11149	11149	10312	9474	8637	7800	6962	6125
Alternate	-7.0 ° C	10.0 ° C	11022	11022	11022	9957	8892	7826	6761	5696	4630	4630	4630

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

(For applications with a two coolant sensors)

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

	IAT Range Low	Hi	-40	-28	-16	-4	8	20	32	44	56	68	80
Primary	10.0 ° C	54.5 ° C	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		400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
Load	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		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
Load	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
	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

16 OBDG06 Diagnostic Supporting Tables - ECM

P0300-P0308: Idle Cyl Mode ddt

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

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

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

P0300-P0308: Cyl Mode ddt

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

P0300-P0308: Cyl Mode ddt (continued)

load	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3500	4000	4500	5000	5500	6000	6500	7000
29	2050	1700	1350	1150	1000	700	650	450	325	200	150	100	75	60	50	40	30	25	0	0	0	0	0	0	0	0
33	2100	1800	1500	1200	1000	750	700	580	350	225	160	110	80	70	60	45	35	30	0	0	0	0	0	0	0	0
38	2000	1800	1600	1400	1100	800	750	600	400	250	180	120	100	80	60	50	40	33	0	0	0	0	0	0	0	0
42	2200	2000	1800	1600	1200	850	800	650	450	275	200	140	100	90	70	60	43	36	0	0	0	0	0	0	0	0
48	2200	2000	1800	1600	1200	900	850	750	550	300	220	170	135	100	80	65	50	40	0	0	0	0	0	0	0	0
54	2200	2000	1800	1600	1200	1000	900	800	650	325	250	180	140	115	90	70	55	45	0	0	0	0	0	0	0	0
61	2200	2000	1800	1600	1200	1100	950	850	750	400	270	200	155	120	100	80	70	55	0	0	0	0	0	0	0	0

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

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

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

load	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3500
8	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
9	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
11	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
12	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
15	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
17	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
22	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
33	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
42	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
48	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
61	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

16 OBDG06 Diagnostic Supporting Tables - ECM

P0300-P0308: Zero torque engine load

Zero Torque: All Cylinders active

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

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

Zero Torque: Active Fuel Management (AFM)

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

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

Catalyst Damaging Misfire Percentage

load
Load

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

RoughRoadSource = CeRRDR_e_WheelSpeedInECM or CeRRDR_e_SerialDataFromABS
Rough Road Threshold

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

P0442: EONV Pressure Threshold Table (in Pascals)

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

	0.0000	6.2499	12.4998	18.7497	24.9996	31.2495	37.4994	43.7493	49.9992	56.2491	62.4990	68.7490	74.9989	81.2488	87.4987	93.7486	99.9985
-10.0000	-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

P0442: Estimate of Ambient Temperature Valid Conditioning Time (Continued….)

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

Axis	Curve
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

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

16 OBDG06 Diagnostic Supporting Tables - ECM

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
KtFCLL_T_AdaptiveLoCoolant
Coolant *> 39 Celcius*
or less than
KtFCLL_T_AdaptiveHiCoolant
Coolant *< 140 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
Voltage *< 350 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_PostIntglRampInTime

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

and
KeFCLP_T_IntegrationCatalystMax
Modeled Catalyst Temperat *< 950 Celcius*
and
KeFCLP_T_IntegrationCatalystMin
Modeled Catalyst Temperat *> 450 Celcius*
and
KfFCLP_T_CoolantThrsh
Coolant *> 74 Celcius*
and
(KeFCLP_Pct_CatAccuSlphrPostDsbl
< 38
Modeled converter sulfur pe *Percent*
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

Tables supporting Deactivation System Performance

P3400

EngSpeedLwrLimitDisableTable — **AXIS is Gear State, Curve is Engine Speed**

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

EngSpeedUprLimitDisableTable — **AXIS is Gear State, Curve is Engine Speed**

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

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

RPM	1st Gear	2nd Gear	3rd Gear	4th Gear	5th Gear	6th Gear	Neutral	Park	Reverse
0	6	6	6	6	6	6	6	6	6
100	5	5	5	5	5	5	5	5	5
200	4	4	4	4	4	4	4	4	4
300	4	4	4	4	4	4	4	4	4
400	4	4	4	4	4	4	4	4	4
500	4	4	4	4	4	4	4	4	4
600	4	4	4	4	4	4	4	4	4
700	4	4	4	4	4	4	4	4	4
800	4	4	4	4	4	4	4	4	4
900	4	4	4	4	4	4	4	4	4

P3400 (Continued….)

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

RPM	1st Gear	2nd Gear	3rd Gear	4th Gear	5th Gear	6th Gear	Neutral	Park	Reverse
1000	4	4	4	4	4	4	4	4	4
1100	4	4	4	4	4	4	4	4	4
1200	4	4	4	4	4	4	4	4	4
1300	4	4	4	4	4	4	4	4	4
1400	4	4	4	4	4	4	4	4	4
1500	4	4	4	4	4	4	4	4	4
1600	4	4	4	4	4	4	4	4	4
1700	4	4	4	4	4	4	4	4	4
1800	4	4	4	4	4	4	4	4	4
1900	4	4	4	4	4	4	4	4	4
2000	4	4	4	4	4	4	4	4	4
2100	4	4	4	4	4	4	4	4	4
2200	4	4	4	4	4	4	4	4	4
2300	4	4	4	4	4	4	4	4	4
2400	4	4	4	4	4	4	4	4	4
2500	4	4	4	4	4	4	4	4	4
2600	4	4	4	4	4	4	4	4	4
2700	4	4	4	4	4	4	4	4	4
2800	4	4	4	4	4	4	4	4	4
2900	4	4	4	4	4	4	4	4	4
3000	4	4	4	4	4	4	4	4	4
3100	4	4	4	4	4	4	4	4	4
3200	4	4	4	4	4	4	4	4	4

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

RPM	1st Gear	2nd Gear	3rd Gear	4th Gear	5th Gear	6th Gear	Neutral	Park	Reverse
0	4	4	4	4	4	4	4	4	4
100	4	4	4	4	4	4	4	4	4
200	4	4	4	4	4	4	4	4	4
300	4	4	4	4	4	4	4	4	4
400	4	4	4	4	4	4	4	4	4
500	4	4	4	4	4	4	4	4	4
600	4	4	4	4	4	4	4	4	4
700	4	4	4	4	4	4	4	4	4
800	4	4	4	4	4	4	4	4	4
900	4	4	4	4	4	4	4	4	4
1000	4	4	4	4	4	4	4	4	4
1100	4	4	4	4	4	4	4	4	4
1200	4	4	4	4	4	4	4	4	4
1300	4	4	4	4	4	4	4	4	4
1400	4	4	4	4	4	4	4	4	4
1500	4	4	4	4	4	4	4	4	4
1600	4	4	4	4	4	4	4	4	4
1700	4	4	4	4	4	4	4	4	4
1800	4	4	4	4	4	4	4	4	4
1900	4	4	4	4	4	4	4	4	4
2000	4	4	4	4	4	4	4	4	4
2100	4	4	4	4	4	4	4	4	4
2200	4	4	4	4	4	4	4	4	4
2300	4	4	4	4	4	4	4	4	4
2400	4	4	4	4	4	4	4	4	4
2500	4	4	4	4	4	4	4	4	4
2600	4	4	4	4	4	4	4	4	4
2700	4	4	4	4	4	4	4	4	4
2800	4	4	4	4	4	4	4	4	4
2900	4	4	4	4	4	4	4	4	4
3000	4	4	4	4	4	4	4	4	4
3100	4	4	4	4	4	4	4	4	4
3200	4	4	4	4	4	4	4	4	4

HalfCylDisabledPRNDL

PRNDL Drive 1	1
PRNDL Drive 2	1
PRNDL Drive 3	0
PRNDL Drive 4	1
PRNDL Drive 5	0
PRNDL Drive 6	0
PRNDL Neutral	1
PRNDL Reverse	1
PRNDL Park	1
PRNDL Transitional 1	1
PRNDL Transitional 2	1
PRNDL Transitional 4	1

HalfCylDisabledPRNDLDeviceControl

PRNDL Drive 1	1
PRNDL Drive 2	1
PRNDL Drive 3	0
PRNDL Drive 4	1
PRNDL Drive 5	0
PRNDL Drive 6	0
PRNDL Neutral	0
PRNDL Reverse	1
PRNDL Park	0
PRNDL Transitional 1	1
PRNDL Transitional 2	1
PRNDL Transitional 4	1

HalfCylDisabledPRNDL (continued…)

PRNDL Transitional 7	1
PRNDL Transitional 8	1
PRNDL Transitional 11	1
PRNDL Transitional 13	1
PRNDL Transitional Illegal	1
PRNDL Transitional Between State	1

HalfCylDisabledPRNDLDeviceControl (continued…)

PRNDL Transitional 7	1
PRNDL Transitional 8	1
PRNDL Transitional 11	1
PRNDL Transitional 13	1
PRNDL Transitional Illegal	1
PRNDL Transitional Between State	1

HalfCylDisabledTransGr — AXIS is Gear State

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

HalfCylDisabledTransGrDeviceControl — AXIS is Gear State

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

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

RPM	1st Gear	2nd Gear	3rd Gear	4th Gear	5th Gear	6th Gear	Neutral	Park	Reverse
0	80	80	80	80	80	80	64	64	64
100	80	80	80	80	80	80	62	62	62
200	80	80	80	80	80	80	59	59	59
300	80	80	80	80	80	80	57	57	57
400	80	80	80	80	80	80	54	54	54
500	80	80	80	80	80	80	54	54	54

P3400 (Continued….)

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

RPM	1st Gear	2nd Gear	3rd Gear	4th Gear	5th Gear	6th Gear	Neutral	Park	Reverse
600	80	80	80	80	80	80	53	53	53
700	80	80	80	80	80	80	53	53	53
800	74	74	70	70	70	70	52	52	52
900	74	74	65	65	65	65	52	52	52
1000	74	74	58	58	58	58	51	51	51
1100	74	74	55	55	55	53	51	51	51
1200	74	74	53	53	53	51	51	51	51
1300	74	74	52	52	52	49	53	53	53
1400	74	74	52	52	52	49	54	54	54
1500	74	74	52	52	52	49	56	56	56
1600	74	74	52	52	52	49	57	57	57
1700	74	74	52	52	52	49	57	57	57
1800	74	74	52	52	52	49	57	57	57
1900	74	74	52	52	52	49	57	57	57
2000	74	74	52	52	52	49	57	57	57
2100	74	74	52	52	52	49	57	57	57
2200	74	74	52	52	52	49	57	57	57
2300	74	74	52	52	52	49	57	57	57
2400	74	74	52	52	52	49	57	57	57
2500	74	74	52	52	52	49	57	57	57
2600	74	74	52	52	52	49	57	57	57
2700	74	74	52	52	52	49	57	57	57
2800	74	74	52	52	52	49	57	57	57
2900	74	74	52	52	52	49	57	57	57
3000	74	74	52	52	52	49	57	57	57
3100	74	74	52	52	52	49	57	57	57
3200	74	74	52	52	52	49	57	57	57

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

RPM	1st Gear	2nd Gear	3rd Gear	4th Gear	5th Gear	6th Gear	Neutral	Park	Reverse
0	48	48	48	48	48	48	48	48	48
100	48	48	48	48	48	48	48	48	48
200	48	48	48	48	48	48	48	48	48
300	48	48	48	48	48	48	48	48	48
400	48	48	48	48	48	48	48	48	48
500	48	48	48	48	48	48	48	48	48
600	48	48	48	48	48	48	48	48	48
700	48	48	48	48	48	48	48	48	48
800	48	48	48	48	48	48	48	48	48
900	48	48	48	48	48	48	48	48	48
1000	48	48	48	48	48	48	48	48	48
1100	48	48	48	48	48	48	48	48	48
1200	48	48	48	48	48	48	48	48	48
1300	48	48	48	48	48	48	48	48	48
1400	48	48	48	48	48	48	48	48	48
1500	48	48	48	48	48	48	48	48	48
1600	48	48	48	48	48	48	48	48	48
1700	48	48	48	48	48	48	48	48	48
1800	48	48	48	48	48	48	48	48	48
1900	48	48	48	48	48	48	48	48	48
2000	48	48	48	48	48	48	48	48	48
2100	48	48	48	48	48	48	48	48	48
2200	48	48	48	48	48	48	48	48	48
2300	48	48	48	48	48	48	48	48	48
2400	48	48	48	48	48	48	48	48	48
2500	48	48	48	48	48	48	48	48	48
2600	48	48	48	48	48	48	48	48	48
2700	48	48	48	48	48	48	48	48	48
2800	48	48	48	48	48	48	48	48	48
2900	48	48	48	48	48	48	48	48	48
3000	48	48	48	48	48	48	48	48	48
3100	48	48	48	48	48	48	48	48	48
3200	48	48	48	48	48	48	48	48	48

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	GRR_Gear1	GRR_Gear2	GRR_Gear3	GRR_Gear4	GRR_Gear5	GRR_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

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

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)

16 OBDG06 Diagnostic Supporting Tables - ECM

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

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

16 OBDG06 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
AIRSystemPressureSensor FA	P2430 P2431 P2432 P2433 P2435 P2436 P2437 P2438
AIR System FA	P0411 P2440 P2444
AIRValveControlCircuit FA	P0412
AIRPumpControlCircuit FA	P0418
Clutch Sensor FA	P0806 P0807 P0808
ClutchPositionSensorCircuitLo FA	P0807
ClutchPositionSensorCircuitHi FA	P0808
Ethanol Composition Sensor FA	P0178 P0179 P2269
EngineMetalOvertempActive	P1258
FuelInjectorCircuit_FA	P0201 P0202 P0203 P0204 P0205 P0206 P0207 P0208
FuelInjectorCircuit_TFTKO	P0201 P0202 P0203 P0204 P0205 P0206 P0207 P0208
CatalystSysEfficiencyLoB1_FA	P0420
CatalystSysEfficiencyLoB2_FA	P0430
AmbientAirPressCktFA	P2228 P2229
AmbientAirPressCktFA_NoSnsr	P0106 P0107 P0108
AmbientAirDefault	For Naturally Aspirated Engines: P0106 P0107 P0108 P2227 P2228 P2229 For Super Charged Engines: P012B P012C P012D P2227 P2228 P2229 For Engines with no Baro Sensor: P0106 P0107 P0108
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

16 OBDG06 Diagnostic Summary Table - ECM

Cert Doc Bundle Name	Pcodes
IAT2_SensorcircuitFP_NoSnsr	P0112 P0113
IAT2_SensorTFTKO	P0096 P0097 P0098
IAT2_SensorTFTKO_NoSnsr	P0111 P0112 P0113
IAT2_SensorFA	P0096 P0097 P0098
IAT2_SensorFA_NoSnsr	P0111 P0112 P0113
SuperchargerBypassValveFA	P2261
CylDeacSystemTFTKO	P3400
MAF_SensorPerfFA	P0101
MAF_SensorPerfTFTKO	P0101
MAP_SensorPerfFA	P0106
MAP_SensorPerfTFTKO	P0106
SCIAP_SensorPerfFA	P012B
SCIAP_SensorPerfTFTKO	P012B
ThrottlePositionSnsrPerfFA	P0121
ThrottlePositionSnsrPerfTFTKO	P0121
MAF_SensorFA	P0101 P0102 P0103
MAF_SensorTFTKO	P0101 P0102 P0103
MAF_SensorFP	P0102 P0103
MAF_SensorCircuitFA	P0102 P0103
MAF_SensorCircuitTFTKO	P0102 P0103
MAP_SensorTFTKO	P0106 P0107 P0108
MAP_SensorFA	P0106 P0107 P0108
SCIAP_SensorFA	P012B P012C P012D
SCIAP_SensorTFTKO	P012B P012C P012D
SCIAP_SensorCircuitFP	P012C P012D
AfterThrottlePressureFA_NA	P0106 P0107 P0108
AfterThrottlePressureFA_SC	P012B P012C P012D
AfterThrottleVacuumTFTKO_NA	P0106 P0107 P0108
AfterThrottleVacuumTFTKO_SC	P012B P012C P012D
SCIAP_SensorCircuitFA	P012C P012D
AfterThrottlePressTFTKO_NA	P0106 P0107 P0108
AfterThrottlePressTFTKO_SC	P012B P012C P012D
MAP_SensorCircuitFA	P0107 P0108
MAP_EngineVacuumStatus	MAP_SensorFA OR P0107, P0108 Pending
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

16 OBDG06 Diagnostic Summary Table - ECM

Cert Doc Bundle Name	Pcodes											
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
CamSensorTFTKO	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391
CrankIntakeCamCorrelationFA	P0016	P0018										
CrankExhaustCamCorrelationFA	P0017	P0019										
IntakeCamSensorTFTKO	P0016	P0018	P0340	P0341	P0345	P0346						
IntakeCamSensorFA	P0016	P0018	P0340	P0341	P0345	P0346						
ExhaustCamSensorTFTKO	P0017	P0019	P0365	P0366	P0390	P0391						
ExhaustCamSensorFA	P0017	P0019	P0365	P0366	P0390	P0391						
IntakeCamSensor_FA	P0016	P0018	P0340	P0341	P0345	P0346						
IntakeCamSensor_TFTKO	P0016	P0018	P0340	P0341	P0345	P0346						
ExhaustCamSensor_FA	P0017	P0019	P0365	P0366	P0390	P0391						
ExhaustCamSensor_TFTKO	P0017	P0019	P0365	P0366	P0390	P0391						
CrankIntakeCamCorrFA	P0016	P0018										
CrankExhaustCamCorrFA	P0017	P0019										
CrankSensorFaultActive	P0335	P0336										
CrankSensor_FA	P0335	P0336										
CrankSensorTestFailedTKO	P0335	P0336										
CrankSensor_TFTKO	P0335	P0336										
CamSensor_FA	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391
CamSensorAnyLocationFA	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391
CamSensor_TFTKO	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391
EvapPurgeSolenoidCircuit_FA	P0443											
EvapFlowDuringNonPurge_FA	P0496											
EvapVentSolenoidCircuit_FA	P0449											

16 OBDG06 Diagnostic Summary Table - ECM

Cert Doc Bundle Name	Pcodes
EvapSmallLeak_FA	P0442
EvapEmissionSystem_FA	P0455 P0446
FuelTankPressureSnsrCkt_FA	P0452 P0453
CoolingFanSpeedTooHigh_FA	P0495
FanOutputDriver_FA	P0480 P0481 P0482
FuelLevelDataFault	P0461 P0462 P0463 P2066 P2067 P2068
PowertrainRelayFault	P1682
PowertrainRelayStateOn_FA	P0685
PowertrainRelayStateOn_Error	P0685
IgnitionOffTimer_FA	P2610
IgnitionOffTimeValid	P2610
EngineModeNotRunTimerError	P2610
EngineModeNotRunTimer_FA	P2610
VehicleSpeedSensor_FA	P0502 P0503 P0722 P0723
VehicleSpeedSensorError	P0502 P0503 P0722 P0723
LowFuelConditionDiagnostic	Flag set to TRUE if the fuel level < 10 % AND No Active DTCs: FuelLevelDataFault P0462 P0463 for at least 30 seconds.
EGRValvePerformance_FA	P0401 P042E
EGRValveCircuit_FA	P0403 P0404 P0405 P0406
EGRValve_FP	P0405 P0406 P042E
EGRValveCircuit_TFTKO	P0403 P0404 P0405 P0406
EGRValvePerformance_TFTKO	P0401 P042E
AnyCamPhaser_FA	P0010 P0011 P0013 P0014 P0020 P0021 P0023 P0024
AnyCamPhaser_TFTKO	P0010 P0011 P0013 P0014 P0020 P0021 P0023 P0024
IntkCamPhaser_FA	P0010 P0011 P0020 P0021
EngOilTempSensorCircuitFA	P0197 P0198
EngOilModeledTempValid	ECT_Sensor_FA IAT_SensorCircuitFA
EngOilPressureSensorCktFA	P0522 P0523
EngOilPressureSensorFA	P0521 P0522 P0523
CylnderDeacDriverTFTKO	P3401 P3409 P3417 P3425 P3433 P3441 P3449

16 OBDG06 Diagnostic Summary Table - ECM

Cert Doc Bundle Name	Pcodes
BrakeBoosterSensorFA	P0556 P0557 P0558
BrakeBoosterVacuumValid	P0556 P0557 P0558
BrakeBoosterVacuumValid	VehicleSpeedSensor_FA MAP_SensorFA
CylnderDeacDriverTFTKO	P3401 P3409 P3417 P3425 P3433 P3441 P3449
EngineTorqueEstInaccurate	EngineMisfireDetected_FA FuelInjedtorCircuit_FA FuelInjedtorCircuit_TFTKO FuelTrimSystemB1_FA FuelTrimSystemB2_FA MAF_SensorTFTKO MAP_SensorTFTKO 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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Fuel Rail Pressure (FRP) Sensor Performance (rationality)	P018B	This DTC detects a fuel pressure sensor response stuck within the normal operating range	Absolute value of fuel pressure change as sensed during intrusive test.	<= 30 kPa	1. FRP Circuit Low DTC (P018C)	not active	Frequency: Continuous; 12.5 ms loop. 60 seconds between intrusive tests that pass Intrusive test requested if fuel system is clamped for >= 5 seconds or fuel pressure error variance <= 0.3 to 0.6 [calculated over a 2.5sec period]; otherwise report pass	DTC Type B 2 trips
					2. FRP Circuit High DTC (P018D)	not active		
					3. FuelPump Circuit Low DTC (P0231)	not active	Duration of intrusive test is fueling related (5 to 12 seconds).	
					4. FuelPump Circuit High DTC (P0232)	not active		
					5. FuelPump Circuit Open DTC (P023F)	not active	Intrusive test is run when fuel flow is below Max allowed fuel flow rate [See Supporting Tables]	
					6. Reference Voltage DTC (P0641)	not active		
					7. Fuel Pump Control Module Driver Over-temperature DTC (P064A)	not active		
					8. Control Module Internal Performance DTC (P0606)	not active		
					9. Engine run time	>=5 seconds		
					10. Emissions fuel level (PPEI $3FB)	not low		
					11. Fuel pump control	enabled		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					12. Fuel pump control state 13. Engine fuel flow 14. ECM fuel control system failure (PPEI $1ED)	normal or FRP Rationality control > 0.047 g/s failure has not occurred		
Fuel Rail Pressure (FRP) Sensor Circuit Low Voltage	P018C	This DTC detects if the fuel pressure sensor circuit is shorted low	FRP sensor voltage	< 0.14 V	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type B 2 trips
Fuel Rail Pressure (FRP) Sensor Circuit High Voltage	P018D	This DTC detects if the fuel pressure sensor circuit is shorted high	FRP sensor voltage	> 4.86 V	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type B 2 trips
Fuel Pump Control Circuit Low Voltage	P0231	This DTC detects if the fuel pump control circuit is shorted to low	Fuel Pump Current	> 14.48A	Ignition OR Ignition power mode OR Fuel Pump Control AND Ignition Run/Crank Voltage	Run or Crank Accessory enabled 9V < voltage < 32V	72 test failures in 80 test samples if Fuel Pump Current <100A 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Pump Control Circuit High Voltage	P0232	This DTC detects if the fuel pump control circuit is shorted to high	Voltage measured at fuel pump circuit	> 3.86 V	Commanded fuel pump output Fuel pump control enable Time that above conditions are met	0% duty cycle (off) False >=4.0 seconds	36 test failures in 40 test samples; 1 sample/12.5ms Pass/Fail determination made only once per trip	DTC Type B 2 trips
Fuel Pump Control Circuit (Open)	P023F	This DTC detects if the fuel pump control circuit is open	Fuel Pump Current AND	<=0.5A	Ignition OR	Run or Crank	72 test failures in 80 test samples; 1 sample/12.5ms	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
			Fuel Pump Duty Cycle	>20%	Ignition power mode OR Fuel Pump Control AND Ignition Run/Crank Voltage	Accessory enabled 9V < voltage < 32V		
Fuel System Control Module Enable Control Circuit	P025A	This DTC detects if there is a fault in the fuel pump control enable circuit	Fuel System Request State [PPEI message $1ED]	≠ Fuel Pump Control Enable Circuit State	Ignition AND PPEI Fuel System Request Message ($1ED)	Run or Crank valid	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if any software or calibration check sum is incorrect	Calculated Checksum (CRC16)	≠ stored checksum for any of the parts (boot, software, application calibration, system calibration)	Ignition OR Ignition power mode OR Fuel Pump Control	Run or Crank Accessory enabled	1 failure if it occurs during the first ROM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background	DTC Type A 1 trip
Control Module Not Programmed	P0602	Indicates that the FSCM needs to be programmed	This DTC is set via calibration, when KeMEMD_b_NoStartCal	= TRUE	Ignition OR Ignition power mode OR Fuel Pump Control	Run or Crank Accessory enabled	Runs once at power up	DTC Type A 1 trip
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up	≠ checksum at power-down	Ignition OR Ignition power mode OR Fuel Pump Control	Run or Crank Accessory enabled	1 failure Frequency: Once at power-up	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Control Module Random Access Memory (RAM)	P0604	Indicates that control module is unable to correctly write and read data to and from RAM	Data read	≠ Data written	Ignition OR Ignition power mode OR Fuel Pump Control	Run or Crank Accessory enabled	1 failure if it occurs during the first RAM test of the ignition cycle, otherwise 5 failures Frequency: Runs continuously in the background.	DTC Type A 1 trip
Control Module Internal Performance 1. Main Processor Configuration Register Test 2. Processor clock test 3. External watchdog test	P0606	This DTC indicates the FPCM has detected an internal processor fault or external watchdog fault [PID $2032 discriminates the source of the fault]	1. For all I/O configuration register faults: •Register contents 2. For Processor Clock Fault: •EE latch flag in EEPROM. OR • RAM latch flag. 3. For External Watchdog Fault: • Software control of fuel pump driver	Incorrect value. 0x5A5A 0x5A Control Lost	Ignition OR Ignition power mode OR Fuel Pump Control 1. For all I/O configuration register faults: •KeMEMD_b_ProcFltCfgRegEnbl 2. For Processor Clock Fault: •KeMEMD_b_ProcFltCLKDiagEnbl 3. For External Watchdog Fault: •KeFRPD_b_FPExtWDogDiagEnbl 3. For External Watchdog Fault: •Control Module ROM(P0601) 3. For External Watchdog Fault: •Control Module RAM(P0604)	Run or Crank Accessory enabled TRUE TRUE TRUE not active not active	Tests 1 and 2 1 failure Frequency: Continuously (12.5ms) Test 3 3 failures out of 15 samples 1 sample/12.5 ms	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Control Module Long Term Memory (EEPROM) Performance	P062F	Indicates that the NVM Error flag has not been cleared	Last EEPROM write	Did not complete	Ignition OR Ignition power mode OR Fuel Pump Control	Run or Crank Accessory enabled	1 test failure Once on controller power-up	DTC Type B 2 trips
5Volt Reference Circuit (Short High/Low/Out of Range)	P0641	Detects continuous short or out of range on the #1 5V sensor reference circuit	Reference voltage AND Output OR Reference voltage AND Output OR Reference voltage AND Output	>= 0.5V inactive >= 5.5V active <= 4.5V active	Ignition	Run or Crank	15 failures out of 20 samples 1 sample/12.5 ms	DTC Type A 1 trip
			OR Reference voltage	> 105% nominal (i.e., 5.25V) OR <95% nominal (i.e., 4.75V)				
Fuel Pump Control Module - Driver Over-temperature 1	P064A	This DTC detects if an internal fuel pump driver overtemperature condition exists under normal operating conditions	Pump Driver Temp	> 150C	Ignition OR Ignition power mode OR Fuel Pump Control KeFRPD_b_FPOverTempDiagEnbl Ignition Run/Crank	Run or Crank Accessory enabled TRUE 9V<voltage<32V	3 failures out of 15 samples 1 sample/12.5 ms	DTC Type B 2 trips
Ignition 1 Switch Circuit Low Voltage	P2534	This DTC detects if the Ignition1 Switch circuit is shorted to low or open	Ignition 1 voltage	<= 6 V	Engine	Running	180 failures out of 200 samples 1 sample/25.0 ms	DTC Type A 1 trip

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
Ignition 1 Switch Circuit High Voltage	P2535	Detects if the Ignition1 Switch circuit is shorted to vehicle supply voltage	Ignition 1 voltage	> 11.7 V	Ignition Run_Crank terminal	Off	180 failures out of 200 samples 1 sample/25.0 ms	DTC Type A 1 trip
Fuel Pump Flow Performance (rationality)	P2635	This DTC detects degradation in the performance of the SIDI electronic return-less fuel system	Filtered fuel rail pressure error	<= Low Threshold (continuously calculated function of desired fuel rail pressure and fuel flow rate) OR >= High Threshold (continuously calculated function of desired fuel rail pressure and fuel flow rate) **(See Supporting Tables tab and Supporting Calculations tab)**	1. FRP Circuit Low DTC (P018C)	not active	Filtered fuel rail pressure error Time Constant = 12.5 seconds Frequency: Continuous 12.5 ms loop	DTC Type B 2 trips
					2. FRP Circuit High DTC (P018D)	not active .		
					3. Fuel Rail Pressure Sensor Performance DTC (P018B)	not active		
					4. FuelPump Circuit Low DTC (P0231)	not active		
					5. FuelPump Circuit High DTC (P0232)	not active		
					6. FuelPump Circuit Open DTC (P023F)	not active		
					7. Reference Voltage DTC (P0641)	not active		
					8. Fuel Pump Control Module Driver Over-temperature DTC's (P064A)	not active		
					9. Control Module Internal Performance DTC (P0606)	not active		
					10. An ECM fuel control system failure (PPEI $1ED)	has not occurred		
					11. The Barometric pressure (PPEI $4C1) signal	valid (for absolute fuel pressure sensor)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumination
					12. Engine run time	>= 30 seconds		
					13. Emissions fuel level (PPEI $3FB)	not low		
					14. Fuel pump control	enabled		
					15. Fuel pump control state	normal		
					16. Battery Voltage	11V<=voltage=<32V		
					17. Fuel flow rate **(See Supporting Tables tab)**	> 0.047 g/s **AND** <= Max allowed fuel flow rate as a function of desired rail pressure & Vbatt		
					18. Fuel Pressure Control System	Is not responding to an over-pressurization due to pressure build during DFCO or a decreasing desired pressure command.		
Control Module Communication Bus “A” Off	U0073	Detects that a CAN serial data bus shorted condition has occurred to force the CAN device driver to enter a bus-off state	Bus Status	Off	Power mode	Run/Crank	5 failures out of 5 samples (5 seconds)	DTC Type B 2 trips
Lost Communication With ECM/PCM “A”	U0100	Detects that CAN serial data communication has been lost with the ECM	Message $0C9	Undetected	1. Power mode 2. Ignition Run/Crank Voltage 3. U0073	Run/Crank 11V<voltage<32V not active	12 failures out of 12 samples (12 seconds)	DTC Type B 2 trips

P2635-Fuel Pump Performance Maximum Fuel Flow map (grams / second)

X-axis= Desired Fuel Pressure (kiloPascals)
Y-axis= Battery voltage (volts)

	200	250	300	350	400	450	500	550	600
4.5	31.219	31.219	31.219	30.102	25.422	21.234	17.477	14.07	10.977
6	31.219	31.219	31.219	30.102	25.422	21.234	17.477	14.07	10.977
7.5	31.219	31.219	31.219	30.102	25.422	21.234	17.477	14.07	10.977
9	31.219	31.219	31.219	30.102	25.422	21.234	17.477	14.07	10.977
10.5	31.219	31.219	31.219	30.102	25.422	21.234	17.477	14.07	10.977
12	31.219	31.219	31.219	31.219	31.219	29.367	25.195	21.422	17.992
13.5	31.219	31.219	31.219	31.219	31.219	31.219	31.219	28.789	25.023
15	31.219	31.219	31.219	31.219	31.219	31.219	31.219	31.219	31.219
16.5	31.219	31.219	31.219	31.219	31.219	31.219	31.219	31.219	31.219
18	31.219	31.219	31.219	31.219	31.219	31.219	31.219	31.219	31.219
19.5	31.219	31.219	31.219	31.219	31.219	31.219	31.219	31.219	31.219
21	31.219	31.219	31.219	31.219	31.219	31.219	31.219	31.219	31.219
22.5	31.219	31.219	31.219	31.219	31.219	31.219	31.219	31.219	31.219
24	31.219	31.219	31.219	31.219	31.219	31.219	31.219	31.219	31.219
25.5	31.219	31.219	31.219	31.219	31.219	31.219	31.219	31.219	31.219
27	31.219	31.219	31.219	31.219	31.219	31.219	31.219	31.219	31.219
28.5	31.219	31.219	31.219	31.219	31.219	31.219	31.219	31.219	31.219

P2635-Fuel Injector curve (grams / second)

X-axis= Fuel Pressure (kiloPascals)

128	148	168	188	208	228	248	268	288	308	328	348
2.9744	3.1548	3.3254	3.4878	3.6428	3.7916	3.9347	4.0729	4.2064	4.3358	4.4615	4.5839
368	388	408	428	448	468	488	508	528	548	568	588
4.7029	4.8191	4.9325	5.0433	5.1517	5.2581	5.3622	5.4642	5.5646	5.6631	5.7599	5.8551
608	628	648	668	688	708	728	748	768			
5.9487	6.041	6.1318	6.2213	6.3096	6.3966	6.4825	6.5673	6.6509			

P2635-Maximum Engine Intake Boost curve (kiloPascals)

X-axis= barometric pressure (kiloPascals)

40	50	60	70	80	90	100	110	120
0	0	0	0	0	0	0	0	0

P2635-Minimum Fuel Injector Pulse Width curve (seconds)

X-axis= engine speed (revolutions / minute)

0	512	1024	1536	2048	2560	3072	3584	4096	4608	5120	5632
0	0.7969	0.7969	0.7969	0.7969	0.7969	0.7969	0.7969	0.7969	0.7969	0.7969	0.7969

6144	6656	7168	7680	8192
0.7969	0.7969	0.7969	0.7969	0.7969