COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Intake Camshaft Actuator Solenoid Circuit – Bank 1	P0010	Detects a VVT system error by monitoring the circuit for electrical integrity	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		System supply voltage is within limits Output driver is commanded on, Ignition switch is in crank or run position	> 11 Volts, and < 32 Volts	20 failures out of 25 samples 250 ms /sample, continuous	Type B 2 trips
Intake Camshaft System Performance – Bank 1	P0011	Detects a VVT system error by comparing the desired and actual cam positions when VVT is activated	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive	(Intake cam Bank 1)Cam Position Error > KtPHSD_phi_CamPosErrorLimIc 1 Deg (see Supporting Table)	The following DTC's are NOT active: P0010 IntkCMP B1 Circuit P0340, P0341, Intake B1 Cam sensors P0335, P0336, Crank sensors P0016, P0017, P0018, P0019 Cam to crank rationality Engine is running VVT is enabled Desired camshaft position > 0 Power Take Off (PTO) not active	System Voltage > 11 Volts, and System Voltage < 32 Volts Desired cam position cannot vary more than 7.5 Cam Deg for at least KtPHSD_t_StablePositionTimeIc1 seconds	200 failures out of 1000 samples 100 ms /sample	Type B 2 trips
Exhaust Camshaft Actuator Solenoid Circuit – Bank 1	P0013	Detects a VVT system error by monitoring the circuit for electrical integrity	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		System supply voltage is within limits Output driver is commanded on, Ignition switch is in crank or run position	> 11 Volts, and < 32 Volts	19 failures out of 30 samples 250 ms /sample, continuous	Type B 2 trips
Exhaust Camshaft System Performance – Bank 1	P0014	Detects a VVT system error by comparing the desired and actual cam positions when VVT is activated	Camshaft position error [absolute value of (desired position - actual position)] is compared to thresholds to determine if excessive	(Exhaust cam Bank 1)Cam Position Error > KtPHSD_phi_CamPosErrorLimEc 1 Deg (see Supporting Table)	The following DTC's are NOT active: P0013 ExhCMP B1 Circuit P0365, P0366, Exh B1 Cam sensors P0335, P0336, Crank sensors P0016, P0017, P0018, P0019 Cam to crank rationality	System Voltage > 11 Volts, and System Voltage < 32 Volts Desired cam position cannot vary more than 1.0 Cam Deg for at least KtPHSD_t_StablePositionTimeEc1 seconds	100 failures out of 150 samples	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Engine is running VVT is enabled Desired camshaft position > 0 Power Take Off (PTO) not active		100 ms /sample	
Crankshaft Position (CKP)-Camshaft Position (CMP) Correlation Bank 1 Sensor A	P0016	Detects cam to crank misalignment by monitoring if cam sensor pulse for bank 1 sensor A occurs during the incorrect crank position	4 cam sensor pulses more than 11 crank degrees before or 11 crank degrees after nominal position in one cam revolution.		Engine Speed Crankshaft and camshaft position signals are synchronized Cam phaser is in "parked" position No Active DTCs: No Pending DTCs:	< 1200 P0335, P0336 P0340, P0341 5VoltReferenceA_FA 5VoltReferenceB_FA P0341	4 failures out of 5 samples if the engine is being assisted by the starter 24 failures out of 30 samples if the engine is running without assistance from the starter One sample per cam rotation	Type B 2 trips
Crankshaft Position (CKP)-Camshaft Position (CMP) Correlation Bank 1 Sensor B	P0017	Detects cam to crank misalignment by monitoring if cam sensor pulse for bank 1 sensor B occurs during the incorrect crank position	4 cam sensor pulses more than 8 crank degrees before or 9 crank degrees after nominal position in one cam revolution.		Engine Speed Crankshaft and camshaft position signals are synchronized Cam phaser is in "parked" position No Active DTCs: No Pending DTCs:	< 1200 P0335, P0336 P0365, P0366 5VoltReferenceA_FA 5VoltReferenceB_FA P0366	4 failures out of 5 samples if the engine is being assisted by the starter 24 failures out of 30 samples if the engine is running without assistance from the starter	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
							One sample per cam rotation	
O2S Heater Control Circuit Bank 1 Sensor 1	P0030	This DTC checks the Heater Output Driver circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit) or voltage high during driver closed state (indicates short to voltage).		Ign Switch position Ignition Voltage Engine Speed	= Crank or Run position 11.0 volts < Ign Voltage < 32.0 volts > 400 RPM	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips
Supercharger Bypass Valve Control Circuit	P0033	Electrical Integrity of Supercharger Bypass Valve Control Circuitry	ECM detects that commanded and actual states of output driver do not match		Ignition Voltage Ignition Voltage Engine Speed	>= 11.00 Volts <= 32.00 Volts > 0	20 failures out of 25 samples 1 sample every 250 msec	Type B 2 trips
O2S Heater Control Circuit Bank 1 Sensor 2	P0036	This DTC checks the Heater Output Driver circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit) or voltage high during driver closed state (indicates short to voltage).		Ign Switch position Ignition Voltage Engine Speed	= Crank or Run position 11.0 volts < Ign Voltage < 32.0 volts > 400 RPM	20 failures out of 25 samples 250 ms /sample Continuous	Type B 2 trips
O2S Heater Control Circuit Bank 2 Sensor 1	P0050	This DTC checks the Heater Output Driver circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit) or voltage high during driver closed state (indicates short to voltage).		Ign Switch position Ignition Voltage Engine Speed	= Crank or Run position 11.0 volts < Ign Voltage < 32.0 volts > 400 RPM	20 failures out of 25 samples 250 ms /sample	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
							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 Engine Soak Time Coolant Temp Ignition Voltage Engine Run Time	ECT_Sensor_FA P2610 IAT_SensorFA < 8.0 ºC > 28800 seconds -30.0 ºC ≤ Coolant ≤ 45.0 ºC < 18.0 volts < 3.00 seconds	Once per valid cold start	Type B 2 trips
HO2S Heater Resistance Bank 1 Sensor 2	P0054	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Learned Heater Resistance.	Calculated Heater Resistance < 4.1 ohms -OR- Calculated Heater Resistance > 10.8 ohms	No Active DTC's Coolant – IAT Engine Soak Time Coolant Temp Ignition Voltage Engine Run Time	ECT_Sensor_FA P2610 IAT_SensorFA < 8.0 ºC > 28800 seconds -30.0 ºC ≤ Coolant ≤ 45.0 ºC < 18.0 volts < 3.00 seconds	Once per valid cold start	Type B 2 trips
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	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
							Continuous	
HO2S Heater Resistance Bank 2 Sensor 1	P0059	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Learned Heater Resistance.	Calculated Heater Resistance < 3.1 ohms -OR- Calculated Heater Resistance > 9.8 ohms	No Active DTC's	ECT_Sensor_FA P2610 IAT_SensorFA	Once per valid cold start	Type B 2 trips
					Coolant – IAT Engine Soak Time	< 8.0 ºC > 28800 seconds		
					Coolant Temp Ignition Voltage Engine Run Time	-30.0 ºC ≤ Coolant ≤ 45.0 ºC < 18.0 volts < 3.00 seconds		
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	ECT_Sensor_FA P2610 IAT_SensorFA	Once per valid cold start	Type B 2 trips
					Coolant – IAT	< 8.0 ºC > 28800 seconds		
					Engine Soak Time Coolant Temp Ignition Voltage Engine Run Time	-30.0 ºC ≤ Coolant ≤ 45.0 ºC < 18.0 volts < 3.00 seconds		
MAP / MAF / Throttle Position Correlation	P0068	Detect when MAP <u>and</u> MAF do not match estimated engine airflow as established by the TPS	1) Difference between measured MAP and estimated MAP exceeds threshold (kPa), or P0651 (5 Volt Ref), or P0107 (MAP circuit low), or P0108 (MAP circuit high) have failed this key cycle, then MAP portion of diagnostic fails	Table, f(TPS). See supporting tables	Engine Speed	> 800 RPM	Continuously fail MAP and MAF portions of diagnostic for 0.1875 sec	Type:A 1 Trip

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						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				
Barometric Pressure (BARO) - Supercharger Inlet Pressure Correlation (supercharged application)	P006D	Compares baro sensor to the calculated baro estimate (part throttle calculation or unthrottled Supercharger Inlet Pressure)	Difference between baro sensor reading and estimated baro when distance since last estimated baro update OR	> 15.0 kPa <= 0.01 kilometers	No Active DTCs:	AmbientAirPressCktFA ECT_Sensor_Ckt_FA IAT_SensorFA MAF_SensorFA AfterThrottlePressureFA_SC TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA	20 failures out of 25 samples 1 sample every 250 msec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Difference between baro sensor reading and estimated baro	> 15.0 kPa				
			when distance since last estimated baro update	> 0.01 kilometers				
Intake Air Temperature Sensor 2 Circuit Performance (For applications with a second IAT sensor)	P0096	Detects an IAT2 sensor that has stuck in range by comparing to IAT and engine coolant temperature at startup	ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up ECT – Power Up IAT2) > ABS(Power Up ECT – Power Up IAT) AND P0116 is passing	> 20 deg C	Time between current ignition cycle and the last time the engine was running No Active DTCs:	> 28800 seconds ECT_Sensor_FA ECT_Sensor_Ckt_FA IAT_SensorFA IAT2_SensorFA P0116 Test Aborted = FALSE P0116 Test Complete = TRUE	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B 2 trips
Intake Air Temperature Sensor 2 Circuit Low (High Temperature) (For applications with a second IAT sensor)	P0097	Detects a continuous short to ground in the IAT 2 signal circuit or the IAT 2 sensor	Raw IAT 2 Input	< 45 Ohms (~150 deg C)	Engine Run Time Coolant Temp Vehicle Speed No Active DTCs:	> 10.0 seconds < 150 deg C >= 0 MPH ECT_Sensor_Ckt_FA ECT_Sensor_Ckt_FP VehicleSpeedSensorError	50 failures out of 63 samples 1 sample every 100 msec	Type B 2 trips
Intake Air Temperature Sensor 2 Circuit High (Low Temperature) (For applications with a second IAT sensor)	P0098	Detects a continuous open circuit in the IAT 2 signal circuit or the IAT 2 sensor	Raw IAT 2 Input	> 420000 Ohms (~-60 deg C)	Engine Run Time Coolant Temp Vehicle Speed Engine Air Flow No Active DTCs:	> 10.0 seconds > -40 deg C <= 318 MPH >= 512 gm/sec ECT_Sensor_Ckt_FA ECT_Sensor_Ckt_FP	50 failures out of 63 samples 1 sample every 100 msec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						VehicleSpeedSensorError MAF_SensorFA MAF_SensorFP MAF_SensorTFTKO		
Radiator Coolant Temp Sensor Circuit Low Voltage (For applications with a 2nd coolant sensor)	P00B3	This DTC detects a short to ground in the RCT signal circuit or the RCT sensor.	RCT Resistance (@ 150ºC)	< 45 Ohms (~ 150° C)	Engine run time Or IAT min	> 0.0 seconds ≤ 150.0 °C	5 failures out of 25 samples 1 sec/sample Continuous	Type B 2 trips
Radiator Coolant Temp Sensor Circuit High Voltage (For applications with a 2nd coolant sensor)	P00B4	Circuit Continuity This DTC detects a short to high or open in the RCT signal circuit or the RCT sensor.	RCT Resistance (@ -60ºC)	> 450000 Ohms (~ -60° C)	Or IAT min	> 10.0 seconds ≥ -7.0 °C	5 failures out of 25 samples 1 sec/sample Continuous	Type B 2 trips
Radiator Coolant Temp - Engine Coolant Temp (ECT) Correlation (For applications with a single coolant sensor)	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	Type B 2 trips

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	
					Engine Off Soak Time	> 28800 seconds		
					Non-volatile memory initiation	= Not occurred		
			2) Absolute difference between ECT at power up & RCT at power up is > by 15.0 C and a block heater has not been detected.		Test complete this trip	= False		
					Test aborted this trip			
						= False		
					IAT	≥ -7 ℃		
					LowFuelCondition Diag	= False		
			3) ECT at power up > IAT at power up by 15.0 C and the time spent cranking the engine without starting is greater than 10.0 seconds with the LowFuelConditionDiag		**Block Heater detection is enabled when either of the following occurs:**			
					1) ECT at power up > IAT at power up by	> 15.0 ℃		
					2) Cranking time	< 10.0 Seconds		
				= False	**Block Heater is detected and diagnostic is aborted when 1)or 2) occurs. Diagnostic is aborted when 3) or 4) occurs:**			
					1a) Vehicle drive time	> 400 Seconds with		
					1b) Vehicle speed	> 14.9 MPH and		

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 ≥ 8.0 ℃		
					2a) ECT drops from power up ECT 2b) Engine run time	> 1.203125 ℃ Within > 30 Seconds		
					3) Engine run time with vehicle speed below 1b 4) Minimum IAT during test	> 1800 Seconds > -7.0 ℃		
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) Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM	>= 450 RPM <= 8000 RPM > 70 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.00	Continuous Calculation are performed every 12.5 msec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					No Active DTCs:	Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Estimate MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM See table "IFRD Residual Weighting Factors". MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensor_FA ECT_Sensor_FA ECT_Sensor_Ckt_FA IAT_SensorFA IAT_SensorFP CylDeacSystemTFTKO		
Mass Air Flow System Performance (supercharged)	P0101	Determines if the MAF sensor is stuck within the normal operating range	See table "Supercharger Intake Flow Rationality Diagnostic Failure Matrix" for combinations of model failures that can set this DTC. TPS model fails when		Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 450 RPM <= 6200 RPM > 69 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.00	Continuous Calculation are performed every 12.5 msec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Filtered Throttle Model Error	> 400 kPa*(g/s)		Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM		
			MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered	> 21 grams/sec		Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Estimate		
			MAP1 model fails when ABS(Measured MAP – MAP Model 1) Filtered	> 22.0 kPa		MAP Model 1 multiplied by MAP1 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost		
			MAP2 model fails when ABS(Measured MAP – MAP Model 2) Filtered	> 22.0 kPa		MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost		
			SCIAP1 model fails when ABS(Measured SCIAP – SCIAP Model 1) Filtered	> 14.0 kPa		SCIAP Model 1 multiplied by SCIAP1 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost		
			SCIAP2 model fails when ABS(Measured SCIAP – SCIAP Model 2) Filtered	> 14.0 kPa		SCIAP Model 2 multiplied by SCIAP2 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					No Active DTCs:	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 IAT2_SensorFA IAT2_SensorCircuitFP SCIAP_SensorCircuitFA SCIAP_SensorCircuitFP AmbientAirDefault_SC		
Mass Air Flow Sensor Circuit Low Frequency	P0102	Detects a continuous short to low or an open in either the signal circuit or the MAF sensor	MAF Output	<= 1500 Hertz (~ 1.158 gm/sec)	Engine Run Time Engine Speed Ignition Voltage Above criteria present for a period of time	> 1.0 seconds >= 300 RPM >= 8.0 Volts >= 1.0 seconds	400 failures out of 500 samples 1 sample every cylinder firing event	Type B 2 trips
Mass Air Flow Sensor Circuit High Frequency	P0103	Detects a high frequency output from the MAF sensor	MAF Output	>= 14500 Hertz (~ 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

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
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 <= 8000 RPM > 70 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.00 Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM MAP Model 1 multiplied by MAP1 Residual Weight Factor based on RPM MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM See table "IFRD Residual Weighting Factors". MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance _FA MAF_SensorCircuitFA CrankSensorFA ECT_sensor_FA ECT_Sensor_FP	Continuous Calculations are performed every 12.5 msec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						IAT_SensorFA IAT_SensorCircuitFP CylDeacSystemTFTKO		
Manifold Absolute Pressure Sensor Performance (supercharged)	P0106	Determines if the MAP sensor is stuck within the normal operating range	See table "Supercharger Intake Flow Rationality Diagnostic Failure Matrix" for combinations of model failures that can set this DTC.		Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 450 RPM <= 6200 RPM > 69 Deg C < 125 Deg C > -20 Deg C < 125 Deg C	Continuous Calculation are performed every 12.5 msec	Type B 2 trips
			TPS model fails when Filtered Throttle Model Error			>= 0.00		
				> 400 kPa*(g/s)		Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM		
			MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered			Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Estimate		
				> 21 grams/sec				
			MAP1 model fails when					
			ABS(Measured MAP – MAP Model 1) Filtered	> 22.0 kPa		MAP Model 1 multiplied by MAP1 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost		
			MAP2 model fails when					
			ABS(Measured MAP – MAP Model 2) Filtered					

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			SCIAP1 model fails when ABS(Measured SCIAP – SCIAP Model 1) Filtered SCIAP2 model fails when ABS(Measured SCIAP – SCIAP Model 2) Filtered	> 22.0 kPa > 14.0 kPa > 14.0 kPa	No Active DTCs:	MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost SCIAP Model 1 multiplied by SCIAP1 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost SCIAP Model 2 multiplied by SCIAP2 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost 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 IAT2_SensorFA IAT2_SensorCircuitFP		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						SCIAP_SensorCircuitFA SCIAP_SensorCircuitFP AmbientAirDefault_SC		
Manifold Absolute Pressure Sensor Circuit Low	P0107	Detects a continuous short to low or open in either the signal circuit or the MAP sensor.	MAP Voltage	< 3.0 % of 5 Volt Range (0.2 Volts = 3.5 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips
Manifold Absolute Pressure Sensor Circuit High	P0108	Detects an open sensor ground or continuous short to high in either the signal circuit or the MAP sensor.	MAP Voltage	> 90.0 % of 5 Volt Range (4.5 Volts = 115.1 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips
Intake Air Temperature Sensor Circuit Performance (For applications with a second IAT sensor)	P0111	Detects an IAT sensor that has stuck in range by comparing to IAT2 and engine coolant temperature at startup	ABS(Power Up IAT - Power Up IAT2) AND ABS(Power Up ECT – Power Up IAT) > ABS(Power Up ECT – Power Up IAT2) AND	> 20 deg C	Time between current ignition cycle and the last time the engine was running No Active DTCs:	> 28800 seconds ECTSensor_FA ECT_Sensor_Ckt_FA IAT_SensorCircuitFA IAT2_SensorCircuitFA	Executes once at the beginning of each ignition cycle if enable conditions are met	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			P0116 is failing			P0116 Test Aborted = FALSE P0116 Test Complete = TRUE		
Intake Air Temperature Sensor Circuit Low (High Temperature)	P0112	Detects a continuous short to ground in the IAT signal circuit or the IAT sensor	Raw IAT Input	< 45 Ohms (~150 deg C)	Engine Run Time Coolant Temp Vehicle Speed No Active DTCs:	> 10.0 seconds < 150 deg C >= 0 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:	> 10.0 seconds > -40 deg C <= 318 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).	See "P0116: Fail if power up ECT exceeds IAT by these values" in the Supporting tables section	No Active DTC's Non-volatile memory initiation Test complete this trip	VehicleSpeedSensor_FA IAT_SensorFA ECT_Sensor_Ckt_FA IgnitionOffTimeValid TimeSinceEngineRunningValid = Not occurred	1 failure 500 msec/sample Once per valid cold start	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			2) ECT at power up > IAT at power up by 15.0 C after a minimum 28800 second soak and a block heater has not been detected.		Test aborted this trip	= False		
					IAT	= False ≥ -7 ºC		
					LowFuelCondition Diag			
						= False		
					Block Heater detection is enabled when either of the following occurs:			
			3) ECT at power up > IAT at power up by 15.0 C after a minimum 28800 seconds soak and the time spent cranking the engine without starting is greater than 10.0 seconds with the LowFuelConditionDiag	= False	1) ECT at power up > IAT at power up by	> 15.0 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		
					1c) Additional Vehicle drive time is provided to 1a when Vehicle speed is below 1b as follows:			
					1d) IAT drops from power up IAT	0.00 times the seconds with vehicle speed below 1b ≥ 8.0 ºC		
					2a) ECT drops from power up ECT	> 1.203125 ºC Within		
					2b) Engine run time	> 30 Seconds		
					3) Engine run time with vehicle speed below 1b	> 1800 Seconds		
					4) Minimum IAT during test			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						≤ -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 (~ 150° C)			5 failures out of 6 samples 1 sec/sample Continuous	Type B 2 trips
Engine Coolant Temp Sensor Circuit High	P0118	Circuit Continuity This DTC detects a short to high or open in the ECT signal circuit or the ECT sensor.	ECT Resistance (@ -60ºC)	> 450000 Ohms (~ -60° C)	Or IAT min	> 10.0 seconds ≥ -7.0 °C	5 failures out of 6 samples 1 sec/sample Continuous	Type B 2 trips
TPS1 Circuit	P0120	Detects a continuous or intermittent short or open in TPS1 circuit on the secondary processor but sensor is in range on the primary processor	Secondary TPS1 Voltage < or Secondary TPS1 Voltage >	0.325 4.75		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions No 5 V reference error No 5 V reference DTCs	19/39 counts or 14 counts continuous; 12.5 msec/count in the secondary processor	Type:A 1 Trip
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	>= 450 RPM <= 8000 RPM > 70 Deg C < 125 Deg C > -20 Deg C < 125 Deg C	Continuous Calculation are performed every 12.5 msec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Minimum total weight factor (all factors multiplied together)	>= 0.00 Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Estimate See table "IFRD Residual Weighting Factors". MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensorFA ECT_sensor_FA ECT_Sensor_FP IAT_SensorFA IAT_SensorCircuitFP CylDeacSystemTFTKO		
					No Active DTCs:			
Throttle Position Sensor Performance (supercharged)	P0121	Determines if the Throttle Position Sensor input is stuck within the normal operating range	See table "Supercharger Intake Flow Rationality Diagnostic Failure Matrix" for combinations of model failures that can set this DTC.		Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp	>= 450 RPM <= 6200 RPM > 69 Deg C < 125 Deg C > -20 Deg C	Continuous Calculation are performed every 12.5 msec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Intake Air Temp Minimum total weight factor (all factors multiplied together)	< 125 Deg C		
			TPS model fails when Filtered Throttle Model Error MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered	> 400 kPa*(g/s) > 21 grams/sec		>= 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		
			MAP1 model fails when ABS(Measured MAP – MAP Model 1) Filtered MAP2 model fails when ABS(Measured MAP – MAP Model 2) Filtered	> 22.0 kPa > 22.0 kPa		MAP Model 1 multiplied by MAP1 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost		
			SCIAP1 model fails when ABS(Measured SCIAP – SCIAP Model 1) Filtered SCIAP2 model fails when ABS(Measured SCIAP – SCIAP Model 2) Filtered	> 14.0 kPa		SCIAP Model 1 multiplied by SCIAP1 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
				> 14.0 kPa	No Active DTCs:	SCIAP Model 2 multiplied by SCIAP2 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost 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 IAT2_SensorFA IAT2_SensorCircuitFP SCIAP_SensorCircuitFA SCIAP_SensorCircuitFP AmbientAirDefault_SC		
TPS1 Circuit Low	P0122	Detects a continuous or intermittent short or open in TPS1 circuit on both processors or just the primary processor	Primary TPS1 Voltage <	0.325		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	79/159 counts; 57 counts continuous; 3.125 msec /count in the Primary processor	Type:A 1 Trip

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						No 5 V reference error		
			Secondary TPS1 Voltage <	0.325		No 5 V reference DTCs	19/39 counts or 14 counts continuous; 12.5 msec/count in the Secondary processor	
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 No 5 V reference error	79/159 counts; 57 counts continuous; 3.125 msec /count in the Primary processor	Type:A 1 Trip
			Secondary TPS1 Voltage >	4.75		No 5 V reference DTCs	19/39 counts or 14 counts continuous; 12.5 msec/count in the Secondary processor	
Engine Coolant Temperature Below Stat Regulating Temperature (For applications with a single coolant sensor)	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: Range #1 (Primary) ECT reaches 75.0 °C	See "P0128: Maximum Accumulated Airflow for IAT and Start-up ECT conditions" in the Supporting tables section	No Active DTC's	MAP_SensorFA MAF_SensorFA TPS_Performance_FA TPS_FA TPS_ThrottleAuthorityDefaulted IAT_SensorFA ECT_Sensor_Ckt_FA	30 failures to set DTC 1 sec/sample Once per ignition key cycle	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			when IAT min is ≤ 54.5°C and ≥ 10.0°C.			ECT_Sensor_Perf_FA VehicleSpeedSensor_FA		
			Range #2 (Alternate) ECT reaches 55.0 °C when IAT min is < 10.0°C and ≥ -7.0°C.		Engine not run time Engine run time Fuel Condition	≥ 1800 seconds ≥ 120 seconds Ethanol ≤ 87%		
					Range #1 (Primary) Test ECT at start run Average Airflow Vehicle speed	≤ 70.0 °C ≥ 10.0 gps > 5 mph for at least 2.4 miles		
					Range #2 (Alternate) Test ECT at start run Average Airflow Vehicle speed	≤ 50.0 °C ≥ 10.0 gps > 5 mph for at least 2.4 miles		
					Accumulated Airflow Adjustments 1) Max. airflow amount added when accumulating airflow is 2) Zero Airflow accumulated when airflow is 3) With AFM active Airflow added to accumulated is multiplied by 4) With Decel Fuel Cut Off active, accumulated airflow is reduced by multiplying actual airflow by	 70.0 gps < 17.0 gps 50.00%		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						1.00 times		
Engine Coolant Temperature Below Stat Regulating Temperature (For applications with a 2nd coolant sensor)	P0128	This DTC detects if the engine coolant temperature rises too slowly due to an ECT or Cooling system fault	Engine run time is accumulated when airflow is ≥ 17 grams per sec during Range #1 or #2: Range #1 (Primary) ECT reaches target temperature of 75.0 °C when IAT min is < 54.5°C and ≥ 10.0°C. Range #2 (Alternate) ECT reaches target temperature of 65.0 °C when IAT min is < 10.0°C and ≥ -7.0°C.	See "P0128: Maximum Accumulated Time for IAT and Start-up ECT conditions" in the Supporting tables section	No Active DTC's MAF_SensorFA IAT_SensorFA THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA Engine not run time ≥ 1800 seconds Engine run time 10 ≤ Eng Run Tme ≤ 1370 seconds 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	1 failure to set DTC 1 sec/sample Once per ignition key cycle	Type B 2 trips
Supercharger Inlet Absolute Pressure (SCIAP) Sensor Performance	P012B	Determines if the Supercharger Inlet Absolute Pressure Sensor input is stuck within the normal operating range	See table "Supercharger Intake Flow Rationality Diagnostic Failure Matrix" for combinations of model failures that can set this DTC. TPS model fails when		Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 450 RPM <= 6200 RPM > 69 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.00	Continuous Calculation are performed every 12.5 msec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Filtered Throttle Model Error	> 400 kPa*(g/s)		Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM		
			MAF model fails when					
			ABS(Measured Flow – Modeled Air Flow) Filtered	> 21 grams/sec		Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Estimate		
			MAP1 model fails when					
			ABS(Measured MAP – MAP Model 1) Filtered	> 22.0 kPa		MAP Model 1 multiplied by MAP1 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost		
			MAP2 model fails when					
			ABS(Measured MAP – MAP Model 2) Filtered	> 22.0 kPa		MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost		
			SCIAP1 model fails when					
			ABS(Measured SCIAP – SCIAP Model 1) Filtered	> 14.0 kPa		SCIAP Model 1 multiplied by SCIAP1 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost		
			SCIAP2 model fails when					
			ABS(Measured SCIAP – SCIAP Model 2) Filtered	> 14.0 kPa		SCIAP Model 2 multiplied by SCIAP2 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					No Active DTCs:	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 IAT2_SensorFA IAT2_SensorCircuitFP SCIAP_SensorCircuitFA SCIAP_SensorCircuitFP AmbientAirDefault_SC		
Supercharger Inlet Absolute Pressure (SCIAP) Sensor Circuit Low	P012C	Detects a continuous short to low or open in either the signal circuit or the SCIAP sensor.	SCIAP 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
Supercharger Inlet Absolute Pressure (SCIAP) Sensor Circuit High	P012D	Detects an open sensor ground or continuous short to high in either the signal circuit or the SCIAP sensor.	SCIAP Voltage	> 90.0 % of 5 Volt Range (4.5 Volts = 115.0 kPa)	Continuous		320 failures out of 400 samples 1 sample every 12.5 msec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
O2S Circuit Low Voltage Bank 1 Sensor 1	P0131	This DTC determines if the O2 sensor circuit is shorted to low.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is < 50 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted	380 failures out of 475 samples	Type B 2 trips
						MAP_SensorFA		
						AIR System FA		
						Ethanol Composition Sensor FA	Frequency: Continuous in 100 milli - second loop	
						EvapPurgeSolenoidCircuit_FA		
						EvapFlowDuringNonPurge_FA		
						EvapVentSolenoidCircuit_FA		
						EvapSmallLeak_FA		
						EvapEmissionSystem_FA		
						FuelTankPressureSnsrCkt_FA		
						FuelInjectorCircuit_FA		
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
						10.0 volts < system voltage< 32.0 volts		
					System Voltage			
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Equivalence Ratio	0.9922 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	3 % <= Throttle <= 70 %		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Fuel Condition	Ethanol <= 87%		
					Fuel State	DFCO not active		
					All of the above met for			
					Time	> 2.0 seconds		
O2S Circuit High Voltage Bank 1 Sensor 1	P0132	This DTC determines if the O2 sensor circuit is shorted to high.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is > 1050 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted	100 failures out of 125 samples	Type B 2 trips
						MAP_SensorFA		
						MAF_SensorFA		
						EvapPurgeSolenoidCircuit_FA	Frequency: Continuous in 100 milli - second loop	
						EvapFlowDuringNonPurge_FA		
						EvapVentSolenoidCircuit_FA		
						EvapSmallLeak_FA		
						EvapEmissionSystem_FA		
						FuelTankPressureSnsrCkt_FA		
						FuelInjectorCircuit_FA		
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Equivalence Ratio	0.9922 ≤ equiv. ratio ≤ 1.0137		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Throttle Position	0.0 % <= Throttle <= 70.0 %		
					Fuel Control State	= Closed Loop		
					Fuel Control State	not = Power Enrichment		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel State	DFCO not active		
					Fuel Condition	Ethanol <= 87%		
					All of the above met for			
					Time	> 2 seconds		
O2S Slow Response Bank 1 Sensor 1	P0133	This DTC determines if the O2 sensor response time is degraded.	The average response time is calculated over the test time, and compared to the threshold. Refer to **"P0133 - O2S Slow Response Bank 1 Sensor 1"** Pass/Fail Threshold table in the Supporting Tables tab.		No Active DTC's TPS_ThrottleAuthority Defaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault_No Snsr (naturally aspirated) AmbientAirDefault_SC (supercharged) MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsr Ckt_FA FuelInjectorCircuit_FA AIR System FA		Sample time is 60 seconds Frequency: Once per trip Green Sensor Delay Criteria The diagnostic will not be enabled until the next ignition cycle after the following has been met: Airflow greater than 22 gps for 120000 grams of accumulated flow non-continuously.	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						EthanolCompositionSensor_FA EngineMisfireDetected_FA	(Note that all other enable criteria must be met on the next ignition cycle for the test to run on that ignition cycle). Note: This feature is only enabled when the vehicle is new and cannot be enabled in service	
					Bank 1 Sensor 1 DTC's not active	= P0131, P0132 or P0134		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Green O2S Condition			
						= Not Valid		
					O2 Heater on for	>= 40 seconds		
					Learned Htr resistance	= Valid		
					Engine Coolant	> 60 ºC		
					IAT	> -40 ºC		
					Engine Run Time	> 160 seconds		
					Time since any AFM status change	> 0.0 seconds		
					Time since Purge On to Off change	> 0.0 seconds		
					Time since Purge Off to On change	> 0.0 seconds		
					Purge duty cycle	>= 0 % duty cycle		
					Engine airflow	20 gps <= engine airflow <= 55 gps		
					Engine speed	1200 <= RPM <= 3000		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Fuel	< 87 % Ethanol		
					Baro	> 70 kpa		
					Throttle Position	>= 5 %		
					Low Fuel Condition Diag	= False		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					LTM fuel cell	= Enabled		
					Transient Fuel Mass	<= 100.0 mgrams		
					Baro	= Not Defaulted		
					Fuel Control State	not = Power Enrichment		
					Fuel State	DFCO not active		
					Commanded Proportional Gain	>= 0.0 %		
					All of the above met for			
					Time	> 3.5 seconds		
O2S Circuit Insufficient Activity Bank 1 Sensor 1	P0134	This DTC determines if the O2 sensor circuit is open.	Measure Oxygen Sensor Signal.	350 mvolts < Oxygen Sensor signal < 550 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted MAF_SensorFA EthanolCompositionSensor_FA	400 failures out of 500 samples.	Type B 2 trips
					System Voltage	10.0 volts < system voltage< 32.0 volts	Minimum of 0 delta TPS changes required to report fail. Delta TPS is incremented when the TPS % change >= 0.0 %	
					AFM Status	= All Cylinders active		
					Heater Warm-up delay	= Complete		
					Predicted Exhaust Temp (by location)	= Warmed Up		
					Engine Run Time	> 300 seconds		
					Fuel	<= 87 % Ethanol		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
							Frequency: Continuous 100msec loop	
O2S Heater Performance Bank 1 Sensor 1	P0135	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	Measured Heater Current.	Measured Heater current < 0.3 amps -OR- Measured Heater current > 3.1 amps	No Active DTC's System Voltage Heater Warm-up delay O2S Heater device control B1S1 O2S Heater Duty Cycle **All of the above met for** Time	ECT_Sensor_FA 10.0 volts < system voltage< 32.0 volts = Complete = Not active > zero > 120 seconds	8 failures out of 10 samples Frequency: 1 tests per trip 5 seconds delay between tests and 1 second execution rate	Type B 2 trips
O2S Circuit Low Voltage Bank 1 Sensor 2	P0137	This DTC determines if the O2 sensor circuit is shorted to low.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is < 50 mvolts	No Active DTC's AIR intrusive test Fuel intrusive test Idle intrusive test	TPS_ThrottleAuthority Defaulted MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA = Not active = Not active = Not active	430 failures out of 540 samples Frequency: Continuous in 100 milli - second loop	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Equivalence Ratio	0.9922 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	3 % <= Throttle <= 70 %		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel Condition	Ethanol <= 87%		
					Fuel State	DFCO not active		
					All of the above met for Time	> 2.0 seconds		
O2S Circuit High Voltage Bank 1 Sensor 2	P0138	This DTC determines if the O2 sensor circuit is shorted to high.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is > 1050 mvolts	No Active DTC's TPS_ThrottleAuthority Defaulted MAP_SensorFA MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA		100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						FuelTankPressureSnsrCkt_FA		
						FuelInjectorCircuit_FA		
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Equivalence Ratio	0.9922 ≤ 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	The EWMA of the Post O2 sensor normalized integral value is greater than the threshold.	1) B1S2 EWMA normalized integral value > 8.5 units	No Active DTC's TPS_ThrottleAuthority Defaulted		Frequency: Once per trip Note: if	Type A 1 trips EWMA

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
(For applications with Post Oxygen Sensor Performance Diagnostic)		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.	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.	OR 2) Accumulated air flow during slow rich to lean test > 74 grams (upper threshold is 450 mvolts and lower threshold is 150 mvolts)		ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA	NaPOPD_b_Reset FastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_Rapid ResponseActive = TRUE, multiple tests per trip are allowed	
					B1S2 Failed this key cycle	P013B, P013E, P013F, P2270 or P2271		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					Learned heater resistance	= Valid	<u>Green Sensor Delay Criteria</u> The diagnostic will not be enabled until the next ignition cycle after the following has been met: Airflow greater than 22 gps for 120000 grams of accumulated flow non-continuously. (Note that all other enable criteria must be met on the next ignition cycle for the test to run on that ignition cycle). Note: This feature is only enabled when the vehicle is new and cannot be enabled in service	
					ICAT MAT Burnoff delay Green O2S Condition	= Not Valid = Not Valid		
					Low Fuel Condition Diag Post fuel cell DTC's Passed DTC's Passed	= False = enabled = P2270 (and P2272 (if applicable)) = P013E (and P014A (if applicable))		
					After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
O2 Sensor Slow Response Lean to Rich Bank 1 Sensor 2 (For applications with Post Oxygen Sensor Performance Diagnostic)	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 > 32.0 units OR 2) Accumulated air flow during slow lean to rich test > 75 grams (lower threshold is 350 mvolts and upper threshold is 650 mvolts) B1S2 Failed this key cycle	No Active DTC's	TPS_ThrottleAuthority Defaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013E, P013F, P2270 or P2271	Frequency: Once per trip Note: if NaPOPD_b_Reset FastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_Rapid ResponseActive = TRUE, multiple tests per trip are allowed	Type A 1 trips EWMA

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						P2270 or P2271		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					Learned heater resistance	= Valid	Green Sensor Delay Criteria	
					ICAT MAT Burnoff delay Green O2S Condition	= Not Valid	The diagnostic will not be enabled until the next ignition cycle after the following has been met: Airflow greater than 22 gps for 120000 grams of accumulated flow non-continuously. (Note that all other enable criteria must be met on the next ignition cycle for the test to run on that ignition cycle). Note: This feature is only enabled when the vehicle is new and cannot be enabled in service	
						= Not Valid		
					Low Fuel Condition Diag	= False		
					Post fuel cell	= enabled		
					DTC's Passed	= P2270 (and P2272 (if applicable))		
					DTC's Passed	= P013E (and P014A (if applicable))		
					DTC's Passed	= P013A (and P013C (if applicable))		
					DTC's Passed	= P2271 (and P2273 (if applicable))		
					DTC's Passed	= P013F (and P014B (if applicable))		
					After above conditions are met: Fuel Enrich mode continued.			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
O2 Sensor Slow Response Rich to Lean Bank 2 Sensor 2 (For applications with Post Oxygen Sensor Performance Diagnostic)	P013C	This DTC determines if the post catalyst O2 sensor has Slow Response in a predefined Rich to Lean voltages range during Rich to Lean transition. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	The EWMA of the Post O2 sensor normalized integral value is greater than the threshold. OR The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds) is greater than the airflow threshold.	1) B1S2 EWMA normalized integral value > 8.5 units OR 2) Accumulated air flow during slow rich to lean test > 74 grams (upper threshold is 450 mvolts and lower threshold is 150 mvolts)	No Active DTC's B2S2 Failed this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Post fuel cell DTC's Passed DTC's Passed	TPS_ThrottleAuthority Defaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013D, P014A, P014B, P2272 or P2273 10.0 volts < system voltage< 32.0 volts = Valid = Not Valid = Not Valid = False = enabled = P2270 (and P2272 (if applicable)) = P013E (and P014A (if applicable))	Frequency: Once per trip Note: if NaPOPD_b_Reset FastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_Rapid ResponseActive = TRUE, multiple tests per trip are allowed <u>Green Sensor Delay Criteria</u> The diagnostic will not be enabled until the next ignition cycle after the following has been met: Airflow greater than 22 gps for 120000 grams of accumulated flow non-continuously. (Note that all other enable criteria must be met on the next ignition cycle for the test to run on that ignition	Type A 1 trips EWMA

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).		cycle). Note: This feature is only enabled when the vehicle is new and cannot be enabled in service	
O2 Sensor Slow Response Lean to Rich Bank 2 Sensor 2 (For applications with Post Oxygen Sensor Performance Diagnostic)	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 > 32.0 units OR 2) Accumulated air flow during slow lean to rich test > 75 grams (lower threshold is 350 mvolts and upper threshold is 650 mvolts)	No Active DTC's	TPS_ThrottleAuthority Defaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected _FA	Frequency: Once per trip Note: if NaPOPD_b_Reset FastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_Rapid ResponseActive = TRUE, multiple tests per trip are allowed	Type A 1 trips 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	EthanolCompositionSensor_FA P013C, P014A, P014B, P2272 or P2273		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					Learned heater resistance	= Valid	_Green Sensor Delay Criteria_	
					ICAT MAT Burnoff delay Green O2S Condition	= Not Valid	The diagnostic will not be enabled until the next ignition cycle after the following has been met: Airflow greater than 22 gps for 120000 grams of accumulated flow non-continuously. (Note that all other enable criteria must be met on the next ignition cycle for the test to run on that ignition cycle). Note: This feature is only enabled when the vehicle is new and cannot be enabled in service	
						= Not Valid		
					Low Fuel Condition Diag	= False		
					Post fuel cell	= enabled		
					DTC's Passed	= P2270 (and P2272 (if applicable))		
					DTC's Passed	= P013E (and P014A (if applicable))		
					DTC's Passed	= P013A (and P013C (if applicable))		
					DTC's Passed	= P2271 (and P2273 (if applicable))		
					DTC's Passed	= P013F (and P014B (if applicable))		
					After above conditions are met: Fuel Enrich mode continued.			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
O2 Sensor Delayed Response Rich to Lean Bank 1 Sensor 2 (For applications with Post Oxygen Sensor Performance Diagnostic)	P013E	This DTC determines if the post catalyst O2 sensor has an initial delayed response to an A/F change from Rich to Lean. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	Post O2 sensor cannot go below the threshold voltage. AND The Accumulated mass air flow monitored during the Delayed Response Test is greater than the threshold.	1) Post O2S signal > 450 mvolts AND 2) Accumulated air flow during stuck rich test > 140 grams.	No Active DTC's B1S2 Failed this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag	TPS_ThrottleAuthority Defaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013B, P013F, P2270 or P2271 10.0 volts < system voltage< 32.0 volts = Valid = Not Valid = Not Valid = False	Frequency: Once per trip Note: if NaPOPD_b_Reset FastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_Rapid ResponseActive = TRUE, multiple tests per trip are allowed Green Sensor Delay Criteria The diagnostic will not be enabled until the next ignition cycle after the following has been met: Airflow greater than 22 gps for 120000 grams of	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Post fuel cell		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	
					DTC's Passed	= enabled = P2270 and P2272 (if applicable)		
					After above conditions are met: DFCO mode entered (wo driver initiated pedal input).			
O2 Sensor Delayed Response Lean to Rich Bank 1 Sensor 2 (For applications with Post Oxygen Sensor Performance Diagnostic)	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 > 650 grams.	No Active DTC's B1S2 Failed this key cycle System Voltage Learned heater resistance	TPS_ThrottleAuthority Defaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013A, P013B, P013E, P2270 or P2271 10.0 volts < system voltage< 32.0 volts = Valid	Frequency: Once per trip Note: if NaPOPD_b_Reset FastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_Rapid ResponseActive = TRUE, multiple tests per trip are allowed Green Sensor Delay Criteria	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					ICAT MAT Burnoff delay Green O2S Condition	= Not Valid = Not Valid	The diagnostic will not be enabled until the next ignition cycle after the following has been met: Airflow greater than 22 gps for 120000 grams of accumulated flow non-continuously. (Note that all other enable criteria must be met on the next ignition cycle for the test to run on that ignition cycle). Note: This feature is only enabled when the vehicle is new and cannot be enabled in service	
					Low Fuel Condition Diag Post fuel cell DTC's Passed DTC's Passed DTC's Passed DTC's Passed	= False = enabled = P2270 (and P2272 (if applicable)) = P013E (and P014A (if applicable)) = P013A (and P013C (if applicable)) = P2271 (and P2273 (if applicable))		
					After above conditions are met: Fuel Enrich mode entered.			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
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 System Voltage AFM Status Heater Warm-up delay Predicted Exhaust Temp (by location) Engine Run Time Fuel	TPS_ThrottleAuthority Defaulted MAF_SensorFA EthanolCompositionSensor_FA 10.0 volts < system voltage< 32.0 volts = All Cylinders active = Complete = Warmed Up > 300 seconds <= 87 % Ethanol	590 failures out of 740 samples. Minimum of 0 delta TPS changes required to report fail. Delta TPS is incremented when the TPS % change >= 0.0 % Frequency: Once per trip for post sensors 100msec loop	Type B 2 trips
O2S Heater Performance Bank 1 Sensor 2	P0141	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	Measured Heater Current.	Measured Heater current < 0.3 amps -OR- Measured Heater current > 2.9 amps	No Active DTC's System Voltage Heater Warm-up delay O2S Heater device control B1S1 O2S Heater Duty Cycle **All of the above met for** Time	ECT_Sensor_FA 10.0 volts < system voltage< 32.0 volts = Complete = Not active > zero > 120 seconds	8 failures out of 10 samples Frequency: 1 tests per trip 5 seconds delay between tests and 1 second execution rate	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
O2 Sensor Delayed Response Rich to Lean Bank 2 Sensor 2 (For applications with Post Oxygen Sensor Performance Diagnostic)	P014A	This DTC determines if the post catalyst O2 sensor has an initial delayed response to an A/F change from Rich to Lean. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	Post O2 sensor cannot go below the threshold voltage. AND The Accumulated mass air flow monitored during the Delayed Response Test is greater than the threshold.	1) Post O2S signal > 450 mvolts AND 2) Accumulated air flow during stuck rich test > 140 grams.	No Active DTC's B2S2 Failed this key cycle System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Post fuel cell DTC's Passed	TPS_ThrottleAuthority Defaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013C, P013D, P014B, P2272 or P2273 10.0 volts < system voltage< 32.0 volts = Valid = Not Valid = Not Valid = False = enabled = P2270 and P2272 (if applicable)	Frequency: Once per trip Note: if NaPOPD_b_Reset FastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_Rapid ResponseActive = TRUE, multiple tests per trip are allowed <u>Green Sensor Delay Criteria</u> The diagnostic will not be enabled until the next ignition cycle after the following has been met: Airflow greater than 22 gps for 120000 grams of accumulated flow non-continuously. (Note that all other enable criteria must be met on the next ignition cycle for the test to run on that ignition cycle). Note: This feature	Type B 2 trips

After above conditions are met:
DFCO mode entered (wo driver initiated pedal input).

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						Note: This feature is only enabled when the vehicle is new and cannot be enabled in service		
O2 Sensor Delayed Response Lean to Rich Bank 2 Sensor 2 (For applications with Post Oxygen Sensor Performance Diagnostic)	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 > 650 grams.	No Active DTC's TPS_ThrottleAuthority Defaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected _FA EthanolCompositionSe nsor_FA B2S2 Failed this key cycle P013C, P013D,	Frequency: Once per trip Note: if NaPOPD_b_Reset FastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_Rapid ResponseActive = TRUE, multiple tests per trip are allowed	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					System Voltage	P014A, P2272 or P2273 10.0 volts < system voltage< 32.0 volts		
					Learned heater resistance	= Valid	Green Sensor Delay Criteria	
					ICAT MAT Burnoff delay Green O2S Condition	= Not Valid	The diagnostic will not be enabled until the next ignition cycle after the following has been met: Airflow greater than 22 gps for 120000 grams of accumulated flow non-continuously. (Note that all other enable criteria must be met on the next ignition cycle for the test to run on that ignition cycle). Note: This feature is only enabled when the vehicle is new and cannot be enabled in service	
						= Not Valid		
					Low Fuel Condition Diag Post fuel cell DTC's Passed	= False = enabled = P2270 (and P2272 (if applicable))		
					DTC's Passed	= P013E (and P014A (if applicable))		
					DTC's Passed	= P013A (and P013C (if applicable))		
					DTC's Passed	= P2271 (and P2273 (if applicable))		
					After above conditions are met: Fuel Enrich mode entered.			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
O2S Circuit Low Voltage Bank 2 Sensor 1	P0151	This DTC determines if the O2 sensor circuit is shorted to low.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is < 50 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted	380 failures out of 475 samples	Type B 2 trips
						MAP_SensorFA		
						AIR System FA		
						Ethanol Composition Sensor FA	Frequency: Continuous in 100 milli - second loop	
						EvapPurgeSolenoidCircuit_FA		
						EvapFlowDuringNonPurge_FA		
						EvapVentSolenoidCircuit_FA		
						EvapSmallLeak_FA		
						EvapEmissionSystem_FA		
						FuelTankPressureSnsrCkt_FA		
						FuelInjectorCircuit_FA		
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Equivalence Ratio	0.9922 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	3 % <= Throttle <= 70 %		
					Fuel Control State	= Closed Loop		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Closed Loop Active = TRUE			
					All Fuel Injectors for active Cylinders Enabled (On)			
					Fuel Condition Ethanol <= 87%			
					Fuel State DFCO not active			
					All of the above met for			
					Time > 2.0 seconds			
O2S Circuit High Voltage Bank 2 Sensor 1	P0152	This DTC determines if the O2 sensor circuit is shorted to high.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is > 1050 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted	100 failures out of 125 samples	Type B 2 trips
						MAP_SensorFA		
						MAF_SensorFA		
						EvapPurgeSolenoidCircuit_FA	Frequency: Continuous in 100 milli - second loop	
						EvapFlowDuringNonPurge_FA		
						EvapVentSolenoidCircuit_FA		
						EvapSmallLeak_FA		
						EvapEmissionSystem_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			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Low Fuel Condition Diag	= False		
					Equivalence Ratio	0.9922 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	0.0 % <= Throttle <= 70.0 %		
					Fuel Control State	= Closed Loop		
					Fuel Control State	not = Power Enrichment		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel State	DFCO not active		
					Fuel Condition	Ethanol <= 87%		
					All of the above met for			
					Time	> 2 seconds		
O2S Slow Response Bank 2 Sensor 1	P0153	This DTC determines if the O2 sensor response time is degraded.	The average response time is calculated over the test time, and compared to the threshold. Refer to **"P0153 - O2S Slow Response Bank 2 Sensor 1"** Pass/Fail Threshold table in the Supporting Tables tab.		No Active DTC's TPS_ThrottleAuthority Defaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault_No Snsr (naturally aspirated) AmbientAirDefault_SC (supercharged) MAF_SensorFA EvapPurgeSolenoidCir cuit_FA EvapFlowDuringNonPu rge_FA EvapVentSolenoidCirc uit_FA EvapSmallLeak_FA EvapEmissionSystem_ FA		Sample time is 60 seconds Frequency: Once per trip Green Sensor Delay Criteria The diagnostic will not be enabled until the next ignition cycle after the following has been met: Airflow	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						FuelTankPressureSnsrCkt_FA	been met. Airflow greater than 22 gps for 120000 grams of accumulated flow non-continuously. (Note that all other enable criteria must be met on the next ignition cycle for the test to run on that ignition cycle). Note: This feature is only enabled when the vehicle is new and cannot be enabled in service	
						FuelInjectorCircuit_FA		
						AIR System FA		
						EthanolCompositionSensor_FA		
						EngineMisfireDetected_FA		
					Bank 2 Sensor 1 DTC's not active	= P0151, P0152 or P0154		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Green O2S Condition	= Not Valid		
					O2 Heater on for	>= 40 seconds		
					Learned Htr resistance	= Valid		
					Engine Coolant	> 60 ºC		
					IAT	> -40 ºC		
					Engine Run Time	> 160 seconds		
					Time since any AFM status change	> 0.0 seconds		
					Time since Purge On to Off change	> 0.0 seconds		
					Time since Purge Off to On change	> 0.0 seconds		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Purge duty cycle	>= 0 % duty cycle		
					Engine airflow	20 gps <= engine airflow <= 55 gps		
					Engine speed	1200 <= RPM <= 3000		
					Fuel	< 87 % Ethanol		
					Baro	> 70 kpa		
					Throttle Position	>= 5 %		
					Low Fuel Condition Diag	= False		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					LTM fuel cell	= Enabled		
					Transient Fuel Mass	<= 100.0 mgrams		
					Baro	= Not Defaulted		
					Fuel Control State	not = Power Enrichment		
					Fuel State	DFCO not active		
					Commanded Proportional Gain	>= 0.0 %		
					All of the above met for			
					Time	> 3.5 seconds		
O2S Circuit Insufficient Activity Bank 2 Sensor 1	P0154	This DTC determines if the O2 sensor circuit is open.	Measure Oxygen Sensor Signal.	350 mvolts < Oxygen Sensor signal < 550 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted	400 failures out of 500 samples.	Type B 2 trips
						MAF_SensorFA EthanolCompositionSensor_FA		
					System Voltage	10.0 volts < system voltage< 32.0 volts	Minimum of 0 delta TPS changes required to report fail. Delta TPS is incremented when the TPS % change >= 0.0 %	
					AFM Status	= All Cylinders active		
					Heater Warm-up delay	= Complete		
					Predicted Exhaust Temp (by location)	= Warmed Up		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Engine Run Time	> 300 seconds		
					Fuel	<= 87 % Ethanol		
							Frequency: Continuous 100msec loop	
O2S Heater Performance Bank 2 Sensor 1	P0155	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	Measured Heater Current.	Measured Heater current < 0.3 amps -OR- Measured Heater current > 3.1 amps	No Active DTC's	ECT_Sensor_FA	8 failures out of 10 samples	Type B 2 trips
					System Voltage	10.0 volts < system voltage< 32.0 volts	Frequency: 1 tests per trip	
					Heater Warm-up delay	= Complete		
					O2S Heater device control	= Not active	5 seconds delay between tests and 1 second execution rate	
					B1S1 O2S Heater Duty Cycle	> zero		
					All of the above met for			
					Time	> 120 seconds		
O2S Circuit Low Voltage Bank 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		430 failures out of 540 samples	Type B 2 trips
						TPS_ThrottleAuthority Defaulted		
						MAP_SensorFA		
						AIR System FA	Frequency: Continuous in 100 milli - second loop	
						Ethanol Composition Sensor FA		
						EvapPurgeSolenoidCircuit_FA		
						EvapFlowDuringNonPurge_FA		
						EvapVentSolenoidCircuit_FA		
						EvapSmallLeak_FA		
						EvapEmissionSystem_FA		
						FuelTankPressureSnsrCkt_FA		
						FuelInjectorCircuit_FA		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Equivalence Ratio	0.9922 ≤ equiv. ratio ≤ 1.0137		
					Throttle Position	3 % <= Throttle <= 70 %		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel Condition	Ethanol <= 87%		
					Fuel State	DFCO not active		
					All of the above met for			
					Time	> 2.0 seconds		
O2S Circuit High Voltage Bank 2 Sensor 2	P0158	This DTC determines if the O2 sensor circuit is shorted to high.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is > 1050 mvolts	No Active DTC's TPS_ThrottleAuthority Defaulted		100 failures out of 125 samples	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						MAP_SensorFA	Frequency: Continuous in 100 milli - second loop	
						MAF_SensorFA		
						EvapPurgeSolenoidCircuit_FA		
						EvapFlowDuringNonPurge_FA		
						EvapVentSolenoidCircuit_FA		
						EvapSmallLeak_FA		
						EvapEmissionSystem_FA		
						FuelTankPressureSnsrCkt_FA		
						FuelInjectorCircuit_FA		
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					EGR Device Control	= Not active		
					Idle Device Control	= Not active		
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Equivalence Ratio	0.9922 ≤ 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		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel State	DFCO not active		
					Fuel Condition	Ethanol <= 87%		
					All of the above met for			
					Time	> 2 seconds		
O2S Circuit Insufficient Activity Bank 2 Sensor 2	P0160	This DTC determines if the O2 sensor circuit is open.	Measure Oxygen Sensor Signal.	380 mvolts < Oxygen Sensor signal < 520 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted	590 failures out of 740 samples.	Type B 2 trips
						MAF_SensorFA		
						EthanolCompositionSensor_FA	Minimum of 0 delta TPS changes required to report fail. Delta TPS is incremented when the TPS % change >= 0.0 %	
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					AFM Status	= All Cylinders active		
					Heater Warm-up delay	= Complete		
					Predicted Exhaust Temp (by location)	= Warmed Up		
					Engine Run Time	> 300 seconds		
					Fuel	<= 87 % Ethanol		
							Frequency: Once per trip for post sensors	
							100msec loop	
O2S Heater Performance Bank 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	Type B 2 trips
					System Voltage	10.0 volts < system voltage< 32.0 volts		
							Frequency: 1 tests per trip	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						per trip		
					Heater Warm-up delay	= Complete		
					O2S Heater device control	= Not active	5 seconds delay between tests and 1 second execution rate	
					B1S1 O2S Heater Duty Cycle	> zero		
					All of the above met for			
					Time	> 120 seconds		
Fuel System Too Lean Bank 1	P0171	Determines if the fuel control system is in a lean condition, based on the filtered long-term fuel trim.	The filtered long-term fuel trim metric	≥ **Long Term Trim Lean** Table	Engine speed	375 <rpm< 7000	> 100 ms Frequency: Continuous	Type B 2 trips
					BARO	> 70 kPa		
					Coolant Temp	-40 <°C< 150	Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during **91 %** of the EPAIII drive cycle. This is also typical of real-world driving, however values will vary (higher or lower) based on the actual conditions present during the drive cycle.	
					MAP	10 <kPa< 255		
					Inlet Air Temp	-20 <°C< 150		
					MAF	1.0 <g/s< 510.0		
					VSS	< 83 mph		
					Fuel Level	> 10 % or if fuel sender is faulty		
					Long 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.		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Long-Term Fuel Trim Cell Usage Sometimes, certain Long-Term Fuel Trim Cells are not utilized for control or diagnosis. **Please see "Supporting Tables" Tab for a list of cells utilized for diagnosis.**			
					Closed loop fueling Enabled A Function of Coolant Temperature based on Start-up coolant temp. and a function of Time also based on Start-up coolant temp. **Please see "Supporting Tables" Tab**			
					Long Fuel Trim enabled	Closed Loop Enabled and coolant temp > 39 and < 140		
						and > 0.3 liters of fuel consumed after a fuel fill event (Flex Fuel Only)		
					EGR Flow Diag. Intrusive Test Not Active			
					Catalyst Monitor Diag. Intrusive Test Not Active			
					Post O2 Diag. Intrusive Test Not Active			
					Device Control Not Active			
					EVAP Diag. "tank pull down" Not Active			
					fuel trim diagnosed during decels? Yes			
					No active DTCs:	IAC_SystemRPM_FA		
						MAP_SensorFA		
						MAF_SensorFA		
						MAF_SensorTFTKO		
						AIR System FA		
						EvapPurgeSolenoidCircuit_FA		
						EvapFlowDuringNonPurge_FA		
						EvapVentSolenoidCircuit_FA		
						EvapSmallLeak_FA		
						EvapEmissionSystem_FA		
						FuelTankPressureSensorCircuit_FA		
						Ethanol Composition Sensor FA		
						FuelInjectorCircuit_FA		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						EngineMisfireDetected_FA		
						EGRValvePerformance_FA		
						EGRValveCircuit_FA		
						MAP_EngineVacuumStatus		
						AmbientAirDefault_NA		
Fuel System Too Rich Bank 1	P0172	Determines if the fuel control system is in a rich condition, based on the filtered long-term fuel trim metric. There are two different, yet related tests that are used to determine a Rich fault, they are Passive and Intrusive and are described below:			BARO	> 70 kPa	> 100 ms Frequency: Continuous Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during **91** % of the EPAIII drive cycle. This is also typical of real-world driving, however values will vary (higher or lower) based on the actual conditions present during the drive cycle.	Type B 2 trips
					Coolant Temp	-40 <°C< 150		
					MAP	10 <kPa< 255		
					IAT	-20 <°C< 150		
					MAF	1.0 <g/s< 510.0		
					VSS	< 83 mph		
					Long 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.		
					Long-Term Fuel Trim Cell Usage Sometimes, certain Long-Term Fuel Trim Cells are not utilized for control or diagnosis. **Please see "Supporting Tables" Tab for a list of cells utilized for diagnosis.**			
					Closed loop fueling Enabled A Function of Coolant Temperature based on Start-up coolant temp. and a function of Time also based on Start-up coolant temp. **Please see "Supporting Tables" Tab**			
					Long Fuel Trim enabled	Closed Loop Enabled and coolant temp > 39 and < 140 and > 0.3 liters of fuel consumed after a fuel fill event (Flex Fuel Only)		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		Passive Test: Non-purge cells are monitored to	The filtered Non-Purge Long Term Fuel Trim metric	**< Non Purge Rich Limit** Table				
		Intrusive Test- When the Purge Long Term fuel trim metric is **< the Purge Rich Limit Table,** Purge is ramped off to determine if excess purge vapor is the cause of the Rich condition. If the filtered Purge-on Long Term fuel trim > **Purge Rich Limit Table** the test passes without checking the Non-Purge Long Term fuel trim metric.	If the Purge Long Term Fuel Trim metric The filtered Non-Purge Long Term Fuel Trim metric	**< Purge Rich Limit** Table **< Non Purge Rich Limit** Table	A Passive Test decision cannot be made when Purge is enabled.	Fail determinations require that the Malfunction Criteria be satisfied for 3 out of 5 intrusive segments.		

Segment Definition -

Segments can last up to 30, and are separated by the lesser of 20 seconds of purge-on time or enough time to purge 16 grams of vapor.

A maximum of 5 completed segments or 20 intrusive attempts are allowed for each intrusive test.

After an intrusive test report is completed, another intrusive test cannot occur for 300 seconds to allow sufficient time to purge excess vapors from the canister. During this period, fuel trim will pass if the filtered Purge-on Long Term fuel trim > Purge Rich Limit Table for at least 200 seconds, indicating that the canister has been purged.

Performing intrusive tests too frequently may also affect EVAP and EPAIII emissions, and the execution frequency of other diagnostics.

					EGR Flow Diag. Intrusive Test Not Active		
				Catalyst Monitor Diag. Intrusive Test Not Active		
				Post O2 Diag. Intrusive Test Not Active		
				Device Control Not Active		
				EVAP Diag. "tank pull down" Not Active		
				fuel trim diagnosed during decels? Yes		

No active DTCs:	IAC_SystemRPM_FA
	MAP_SensorFA
	MAF_SensorFA
	MAF_SensorTFTKO
	AIR System FA
	EvapPurgeSolenoidCircuit_FA

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS		ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
							EvapFlowDuringNonPurge_FA		
							EvapVentSolenoidCircuit_FA		
							EvapSmallLeak_FA		
							EvapEmissionSystem_FA		
							FuelTankPressureSensorCircuit_FA		
							Ethanol Composition Sensor FA		
							FuelInjectorCircuit_FA		
							EngineMisfireDetected_FA		
							EGRValvePerformance_FA		
							EGRValveCircuit_FA		
							MAP_EngineVacuumStatus		
							AmbientAirDefault_NA		
Fuel System Too Lean Bank 2	P0174	Determines if the fuel control system is in a lean condition, based on the filtered long-term fuel trim.	The filtered long-term fuel trim metric	≥ **Long Term Trim Lean** Table	Engine speed	375 <rpm< 7000	> 100 ms Frequency: Continuous Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during **91** % of the EPAIII drive cycle. This is also typical of real-world driving, however values will vary (higher or lower) based on the actual conditions present during the drive cycle.	Type B 2 trips
					BARO	> 70 kPa		
					Coolant Temp	-40 <°C< 150		
					MAP	10 <kPa< 255		
					Inlet Air Temp	-20 <°C< 150		
					MAF	1.0 <g/s< 510.0		
					VSS	< 83 mph		
					Fuel Level	> 10 % or if fuel sender		
					Long Fuel Trim data accumulation:	> 28 seconds of data must accumulate on each trip, with at least 18 seconds of data in the current fuel trim cell before a pass or fail decision can be made.		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Long-Term Fuel Trim Cell Usage Sometimes, certain Long-Term Fuel Trim Cells are not utilized for control or diagnosis. **Please see "Supporting Tables" Tab for a list of cells utilized for diagnosis.**			
					Closed loop fueling Enabled A Function of Coolant Temperature based on Start-up coolant temp. and a function of Time also based on Start-up coolant temp. **Please see "Supporting Tables" Tab**			
					Long Fuel Trim enabled	Closed Loop Enabled and coolant temp > 39 and < 140		
						and > 0.3 liters of fuel consumed after a fuel fill event (Flex Fuel Only)		
					EGR Flow Diag. Intrusive Test Not Active			
					Catalyst Monitor Diag. Intrusive Test Not Active			
					Post O2 Diag. Intrusive Test Not Active			
					Device Control Not Active			
					EVAP Diag. "tank pull down" Not Active			
					fuel trim diagnosed during decels? Yes			
					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		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					FuelInjectorCircuit_FA EngineMisfireDetected_FA EGRValvePerformance_FA EGRValveCircuit_FA MAP_EngineVacuumStatus AmbientAirDefault_NA			
Fuel System Too Rich Bank 2	P0175	Determines if the fuel control system is in a rich condition, based on the filtered long-term fuel trim metric. There are two different, yet related tests that are used to determine a Rich fault, they are Passive and Intrusive and are described below:			BARO Coolant Temp MAP IAT MAF VSS Long Fuel Trim data accumulation: **Long-Term Fuel Trim Cell Usage** Sometimes, certain Long-Term Fuel Trim Cells are not utilized for control or diagnosis. **Please see "Supporting Tables" Tab for a list of cells utilized for diagnosis.** **Closed loop fueling Enabled** A Function of Coolant Temperature based on Start-up coolant temp. and a function of Time also based on Start-up coolant temp. **Please see "Supporting Tables" Tab**	> 70 kPa -40 <°C< 150 10 <kPa< 255 -20 <°C< 150 1.0 <g/s< 510.0 < 83 mph > 28 seconds of data must accumulate on each trip, with at least 18 seconds of data in the current fuel trim cell before a pass or fail decision can be made.	> 100 ms Frequency: Continuous Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically enabled during **91** % of the EPAIII drive cycle. This is also typical of real-world driving, however values will vary (higher or lower) based on the actual conditions present during the drive cycle.	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Long Fuel Trim enabled	Closed Loop Enabled and coolant temp > 39 and < 140 and > 0.3 liters of fuel consumed after a fuel fill event (Flex Fuel Only)		
		Passive Test: Non-purge cells are monitored to determine if a rich condition exists.	The filtered Non-Purge Long Term Fuel Trim metric	$\leq$ **Non Purge Rich Limit** Table				
		Intrusive Test- When the Purge Long Term fuel trim metric is $\leq$ **the Purge Rich Limit Table,** Purge is ramped off to determine if excess purge vapor is the cause of the Rich condition. If the filtered Purge-on Long Term fuel trim > **Purge Rich Limit Table** the test passes without checking the Non-Purge Long Term fuel trim metric.	If the Purge Long Term Fuel Trim metric The filtered Non-Purge Long Term Fuel Trim metric	$\leq$ **Purge Rich Limit** Table $\leq$ **Non Purge Rich Limit** Table	A Passive Test decision cannot be made when Purge is enabled.	Fail determinations require that the Malfunction Criteria be satisfied for 3 out of 5 intrusive segments.		

Segment Definition -

Segments can last up to 30, and are separated by the lesser of 20 seconds of purge-on time or enough time to purge 16 grams of vapor.

A maximum of 5 completed segments or 20 intrusive attempts are allowed for each intrusive test.

After an intrusive test report is completed, another intrusive test cannot occur for 300 seconds to allow sufficient time to purge excess vapors from the canister. During this period, fuel trim will pass if the filtered Purge-on Long Term fuel trim > Purge Rich Limit Table for at least 200 seconds, indicating that the canister has been purged.

Performing intrusive tests too frequently may also affect EVAP and EPAIII emissions, and the execution frequency of other diagnostics.

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					EGR Flow Diag. Intrusive Test Not Active			
					Catalyst Monitor Diag. Intrusive Test Not Active			
					Post O2 Diag. Intrusive Test Not Active			
					Device Control Not Active			
					EVAP Diag. "tank pull down" Not Active			
					fuel trim diagnosed during decels? Yes			
					No active DTCs:	IAC_SystemRPM_FA		
						MAP_SensorFA		
						MAF_SensorFA		
						MAF_SensorTFTKO		
						AIR System FA		
						EvapPurgeSolenoidCircuit_FA		
						EvapFlowDuringNonPurge_FA		
						EvapVentSolenoidCircuit_FA		
						EvapSmallLeak_FA		
						EvapEmissionSystem_FA		
						FuelTankPressureSensorCircuit_FA		
						Ethanol Composition Sensor FA		
						FuelInjectorCircuit_FA		
						EngineMisfireDetected_FA		
						EGRValvePerformance_FA		
						EGRValveCircuit_FA		
						MAP_EngineVacuumStatus		
						AmbientAirDefault_NA		
Injector 1	P0201	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 1 seconds	8 failures out of 10 samples 250 ms /sample Continuous	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Injector 2	P0202	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 1 seconds	8 failures out of 10 samples 250 ms /sample Continuous	Type B 2 trips
Injector 3	P0203	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 1 seconds	8 failures out of 10 samples 250 ms /sample Continuous	Type B 2 trips
Injector 4	P0204	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 1 seconds	8 failures out of 10 samples 250 ms /sample Continuous	Type B 2 trips
Injector 5	P0205	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 1 seconds	8 failures out of 10 samples 250 ms /sample Continuous	Type B 2 trips
Injector 6	P0206	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 1 seconds	8 failures out of 10 samples 250 ms /sample Continuous	Type B 2 trips
Injector 7	P0207	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 1 seconds	8 failures out of 10 samples 250 ms /sample Continuous	Type B 2 trips
Injector 8	P0208	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 32 volts greater than 1 seconds	8 failures out of 10 samples 250 ms /sample Continuous	Type B 2 trips
TPS2 Circuit	P0220	Detects a continuous or intermittent short or open in TPS2 circuit on the secondary processor but sensor is in range on the primary processor	Secondary TPS2 Voltage < or Secondary TPS2 Voltage >	0.25 4.59		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions No 5 V reference error	19/39 counts or 14 counts continuous; 12.5 msec/count in the Secondary processor	Type A 1 Trip

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						No 5 V reference DTCs		
TPS2 Circuit Low	P0222	Detects a continuous or intermittent short in TPS2 circuit on both processors or just the primary processor	Primary TPS2 Voltage <	0.25		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions No 5 V reference error	79/159 counts; 57 counts continuous; 3.125 msec /count in the Primary processor	Type A 1 Trip
			Secondary TPS2 Voltage <	0.25		No 5 V reference DTCs	19/39 counts or 14 counts continuous; 12.5 msec/count in the Secondary processor	
TPS2 Circuit High	P0223	Detects a continuous or intermittent short or open in TPS2 circuit on both processors or just the primary processor	Primary TPS2 Voltage >	4.59		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions No 5 V reference error	79/159 counts; 57 counts continuous; 3.125 msec /count in the Primary processor	Type A 1 Trip
			Secondary TPS2 Voltage >	4.59		No 5 V reference DTCs	19/39 counts or 14 counts continuous; 12.5 msec/count in the Secondary processor	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Fuel Pump Primary Circuit (ODM)	P0230	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Engine Speed	11 volts ≤ Voltage ≤ 32 volts ≥ 0 RPM	8 failures out of 10 samples 250 ms /sample Continuous	2 trips Type B
Supercharger Intercooler Coolant Pump Control Circuit	P023A	Electrical Integrity of Supercharger Intercooler Coolant Pump Control Circuitry	ECM detects that commanded and actual states of output driver do not match		Ignition Voltage Ignition Voltage Engine Speed	>= 11.00 Volts <= 32.00 Volts > 0	20 failures out of 25 samples 1 sample every 250 msec	Type B 2 trips
Random Misfire Detected Cylinder 1 Misfire Detected Cylinder 2 Misfire Detected Cylinder 3 Misfire Detected Cylinder 4 Misfire Detected Cylinder 5 Misfire Detected Cylinder 6 Misfire Detected Cylinder 7 Misfire Detected Cylinder 8 Misfire Detected	P0300 P0301 P0302 P0303 P0304 P0305 P0306 P0307 P0308	These DTC's will determine if a random or a cylinder specific misfire is occurring by monitoring crankshaft velocity	Deceleration index vs. Engine Speed Vs Engine load Deceleration index calculation is tailored to specific veh. Tables used are 1st tables encountered that are not max of range. Undetectable region at a given speed/load point is where all tables are max of range point. see Algorithm Description Document for additional details. Misfire Percent Emission Failure Threshold	(>Idle SCD AND > Idle SCD ddt Tables) **OR** (>SCD Delta AND > SCD Delta ddt Tables) **OR** (>Idle Cyl Mode AND > Idle Cyl Mode ddt Tables) **OR** (>Cyl Mode AND > Cyl Mode ddt Tables) **OR** (>Rev Mode Table) **OR** (> AFM Table in Cyl Deact mode) ≥ 1.00% P0300 ≥ 1.00% emission	Engine Run Time ECT If ECT at startup ECT System Voltage + Throttle delta - Throttle delta	> 2 crankshaft revolutions -7ºC < ECT < 130ºC < -7ºC 21ºC < ECT < 130ºC 9.00<volts<32.00 < 75.00% per 25 ms < 75.00% per 25 ms	Emission Exceedence = any (5) failed 200 rev blocks out of (16) 200 rev block tests Failure reported for (1) Exceedence in 1st (16) 200 rev block tests, or (4) Exceedences thereafter. any Catalyst Exceedence = (1) 200 rev block as data supports for catalyst damage. Failure reported with (1 or 3) Exceedences in FTP, or (1) Exceedence outside FTP.	Type B 2 trips (Mil Flashes with Catalyst Damaging Misfire)

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Misfire Percent Catalyst Damage	>"Catalyst Damaging Misfire Percentage" Table: **Unless**				
			Engine Speed ≤ 1500 rpm AND Engine Load ≤ 40% load AND Misfire counts ≥ 180 counts on one cylinder (at low speed/loads, one cylinder					
					Engine Speed	375 < rpm < (Engine Speed Limit) - 400	Continuous 4 cycle delay	
						Engine speed limit is a function of inputs like Gear and temperature		
						typical Engine Speed Limit = 5000 rpm (varies by application)		
				disable conditions:	No active DTCs:	TPS_FA	4 cycle delay	
						EnginePowerLimited		
						MAF_SensorTFTKO		
						MAP_SensorTFTKO		
						IAT_SensorTFTKO		
						ECT_Sensor_Ckt_TFTKO		
						5VoltReferenceB_FA		
						CrankSensorTestFailedTKO		
						CrankSensorFaultActive		
						CrankIntakeCamCorrelationFA		
						CrankExhaustCamCorrelationFA		
						CrankCamCorrelationTFTKO		
						AnyCamPhaser_FA		
						AnyCamPhaser_TFTKO		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					P0315 & engine speed	> 1000 rpm		
					Fuel Level Low	LowFuelConditionDiagnostic	500 cycle delay	
					Cam and Crank Sensors	in sync with each other	4 cycle delay	
					Misfire requests TCC unlock	Not honored because Transmission in hot mode	4 cycle delay	
					Fuel System Status	≠ Fuel Cut	4 cycle delay	
					Active Fuel Management	Transition in progress	7 cycle delay	
					Undetectable engine speed and engine load region	invalid speed load range in **decel index** tables	4 cycle delay	
					Abusive Engine Over Speed	> 8192 rpm	0 cycle delay	
					Below zero torque (except CARB approved 3000 rpm to redline triangle.)	<" Zero torque engine load" in Supporting Tables tab	4 cycle delay	

					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	
					Driveline Ring Filter active After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early.			
					Filter Driveline ring: Stop filter early:	4 engine cycles after misfire 3 Engine cycles after misfire		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			RR calc In EBCM (ABS) from Wheel speed		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 Monitor Rough Road RoughRoadSource ABS/TCS system RoughRoad	 > 3 % > 950 rpm > 3.1 mph = 4 consecutive cyls = 4 consecutive cyls = 4 consecutive cyls 1 (1=Yes) FromABS not active not detected (wheel sensor)		
Crankshaft Position System Variation Not Learned	P0315	Monitor for valid crankshaft error compensation factors	Sum of Compensation factors OR ≤ 3.9960	≥ 4.0040	OBD Manufacturer Enable Counter	0	0.50 seconds Frequency Continuous 100 msec	Type A 1 Trip
Knock Sensor (KS) Module Performance	P0324	This diagnostic will detect a failed internal ECM component associated with knock control	Any Cylinder's Avg Gain Signal **or** All Cylinder's Actual Signals	> 4.50 Volts ≤ 0.20 Volts	Engine Speed Engine Air Flow No Active DTC's Engine Speed Engine Air Flow No Active DTC's	≥ 400 RPM > 50 mg/cylinder KS_Ckt_Perf_B1B2_FA ≥ 400 RPM > 50 mg/cylinder KS_Ckt_Perf_B1B2_FA	50 Failures out of 63 Samples 100 msec rate	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Knock Sensor (KS) Circuit Bank 1 E38 & E67 controllers	P0325	This diagnostic checks for an open in the knock sensor circuit	Gated Low Pass Filter Voltage	> 4.0 Volts or < 1.24 Volts	Diagnostic Enabled (1 = Enabled) Engine Speed ECT Engine Run Time No Active DTC's Power Take-Off Disabled	= 1 ≥ 400 RPM ≥ -40 deg. C ≥ 2 seconds KS_Ckt_Perf_B1B2_FA Disabled	50 Failures out of 63 Samples 100 msec rate	Type B 2 trips
Knock Sensor (KS) Circuit Bank 1 E37 Controller	P0325	This diagnostic checks for an open in the knock sensor circuit	Gated FFT Output	< OpenCircuitThresh See Supporting Tables for OpenCircuitThresh	Diagnostic Enabled (1 = Enabled) Engine Speed ECT Engine Run Time No Active DTC's Power Take-Off	= 1 ≥ 1800 RPM ≥ -40 deg. C ≥ 1 seconds KS_Ckt_Perf_B1B2_FA = Not Active	50 Failures out of 63 Samples 100 msec rate	Type B 2 trips
Knock Sensor (KS) Performance Bank 1 (Common algorithm on all three controllers)	P0326	This diagnostic checks for an overactive knock sensor caused by excessive knock or noisy engine components	Knock Fast Retard (spark degrees) > KeKNOC_phi_FastRtdDiagThrsh See Supporting Tables for FastRtdMax	> (FastRtdMax + 6.0 degrees - 3.5) degrees spark	Diagnostic Enabled (1 = Enabled) Knock Detection Enabled Engine Speed MAP No Active DTC's Power Take-Off Disabled	= 1 > 0 **Knock Detection Enabled** is calculated by multiplying the following three factors: FastAttackRate FastAttackCoolGain FastAttackBaroGain (see Supporting Tables) ≥ 400 RPM ≥ 10 kPa TPS_ThrottleAuthority Defaulted Disabled	31 Failures out of 63 Samples 100 msec rate	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Knock Sensor (KS) Circuit Low Bank 1 E38 & E67 controllers	P0327	This diagnostic checks for an out of range low knock sensor signal	Sensor Input Signal Line **or** Sensor Return Signal Line	> 2.86 Volts < 1.48 Volts	ECT Engine Run Time Valid Oil Temp Required? (1= Yes, 0 = No) If No: No Eng Oil Temp enable criteria If Yes: ValidOilTemp and Engine Oil Temp	≥ -40 deg. C ≥ 2 seconds = 0 = EngOilValid < 256 deg. C	50 Failures out of 63 Samples 100 msec rate	Type B 2 trips
Knock Sensor (KS) Circuit Low Bank 1 E37 controller	P0327	This diagnostic checks for an out of range low knock sensor signal	Sensor Input Signal Line **or** Sensor Return Signal Line	< ShortLowThresh * (5 / 65,535) Volts < 2 * [ShortLowThresh * (5 / 65,535) - 2.5] Volts See Supporting Tables for ShortLowThresh	ECT Engine Run Time Valid Oil Temp Required? (1= Yes, 0 = No) If No: No Eng Oil Temp enable criteria If Yes: ValidOilTemp and Engine Oil Temp	≥ -40 deg. C ≥ 1 seconds = 1 = EngOilValid < 50 deg. C	50 Failures out of 63 Samples 100 msec rate	Type B 2 trips
Knock Sensor (KS) Circuit High Bank 1 E38 & E67 controllers	P0328	This diagnostic checks for an out of range high knock sensor signal	Sensor Input Signal Line **or** Sensor Return Signal Line	< 2.02 Volts > 3.76 Volts	ECT Engine Run Time Valid Oil Temp Required? (1= Yes, 0 = No)	≥ -40 deg. C ≥ 2 seconds = 0	50 Failures out of 63 Samples 100 msec rate	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					If No: No Eng Oil Temp enable criteria If Yes: ValidOilTemp and Engine Oil Temp	 = EngOilValid < 256 deg. C		
Knock Sensor (KS) Circuit High Bank 1 E37 controller	P0328	This diagnostic checks for an out of range high knock sensor signal	Sensor Input Signal Line **or** Sensor Return Signal Line	> ShortHiThresh * (5 / 65,535) Volts > 2 * [ShortLowThresh * (5 / 65,535) - 2.5] Volts See Supporting Tables for ShortHiThresh	ECT Engine Run Time Valid Oil Temp Required? (1= Yes, 0 = No) If No: No Eng Oil Temp enable criteria If Yes: ValidOilTemp and Engine Oil Temp	≥ -40 deg. C ≥ 1 seconds = 1 = EngOilValid < 50 deg. C	50 Failures out of 63 Samples 100 msec rate	Type B 2 trips
Knock Sensor (KS) Circuit Bank 2 E38 & E67 controllers	P0330	This diagnostic checks for an open in the knock sensor circuit	Gated Low Pass Filter Voltage	> 4.0 Volts or < 1.24 Volts	Diagnostic Enabled (1 = Enabled) Engine Speed ECT Engine Run Time No Active DTC's Power Take-Off Disabled (= FALSE)	= 1 ≥ 400 RPM ≥ -40 deg. C ≥ 2 seconds KS_Ckt_Perf_B1B2_FA GetPTOR_b_PTO_Active	50 Failures out of 63 Samples 100 msec rate	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Knock Sensor (KS) Circuit Bank 2 E37 controller	P0330	This diagnostic checks for an open in the knock sensor circuit	Gated FFT Output	< OpenCircuitThresh See Supporting Tables for OpenCircuitThresh	Diagnostic Enabled (1 = Enabled) Engine Speed ECT Engine Run Time No Active DTC's Power Take-Off	= 1 ≥ 1800 RPM ≥ -40 deg. C ≥ 1 seconds KS_Ckt_Perf_B1B2_FA = Not Active	50 Failures out of 63 Samples 100 msec rate	Type B 2 trips
Knock Sensor (KS) Circuit Low Bank 2 E38 & E67 controllers	P0332	This diagnostic checks for an out of range low knock sensor signal	Sensor Input Signal Line **or** Sensor Return Signal Line	> 2.86 Volts < 1.48 Volts	ECT Engine Run Time Valid Oil Temp Required? (1= Yes, 0 = No) If No: No Eng Oil Temp enable criteria If Yes: ValidOilTemp and Engine Oil Temp	≥ -40 deg. C ≥ 2 seconds = 0 = EngOilValid < 256 deg. C	50 Failures out of 63 Samples 100 msec rate	Type B 2 trips
Knock Sensor (KS) Circuit Low Bank 2 E37 controller	P0332	This diagnostic checks for an out of range low knock sensor signal	Sensor Input Signal Line **or** Sensor Return Signal Line	< ShortLowThresh * (5 / 65,535) Volts < 2 * [ShortLowThresh * (5 / 65,535) - 2.5] Volts See Supporting Tables for ShortLowThresh	ECT Engine Run Time Valid Oil Temp Required? (1= Yes, 0 = No) If No: No Eng Oil Temp enable criteria	≥ -40 deg. C ≥ 1 seconds = 1	50 Failures out of 63 Samples 100 msec rate	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					If Yes: ValidOilTemp and Engine Oil Temp	= EngOilValid < 50 deg. C		
Knock Sensor (KS) Circuit High Bank 2 E38 & E67 controllers	P0333	This diagnostic checks for an out of range high knock sensor signal	Sensor Input Signal Line **or** Sensor Return Signal Line	< 2.02 Volts > 3.76 Volts	ECT Engine Run Time Valid Oil Temp Required? (1= Yes, 0 = No) If No: No Eng Oil Temp enable criteria If Yes: ValidOilTemp and Engine Oil Temp	≥ -40 deg. C ≥ 2 seconds = 0 = EngOilValid < 256 deg. C	50 Failures out of 63 Samples 100 msec rate	Type B 2 trips
Knock Sensor (KS) Circuit High Bank 2 E37 controller	P0333	This diagnostic checks for an out of range high knock sensor signal	Sensor Input Signal Line **or** Sensor Return Signal Line	> ShortHiThresh * (5 / 65,535) Volts > 2 * [ShortLowThresh * (5 / 65,535) - 2.5] Volts See Supporting Tables for ShortHiThresh	ECT Engine Run Time Valid Oil Temp Required? (1= Yes, 0 = No) If No: No Eng Oil Temp enable criteria If Yes: ValidOilTemp and Engine Oil Temp	≥ -40 deg. C ≥ 1 seconds = 1 = EngOilValid < 50 deg. C	50 Failures out of 63 Samples 100 msec rate	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Crankshaft Position (CKP) Sensor A Circuit	P0335	Determines if a fault exists with the crank position sensor signal	Engine-Cranking Crankshaft Test:		Engine-Cranking Crankshaft Test:		Engine-Cranking Crankshaft Test:	Type B 2 trips
			Time since last crankshaft position sensor pulse received	>= 4.0 seconds	Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow	= FALSE = FALSE = FALSE > 3.0 grams/second))	Continuous every 100 msec	
			Time-Based Crankshaft Test:		Time-Based Crankshaft Test:		Time-Based Crankshaft Test:	
			No crankshaft pulses received	>= 0.3 seconds	Engine is Running Starter is not engaged No DTC Active:	5VoltReferenceB_FA	Continuous every 12.5 msec	
			Event-Based Crankshaft Test:		Event-Based Crankshaft Test:		Event-Based Crankshaft Test:	
			No crankshaft pulses received		Engine is Running OR Starter is engaged No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA P0340	2 failures out of 10 samples One sample per engine revolution	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						P0341		
Crankshaft Position (CKP) Sensor A Performance	P0336	Determines if a performance fault exists with the crank position sensor signal	Crank Re-synchronization Test:		Crank Re-synchronization Test:		Crank Re-synchronization Test:	Type B 2 trips
			Time in which 25 or more crank re synchronizations occur		Engine Air Flow Cam-based engine speed	>= 3.0 grams/second	Continuous every 250 msec	
				< 20.0 seconds	No DTC Active:	> 450 RPM 5VoltReferenceB_FA P0335		
			Time-Based Crankshaft Test:		Time-Based Crankshaft Test:		Time-Based Crankshaft Test:	
			No crankshaft synchronization gap found		Engine is Running Starter is not engaged		Continuous every 12.5 msec	
				>= 0.4 seconds	No DTC Active:	5VoltReferenceB_FA		
			Engine Start Test during Crank:		Engine Start Test during Crank:		Engine Start Test during Crank:	
			Time since starter engaged without detecting crankshaft synchronization gap		Starter engaged		Continuous every 100 msec	
					AND			
					(cam pulses being received			
				>= 1.5 seconds	OR			
					(DTC P0101	= FALSE		
					AND DTC P0102	= FALSE		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					AND DTC P0103 AND	= FALSE		
					Engine Air Flow	> 3.0 grams/second))		
			Event-Based Crankshaft Test:		Event-Based Crankshaft Test:		Event-Based Crankshaft Test:	
			Crank Pulses received in one engine revolution		Engine is Running		8 failures out of 10 samples	
			OR Crank Pulses received in one engine revolution	< 51 > 65	OR Starter is engaged 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:		Engine Cranking Camshaft Test:		Engine Cranking Camshaft Test:	Type B 2 trips
			Time since last camshaft position sensor pulse received		Starter engaged AND (cam pulses being received		Continuous every 100 msec	
			OR Time that starter has been engaged without a camshaft sensor pulse	>= 5.5 seconds >= 4.0 seconds	OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow	= FALSE = FALSE = FALSE > 3.0 grams/second))		
			Time-Based Camshaft Test:		Time-Based Camshaft Test:		Time-Based Camshaft Test:	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Engine is Running Starter is not engaged No DTC Active:	5VoltReferenceA_FA	Continuous every 100 msec	
			Fast Event-Based Camshaft Test:		Fast Event-Based Camshaft Test:		Fast Event-Based Camshaft Test:	
			No camshaft pulses received during first 24 MEDRES events (There are 24 MEDRES events per engine cycle)		Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged		Continuous every MEDRES event	
					No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA		
			Slow Event-Based Camshaft Test:		Slow Event-Based Camshaft Test:		Slow Event-Based Camshaft Test:	
			The number of camshaft pulses received during 100 engine cycles	= 0	Crankshaft is synchronized		8 failures out of 10 samples	
					No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Continuous every engine cycle	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor A	P0341	Determines if a performance fault exists with the cam position bank 1 sensor A signal	Fast Event-Based Camshaft Test: The number of camshaft pulses received during first 24 MEDRES events is less than 2 or greater than 8 (There are 24 MEDRES events per engine cycle) Slow Event-Based Camshaft Test: The number of camshaft pulses received during 100 engine cycles AND	 < 398 > 402	Fast Event-Based Camshaft Test: Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active: Slow Event-Based Camshaft Test: Crankshaft is synchronized No DTC Active:	 5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA 5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Fast Event-Based Camshaft Test: Continuous every MEDRES event Slow Event-Based Camshaft Test: 8 failures out of 10 samples Continuous every engine cycle	Type B 2 trips
IGNITION CONTROL #1 CIRCUIT	P0351	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 1 (Cylinders 1 and 4 for			Engine running Ignition Voltage	> 6.00 Volts	50 Failures out of 63 Samples	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		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.				100 msec rate	
IGNITION CONTROL #2 CIRCUIT	P0352	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 2 (Cylinders 2 and 5 for V6 with waste spark)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	> 6.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B 2 trips
IGNITION CONTROL #3 CIRCUIT	P0353	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 3 (Cylinders 3 and 6 for V6 with waste spark)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	> 6.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B 2 trips
IGNITION CONTROL #4 CIRCUIT	P0354	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 4 (if applicable)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	> 6.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B 2 trips

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	> 6.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B 2 trips
IGNITION CONTROL #6 CIRCUIT	P0356	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 6 (if applicable)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	> 6.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B 2 trips
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	> 6.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B 2 trips
IGNITION CONTROL #8 CIRCUIT	P0358	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 8 (if applicable)			Engine running Ignition Voltage	> 6.00 Volts	50 Failures out of 63 Samples 100 msec rate	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.					
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor B	P0365	Determines if a fault exists with the cam position bank 1 sensor B signal	Engine Cranking Camshaft Test:		Engine Cranking Camshaft Test:		Engine Cranking Camshaft Test:	Type B 2 trips
			Time since last camshaft position sensor pulse received		Starter engaged AND (cam pulses being received		Continuous every 100 msec	
			OR	>= 5.5 seconds				
			Time that starter has been engaged without a camshaft sensor pulse	>= 4.0 seconds	OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow	= FALSE = FALSE = FALSE > 3.0 grams/second))		
			Time-Based Camshaft Test:		Time-Based Camshaft Test:		Time-Based Camshaft Test:	
			Fewer than 4 camshaft pulses received in a time	> 3.0 seconds	Engine is Running Starter is not engaged No DTC Active:	5VoltReferenceA_FA	Continuous every 100 msec	
			Fast Event-Based Camshaft Test:		Fast Event-Based Camshaft Test:		Fast Event-Based Camshaft Test:	
			No camshaft pulses received during first 10 MEDRES events		Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged		Continuous every MEDRES event	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			(There are 10 MEDRES events per engine cycle)		No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA		
			Slow Event-Based Camshaft Test: The number of camshaft pulses received during 100 engine cycles	= 0	Slow Event-Based Camshaft Test: Crankshaft is synchronized No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Slow Event-Based Camshaft Test: 8 failures out of 10 samples Continuous every engine cycle	
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor B	P0366	Determines if a performance fault exists with the cam position bank 1 sensor B signal	Fast Event-Based Camshaft Test: The number of camshaft pulses received during first 10 MEDRES events is less than 3 or greater than 11 (There are 10 MEDRES events per engine cycle)		Fast Event-Based Camshaft Test: Crankshaft is synchronized Starter must be engaged to enable the diagnostic, but the diagnostic will not disable when the starter is disengaged No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Fast Event-Based Camshaft Test: Continuous every MEDRES event	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Slow Event-Based Camshaft Test:		Slow Event-Based Camshaft Test:		Slow Event-Based Camshaft Test:	
			The number of camshaft pulses received during 100 engine cycles		Crankshaft is synchronized		8 failures out of 10 samples	
					No DTC Active:	5VoltReferenceA_FA 5VoltReferenceB_FA	Continuous every engine cycle	
			AND	< 398 > 402		CrankSensor_FA		
Secondary AIR Incorrect Airflow Single Bank Systems	P0411	Detects an insufficient flow condition

This test is run during Phase 1 (AIR pump commanded On, Valve commanded Open)

  Leaks downstream of the valve are detected via an evaluation of both pressure error and average pressure "String Length"(SL) – a term that represents the absolute pressure delta accumulated every 6.25ms, then averaged over the duration of the test. Low SL values are indicative of downstream leaks or blockages. | Predicted System Pressure versus Actual System Pressure Error

or

OR

System Pressure Error

while the Average String Length | > 5.0 kPa

< -5.0 kPa

> 5.0 kPa

< -2.0 kPa

>**SL Threshold Bank 1** Table | BARO > 60 kPa
Inlet Air Temp > 5.0 deg C.
Coolant Temp > 5.0 deg C.
< 60.0 deg C.
Engine off time > 3600.0 seconds
System Voltage > 10.0 OR < 32.0
SL Stability time > 3.0 seconds
SL Range rpm < 5600 or > 6400

Conditional test weight is calculated by multiplying the following Factors

Phase 1 Baro Test Weight Factor
Phase 1 MAF Test Weight Factor
Phase 1 System Volt Test Weight Factor
Phase 1 Ambient Temp Test Weight Factor | Phase 1 Conditional test weight > 4.0 seconds

Total 'String Length' accumulation time

> 10 seconds | Type B 2 trips |
| | | | **disable conditions:** | | MAP < 20 kPa for 2 seconds
Engine Speed > 5000 RPM
MAF > 50 gm/s for 3 seconds
No active DTCs: AIRSystemPressureSensor FA
AIRValveControlCircuit FA
AIRPumpControlCircuit FA | | Frequency: Once per trip when AIR pump commanded On | |

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						MAF_SensorFA		
						MAP_SensorFA		
						IAT_SensorFA		
						ECT_Sensor_FA		
						EngineMisfireDetected_FA		
						CatalystSysEfficiencyLoB1_FA		
						CatalystSysEfficiencyLoB2_FA		
						ControllerProcessorPerf_FA		
						5VoltReferenceA_FA		
						5VoltReferenceB_FA		
						IgnitionOutputDriver_FA		
						FuelInjectorCircuit_FA		
Secondary AIR Solenoid Control Circuit	P0412	This DTC checks the AIR solenoid circuit for electrical integrity	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		System Voltage	> 10.0 Volts < 32.0 Volts	50 failures out of 63 samples 250 ms loop Continuous	Type B 2 trips
Secondary AIR Pump Control Circuit	P0418	This DTC checks the AIR Pump circuit for electrical integrity	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		System Voltage	> 10.0 Volts < 32.0 Volts	50 failures out of 63 samples 250 ms loop Continuous	Type B 2 trips
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	Type A 1 Trip

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and O2 during lean A/F excursions to store the excess oxygen (I.e. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H2 to release this stored oxygen (I.e. Cerium Reduction). This is referred to as the Oxygen Storage Capacity, or OSC. CatMon's strategy is to "measure" the OSC of the catalyst through forced Lean and Rich A/F excursions Normalized Ratio OSC Value Calculation Information and Definitions = 1. Raw OSC Calculation = (post cat O2 Resp time - pre cat O2 Resp time) 2. BestFailing OSC value from a calibration table (based on temp and exhaust gas flow) 3. WorstPassing OSC value (based on temp and exhaust gas flow) Normalized Ratio Calculation = (1-2) / (3-2) A Normalized Ratio of 1 essentially represents a good part and a ratio of 0 essentially represents a very bad part.			Throttle Position	< 2.00 %	per trip Maximum of 8 tests per trip Frequency: Fueling Related : 12.5 ms OSC Measurements: 100 ms Temp Prediction: 1000ms	
		The Catalyst Monitoring Test is done during idle. Several conditions must be meet in order to execute this test. These conditions and their related values are listed in the secondary parameters area of this document.			Vehicle Speed	< 1.24 MPH		
					Engine speed	> 1300 RPM for a minimum of 16 seconds since end of last idle period.		
					Engine run time	$\geq$ MinimumEngineRunTime**, This is a function of Coolant Temperature, please see Supporting Tables**		
					Tests attempted this trip	< 255		
					The catalyst diagnostic has not yet completed for the current trip.			
					Catalyst Idle Conditions Met Criteria			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					General Enable met and the Valid Idle Period Criteria met			
					Green Converter Delay	Not Active		
					Induction Air	*-20 < ° C < 250*		
					Intrusive test(s): Fueltrim Post O2 EVAP EGR	Not Active		
					RunCrank Voltage	> 10.90 Volts		
					Ethanol Estimation	NOT in Progress		
					ECT	*45 < ° 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 80 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 80 cal value), either the vehicle speed must exceed the vehicle speed cal or the TPS must exceed the TPS cal as stated in the Valid Idle Period Criteria section above.			
					Closed loop fueling Enabled			
					PRNDL			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Idle Stable Criteria :: Must hold true from after Catalyst Idle Conditions Met to the end of test			
					MAF	*2.00 < g/s < 21.00*		
					Predicted catalyst temperature	< 900 degC		
					Engine Fueling Criteria at Beginning of Idle Period			
					The following fueling related must also be met from between 4 and 7 seconds after the Catalyst Idle Conditions Met Criteria has been met for at least 4 seconds prior to allowing intrusive control			
					Number of pre-O2 switches	>= 2		
					Short Term Fuel Trim Avg	*0.960 < ST FT Avg < 1.040*		
					Rapid Step Response (RSR) feature will initiate multiple tests:			
					If the difference between current EWMA value and the current OSC Normalized Ratio value is > 0.620 and the current OSC Normalized Ratio value is < 0.100			
					Maximum of 18 RSR tests to detect failure when RSR is enabled.			
					Green Converter Delay Criteria			
					This is part of the check for the Catalyst Idle Conditions Met Criteria section			
					The diagnostic will not be enabled until the following has been met:			
					Predicted catalyst temperature > 550 ° C for 3600 seconds non-continuously.			
					Note: this feature is only enabled when the vehicle is new and cannot be enabled in service			
					PTO Not Active			
					General Enable			
					DTC's Not Set			
					MAF_SensorFA			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					AmbientAirDefault_SC			
					IAT_SensorCircuitFA			
					ECT_Sensor_FA			
					O2S_Bank_1_Sensor_1_FA			
					O2S_Bank_1_Sensor_2_FA			
					O2S_Bank_2_Sensor_1_FA			
					O2S_Bank_2_Sensor_2_FA			
					FuelTrimSystemB1_FA			
					FuelTrimSystemB2_FA			
					EngineMisfireDetected_FA			
					EvapPurgeSolenoidCircuit_FA			
					IAC_SystemRPM_FA			
					EGRValvePerformance_FA			
					EGRValveCircuit_FA			
					CamSensor_FA			
					CrankSensorFaultActive			
					TPS_Performance_FA			
					EnginePowerLimited			
					VehicleSpeedSensor_FA			
Catalyst System Low Efficiency Bank 2	P0430	Oxygen Storage	Normalized Ratio OSC Value (EWMA filtered)	< 0.350			1 test attempted per valid idle period Minimum of 1 test per trip	Type A 1 Trip
					Valid Idle Period Criteria			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts with NO and O2 during lean A/F excursions to store the excess oxygen (I.e. Cerium Oxidation). During rich A/F excursions, Cerium Oxide reacts with CO and H2 to release this stored oxygen (I.e. Cerium Reduction). This is referred to as the Oxygen Storage Capacity, or OSC. CatMon's strategy is to "measure" the OSC of the catalyst through forced Lean and Rich A/F excursions Normalized Ratio OSC Value Calculation Information and Definitions = 1. Raw OSC Calculation = (post cat O2 Resp time - pre cat O2 Resp time) 2. BestFailing OSC value from a calibration table (based on temp and exhaust gas flow) 3. WorstPassing OSC value (based on temp and exhaust gas flow) Normalized Ratio Calculation = (1-2) / (3-2) A Normalized Ratio of 1 essentially represents a good part and a ratio of 0 essentially represents a very bad part.			Throttle Position	< 2.00 %	Maximum of 8 tests per trip Frequency: Fueling Related : 12.5 ms OSC Measurements: 100 ms Temp Prediction: 1000ms	
		The Catalyst Monitoring Test is done during idle. Several conditions must be meet in order to execute this test. These conditions and their related values are listed in the secondary parameters area of this document.			Vehicle Speed	< *1.24 MPH*		
					Engine speed	> 1300 RPM for a minimum of 16 seconds since end of last idle period.		
					Engine run time	> MinimumEngineRunTime**, This is a function of Coolant Temperature, please see Supporting Tables**		
					Tests attempted this trip	< 255		
					The catalyst diagnostic has not yet completed for the current trip.			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Catalyst Idle Conditions Met Criteria			
					General Enable met and the Valid Idle Period Criteria met			
					Green Converter Delay	Not Active		
					Induction Air	*-20 < ° C < 250*		
					Intrusive test(s): Fueltrim Post O2 EVAP EGR	Not Active		
					RunCrank Voltage	> 10.90 Volts		
					Ethanol Estimation	NOT in Progress		
					ECT	*45 < ° C < 129*		
					Barometric Pressure	> 70 KPA		
					Idle Time before going intrusive is	< 50 Seconds		
					Idle time is incremented if Vehicle speed	< 1.24 Kph 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 80 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 80 cal value), either the vehicle speed must exceed the vehicle speed cal or the TPS must exceed the TPS cal as stated in the Valid Idle Period Criteria section above.			
					Closed loop fueling Enabled			
					PRNDL			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Idle Stable Criteria :: Must hold true from after Catalyst Idle Conditions Met to the end of test MAF *2.00 < g/s < 21.00* Predicted catalyst temperature < 900 degC *Engine Fueling Criteria at Beginning of Idle Period* **The following fueling related must also be met from between 4 and 7 seconds after the Catalyst Idle Conditions Met Criteria has been met for at least 4 seconds prior to allowing intrusive control** Number of pre-O2 switches >= 2 Short Term Fuel Trim Avg *0.96 < ST FT Avg < 1.04* *Rapid Step Response (RSR) feature will initiate multiple tests:* If the difference between current EWMA value and the current OSC Normalized Ratio value is > 0.620 and the current OSC Normalized Ratio value is < 0.100 Maximum of 18 RSR tests to detect failure when RSR is enabled. *Green Converter Delay Criteria* This is part of the check for the Catalyst Idle Conditions Met Criteria section The diagnostic will not be enabled until the following has been met: Predicted catalyst temperature > 550 ° C for 3600 seconds non-continuously. Note: this feature is only enabled when the vehicle is new and cannot be enabled in service PTO Not Active *General Enable* **DTC's Not Set** MAF_SensorFA AmbientAirDefault_SC			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					IAT_SensorCircuitFA			
					ECT_Sensor_FA			
					O2S_Bank_1_Sensor_1_FA			
					O2S_Bank_1_Sensor_2_FA			
					O2S_Bank_2_Sensor_1_FA			
					O2S_Bank_2_Sensor_2_FA			
					FuelTrimSystemB1_FA			
					FuelTrimSystemB2_FA			
					EngineMisfireDetected_FA			
					EvapPurgeSolenoidCircuit_FA			
					IAC_SystemRPM_FA			
					EGRValvePerformance_FA			
					EGRValveCircuit_FA			
					CamSensor_FA			
					CrankSensorFaultActive			
					TPS_Performance_FA			
					EnginePowerLimited			
					VehicleSpeedSensor_FA			

Evaporative Emission (EVAP) System Small Leak Detected	P0442	This DTC will detect a small leak (≥ 0.030") in the EVAP system between the fuel fill cap and the purge solenoid. The engine off natural vacuum method (EONV) is used. EONV is an evaporative system leak detection diagnostic that runs when the vehicle is shut off when enable conditions are met. Prior to sealing the system and performing the diagnostic, the fuel volatility is analyzed. In an open system (Canister Vent Solenoid [CVS] open) high volatility fuel creates enough flow to generate a measurable pressure differential relative to atmospheric.	The total delta from peak pressure to peak vacuum during the test is normalized against a calibration pressure threshold table that is based upon fuel level and ambient temperature. (See P0442: EONV Pressure Threshold Table on Supporting Tables Tab). The normalized value is calculated by the following equation: 1 - (peak pressure - peak vacuum)/pressure threshold. The normalized value is entered into EWMA (with 0= perfect pass and 1= perfect fail).		Fuel Level
					
					Drive Time
					
					Drive length
					
					ECT
					
					Baro
					
					Odometer
					
					    Time since last complete test
					
					if normalized result and EWMA is passing
					
					OR
					
					    Time since last complete test
					
					if normalized result or EWMA is failing
						10 % ≤ Percent ≤ 90 %
						
						≥ 900 seconds
						
						≥ 5.0 miles
						
						≥ 70 °C
						
						≥ 70 kPa
						
						≥ 10.0 miles
						
						≥ 17 hours
						
						≥ 10 hours
							Once per trip, during hot soak (up to 2400 sec.).
							
							No more than 2 unsuccessful attempts between completed tests.
								Type A 1 trip
								
								EWMA
								
								Average run length is 7 under normal conditions
								
								Run length is 2 to 6 trips after code clear or non-volatile reset

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

		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	When EWMA is > 0.71 (EWMA Fail Threshold)
			
			, 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.
				≤ 0.35 (EWMA Re-Pass Threshold)	Estimated ambient temperature at end of drive
					
					Estimate of Ambient Air Temperature Valid
					
					Conditions for Estimate of Ambient Air Temperature (EAT) to be valid:
					
					1. Cold Start
					  Startup delta deg C (ECT-IAT)
					OR
					
					2. Short Soak and Previous EAT Valid
					  Previous time since engine off
					OR
						0 °C ≤ Temperature ≤ 34 °C
						
						≤ 8 °C
						
						≤ 7200 seconds		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		vacuum peak, the test then completes. If the key is turned on while the diagnostic test is in progress, the test will abort.			**3. Not a Cold Start and Previous EAT Valid and between Short and Long Soak**			
					Previous time since engine off	7200 seconds < Time <		
					AND			
					Must expire Estimate of Ambient Temperature Valid Conditioning Time. **Please see "P0442: Estimate of Ambient Temperature Valid Conditioning Time" in Supporting Tables Tab.**	Vehicle Speed ≥ 9.9 mph AND Mass Air Flow ≥ 0 g/sec		
					4. Not a Cold Start and Previous EAT Not Valid and less than Long Soak			
					Previous time since engine off AND	< 25200 seconds		
					Must expire maximum value in Estimate of Ambient Temperature Valid Conditioning Time. **Please see "P0442: Estimate of Ambient Temperature Valid Conditioning Time" in Supporting Tables Tab.**	Vehicle Speed ≥ 9.9 mph AND Mass Air Flow ≥ 0 g/sec		
					OR			
					5. Long Soak			
					Previous time since engine off	≥ 25200 seconds		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
				Abort Conditions:	**1. High Fuel Volatility** During the volatility phase, pressure in the fuel tank is integrated vs. time. If the integrated pressure is then test aborts and unsuccessful attempts is incremented. OR **2. Vacuum Refueling Detected** See P0454 Fault Code for information on vacuum refueling algorithm. OR **3. Fuel Level Refueling Detected** See P0464 Fault Code for information on fuel level refueling. 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	> -5		

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**	0.50 seconds		
					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.		Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	20 failures out of 25 samples 250 ms /sample Continuous with solenoid operation	Type B 2 trips
Evaporative Emission (EVAP) Vent System Performance	P0446	This DTC will determine if a restriction is present in the vent solenoid, vent filler, vent hose or EVAP canister. This test runs with normal purge and vent valve is open.	Vent Restriction Prep Test: Vented Vacuum or Vented Vacuum for 60 seconds Vent Restriction Test:	< -623 Pa > 1245 Pa	Fuel Level System Voltage Startup IAT Startup ECT BARO No active DTCs:	10% ≤ Percent ≤ 90% 11 volts ≤ Voltage ≤ 32 volts 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C ≥ 70 kPa MAP_SensorFA	Once per Cold Start Time is dependent on driving conditions	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Tank Vacuum for 5 seconds BEFORE Purge Volume 2 liters of fuel must be consumed after setting the DTC active the first time to set the DTC active the second time.	> 2989 Pa ≥ 12 liters		TPS_FA VehicleSpeedSensor_FA IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454	Maximum time before test abort is 1000 seconds	
Evaporative Emission (EVAP) Vent Solenoid Control Circuit (ODM)	P0449	This DTC checks the circuit for electrical integrity during operation. If the P0449 is active, an intrusive test is performed with the vent solenoid commanded closed for 15 seconds.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	20 failures out of 25 samples 250 ms / sample Continuous with solenoid operation	Type B 2 trips
Fuel Tank Pressure (FTP) Sensor Circuit Performance	P0451	The DTC will be set if the fuel tank vacuum sensor is out of range when it tries to re-zero prior to the phase-1 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)		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.	Type A 1 trip EWMA Average run length: 6

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Upper voltage threshold (voltage addition above the nominal voltage)	0.2 volts				Run length is 2 trips after code clear or non-volatile reset
			Lower voltage threshold (voltage subtraction below the nominal voltage)	0.2 volts			The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete.	
			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	> 0.73 (EWMA Fail Threshold)				
			, the DTC light is illuminated. The DTC light can be turned off if the EWMA is					
				≤ 0.40 (EWMA Re-Pass Threshold)				
			and stays below the EWMA fail threshold for 2 additional consecutive trips.					

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Fuel Tank Pressure (FTP) Sensor Circuit Low Voltage	P0452	This DTC will detect a fuel tank pressure sensor signal that is too low out of range.	Fuel tank pressure sensor signal The normal operating range of the fuel tank pressure sensor is 0.5 volts (~1245 Pa) to 4.5 volts (~ -3736 Pa).	< 0.15 volts (3 % of Vref or ~ 1681 Pa)	Time delay after sensor power up for sensor warm-up ECM State ≠ crank	is 0.10 seconds	80 failures out of 100 samples 100 ms / sample Continuous	Type B 2 trips
Fuel Tank Pressure (FTP) Sensor Circuit High Voltage	P0453	This DTC will detect a fuel tank pressure sensor signal that is too high out of range.	Fuel tank pressure sensor signal The normal operating range of the fuel tank pressure sensor is 0.5 volts (~1245 Pa) to 4.5 volts (~ -3736 Pa).	> 4.85 volts (97% of Vref or ~ -4172 Pa)	Time delay after sensor power up for sensor warm-up ECM State ≠ crank		80 failures out of 100 samples 100 ms / sample Continuous	Type B 2 trips
Fuel Tank Pressure (FTP) Sensor Circuit Intermittent	P0454	This DTC will detect intermittent tank vacuum sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event.	If an abrupt change in tank vacuum is detected the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that a refueling event occurred. If a refueling is confirmed, then the test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem. The abrupt change is defined as a change in vacuum:	112 Pa < Vacuum < 249 Pa	This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period. The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete. The test will report a failure if 2 out of 3 samples are failures.	Type A 1 trip

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			in the span of 1.0 seconds. A refueling event is confirmed if the fuel level has a persistent change for 30 seconds.	of 10 %				
Evaporative Emission (EVAP) System Large Leak Detected	P0455	This DTC will detect a weak vacuum condition (large leak or purge blockage) in the EVAP system. Purge valve is controlled (to allow purge flow) and vent valve is commanded closed.	Purge volume BEFORE Tank vacuum 2 liters of fuel must be consumed after setting the DTC active the first time to set the DTC active the second time. Weak Vacuum Follow-up Test (fuel cap replacement test) Weak Vacuum Test failed. Passes if tank vacuum Note: Weak Vacuum Follow-up Test can only report a pass.	> 45 liters ≤ 2740 Pa ≥ 2740 Pa	Fuel Level System Voltage BARO No active DTCs:	10% ≤ Percent ≤ 90% 11 volts ≤ Voltage ≤ 32 volts ≥ 70 kPa MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454	Once per cold start Time is dependent on driving conditions Maximum time before test abort is 1000 seconds Weak Vacuum Follow-up Test	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Cold Start Test If ECT > IAT, Startup temperature delta (ECT-IAT): Cold Test Timer Startup IAT Temperature Startup ECT	≤ 8 °C ≤ 1000 seconds 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C	With large leak detected, the follow-up test is limited to 1300 seconds. Once the MIL is on, the follow-up test runs indefinitely.	
					Weak Vacuum Follow-up Test This test can run following a weak vacuum failure or on a hot restart.			
Fuel Level Sensor 1 Performance (For use on vehicles with a single fuel tank)	P0461	This DTC will detect a fuel sender stuck in range in the primary fuel tank.	Delta Fuel Volume change over an accumulated 150 miles.	< 3 liters	Engine Running No active DTCs:	 VehicleSpeedSensor_FA	250 ms / sample Continuous	Type B 2 trips
Fuel Level Sensor 1 Performance (For use on vehicles with electric transfer pump dual fuel tanks)	P0461	This DTC will detect a fuel sender stuck in range in the primary fuel tank.	Fuel Level in Primary and Secondary Tanks 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 During fuel transfer, when the enable conditions are met, at least 3.0 liters of fuel will be transferred from the secondary tank and 3.0 liters of fuel will be transferred into the primary tank within 180 seconds. There is a short delay of 20 seconds to allow	>= 99.0 liters < 0.0 liters 200 miles	Engine Running No active DTCs: During fuel transfer Transfer Pump is commanded on No device control for the transfer pump Fuel Volume in Secondary Tank	 VehicleSpeedSensor_FA < 43 liters	250 ms / sample Continuous	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			fuel slosh to settle before the fail timer begins. If the secondary tank volume does decrease by the cal amount but the primary volume does not increase by the cal amount after the fail timer has expired, then P0461 sets.		Vehicle Speed	< 0 mph		
			OR					
				Distance Traveled without a Primary Fuel Level Change				
			Delta Fuel Volume change over an accumulated 175 miles.	< 3 liters				
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	Type B 2 trips
			Fuel Level in Primary Tank Remains in an Unreadable Range too Long					
			If fuel volume in primary tank is	>= 28.5 liters				
			AND					
			Fuel volume in secondary tank	< 6.0 liters				
			and remains in this condition for	200 miles				
			OR					
			After Refuel Event					

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			If the secondary fuel volume changes by 10.0 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	< 28.5 liters		
			Distance Traveled without a Primary Fuel Level Change					
			Delta Fuel Volume change over an accumulated 80 miles.	< 3 liters				
Fuel Level Sensor 1 Circuit Low Voltage	P0462	This DTC will detect a fuel sender stuck out of range low in the primary fuel tank.	Fuel level Sender % of 5V range	< 10 %	Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	180 failures out of 225 samples 100 ms / sample Continuous	Type B 2 trips
Fuel Level Sensor 1 Circuit High Voltage	P0463	This DTC will detect a fuel sender stuck out ofrange high in the primary fuel tank.	Fuel level Sender % of 5V range	> 60 %	Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	180 failures out of 225 samples 100 ms / sample Continuous	Type B 2 trips
Fuel Level Sensor 1 Circuit Intermittent	P0464	This DTC will detect intermittent fuel level sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event.	If a change in fuel level is detected, the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that an actual refueling event occurred. If a refueling event is confirmed, then the test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem.		This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off natural vacuum small leak test. The test can only execute up to once per engine-off period. The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete.	Type A 1 trip

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			An intermittent change in fuel level is defined as: The fuel level changes by 10 % and does not remain for 30 seconds during a 600 second refueling rationality test.	> 10 %			The test will report a failure if 2 out of 3 samples are failures.	
Cooling Fan 1 Relay Control Circuit (ODM) (Not used on systems with mechanical fans)	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	Type B 2 trips Not used on systems with Mechanical Fan)
Cooling Fan 2 Relay Control Circuit (ODM) (Not used on systems with mechanical fans)	P0481	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Engine Speed	11 volts ≤ Voltage ≤ 32 volts ≥ 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous with fan operation	Type B 2 trips Not used on systems with Mechanical Fan)

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Evaporative Emission (EVAP) System Flow During Non-Purge	P0496	This DTC will determine if the purge solenoid is leaking to engine manifold vacuum. This test will run with the purge valve closed and the vent valve closed.	Tank Vacuum for 5 seconds BEFORE Test time	> 2491 Pa ≥ refer to "P0496: Purge Valve Leak Test Engine Vacuum Test Time (Cold Start) as a Function of Fuel Level table" in Supporting Tables Tab.	Fuel Level System Voltage BARO Startup IAT Temperature Startup ECT Engine Off Time No active DTCs:	10% ≤ Percent ≤ 90% 11 volts ≤ Voltage ≤ 32 volts ≥ 70 kPa 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C ≥ 28800.0 seconds MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454	Once per cold start Cold start: max time is 1000 seconds	Type B 2 trips
Transmission Output Speed Sensor (TOSS) (Manual trans only)	P0502	No activity in the TOSS circuit	TOSS Raw Speed Maximum Engine Torque Minimum Engine Torque Maximum Engine Torque in Park or Neutral Minimum Engine Torque in Park or Neutral Minimum Throttle opening	<= 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	<= 8192 N-m >= 68 N-m <= 8192 N-m >= 54 N-m >= 8.0 %	>= 4.5 sec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Minimum Engine Speed when there is a Brake DTC	>= 1500 RPM		
					Minimum Engine Speed when there is no Brake DTC	>= 1500 RPM		
					Maximum Engine Speed	<= 6500 RPM		
					Minimum Transmission Fluid Temperature	>= -20 ° C.		
					Disable P0502 if PTO Active	= 0 Boolean		
					Maximum Engine Speed	<= 7500 RPM		
					Minimum Engine Speed	>= 200 RPM		
					Time at Engine Speed	>= 5 sec		
					Maximum Ignition Voltage	<= 32 volts		
					Minimum Ignition Voltage	>= 9 volts		
				Disable Conditions:	Disables on these Pcodes:	EngineTorqureInaccurate MAF_SensorTFTKO MAP_SensorTFTKO P0503 P0502 ACTIVE and TFTKO		
Transmission Output Speed Sensor (TOSS)	P0503	TOSS Signal Intermittent	Loop-to-Loop change in TOSS	>= 350 RPM			>= 3.25 sec	Type B 2 trips
					Loop-to-Loop Input Speed Change	<= 500 RPM		
					Raw Output Speed	>= 300 RPM		
					Output Speed change	<= 150 RPM		
					Time for Input Speed Change	>= 2 sec		
					Time since Range Change	>= 6 sec		
					Time for Positive Output Speed Change	>= 2 sec		
					Time above raw Output Speed	>= 2 sec		
					Time since 4WD Range change	>= 6 sec		
					Maximum Ignition Voltage	<= 32 volts		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Minimum Ignition Voltage	>= 9 volts		
					Minimum Engine Torque	>= 75 N-m		
					Minimum Engine Speed	>= 600 RPM		
					Maximum TCC slip	<= 4096 RPM		
					Minimum TCC slip	>= -4096 RPM		
					Minimum Throttle position	>= 8.0 %		
					Minimum Vehicle speed	<= 186 mph		
					Disables on these Pcodes:	P0503 ACTIVE and TFTKO		
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 every 12.5 ms loop	Type B 2 trips
			filter coefficient	0.003	Coolant Temp	> 60 °C and < 125 °C	Diagnostic reports pass or fail in	
					Engine run time	≥ 60 sec	10 sec	
					Ignition voltage	32 ≥ volts ≥ 11	once all enable conditions are met	
					Time since gear change	≥ 3 sec		
					Time since a TCC mode change	> 3 sec		
					IAT	> -20 °C		
					Vehicle speed	≤ 1.24 mph		
					Commanded RPM delta	≤ 25 rpm		
					For manual transmissions: Clutch Pedal or	> 88.00 pct		
					Clutch Pedal	< 16.00 pct		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					No active DTCs	PTO not active Transfer Case not in 4WD LowState		
						Off-vehicle device control (service bay control) must not be active.		
						AmbientAirDefault		
						ECT_Sensor_FA		
						EGRValveCircuit_FA		
						EGRValvePerformance_FA		
						IAT_SensorCircuitFA		
						EvapFlowDuringNonPurge_FA		
						FuelTrimSystemB1_FA		
						FuelTrimSystemB2_FA		
						FuelInjectorCircuit_FA		
						MAF_SensorFA		
						EngineMisfireDetected_FA		
						IgnitionOutputDriver_FA		
						EnginePowerLimited		
						TPS_FA		
						TPS_Performance_FA		
						VehicleSpeedSensor_FA		
						FuelLevelDataFault		
						LowFuelConditionDiagnostic		
						Clutch Sensor FA		
					All of the above met for Idle time	> 10 sec		
High Engine Speed Idle System	P0507	This DTC will determine if a high idle exists	Filtered Engine Speed Error filter coefficient	> -182.00 rpm 0.003	Baro	> 70 kPa	Diagnostic runs in every 12.5 ms loop	Type B 2 trips
					Coolant Temp	> 60 °C and < 125 °C	Diagnostic reports	
					Engine run time	≥ 60 sec	pass or fail in	
					Ignition voltage	32 ≥ volts ≥ 11		
					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 or	> 88.00 pct		
					Clutch Pedal	< 16.00 pct		
						PTO not active Transfer Case not in 4WD LowState		
						Off-vehicle device control (service bay control) must not be active.		
					No active DTCs	AmbientAirDefault		
						ECT_Sensor_FA		
						EGRValveCircuit_FA		
						EGRValvePerformance_FA		
						IAT_SensorCircuitFA		
						EvapFlowDuringNonPurge_FA		
						FuelTrimSystemB1_FA		
						FuelTrimSystemB2_FA		
						FuelInjectorCircuit_FA		
						MAF_SensorFA		
						EngineMisfireDetected_FA		
						IgnitionOutputDriver_FA		
						EnginePowerLimited		
						TPS_FA		
						TPS_Performance_FA		
						VehicleSpeedSensor_FA		
						FuelLevelDataFault		
						LowFuelConditionDiagnostic		
						Clutch Sensor FA		
					All of the above met for Idle time	> 10 sec		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
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	Type B 2 trips
					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)			
			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		>= 0.30 weighting		
					No active DTC's	Fault bundles: CrankSensorFA ECT_Sensor_FA MAF_SensorFA IAT_SensorFA EOPCircuit_FA		
Engine Oil Pressure (EOP) Sensor Circuit Low Voltage	P0522	Determines if the Engine Oil Pressure (EOP) Sensor circuit voltage is too low	(Engine Oil Pressure Sensor Circuit Voltage) / 5 Volts	< 5 percent	Engine Running Ignition Voltage Sensor Present Diagnostic enabled/disabled	= True <= 32.0 V and >= 11.0 V Yes Enabled	50 failures out of 63 samples Performed every 100 msec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
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	Type B 2 trips
Brake Booster Pressure Sensor Performance (AFM applications only)	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. 1st order lag fail threshold 1st order lag re-pass threshold	> 0.5 < 0.6	Throttle Area (with idle included) for time period of Ignition Voltage BrkBoostVacDiff For time period of AND Vacuum Delta Diagnostic enabled/disabled No active DTC's	\<= 1 Percent for > 3 sec \<= 18.0 V and >= 11.0 V > 0 kPa >= 0.2 Seconds >= 6.0 kPa Enabled Fault bundles: MAP_SensorFA TPS_FA	Pass counter incremented when enable conditions are met, pass achieved when counter >= 8 Performed every 100 msec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Brake Booster Pressure Sensor Circuit Low Voltage (AFM applications only)	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	Type B 2 trips
Brake Booster Pressure Sensor Circuit High Voltage (AFM applications only)	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	Type B 2 trips
Cruise Control Mutil-Functon Switch Circuit MIL: NO	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 architecture where cruise switch states are received over serial data	Cruise switch data integrity is equal to "illegal range"		Switch architecture CeCRZG_e_CAN is CAN, CAN based switch diagnostic 1 is TRUE, general switch diagnostic enable 1 is TRUE	fail continuously for greater than 0.750 seconds	Special Type C 1Trip MIL: NO
		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 switches hardwired to the ECM			Switch architecture CeCRZG_e_CAN is ANALOG, general switch diagnostic enable 1 is TRUE	fail continuously for greater than 0.750 seconds	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Cruise Control Resume Circuit	P0567	Detects a failure of the cruise resume switch in a continuously applied state	Cruise Control Resume switch remains applied for greater than a calibratable period of time for architecture where cruise switch states are received over serial data			Switch architecture CeCRZG_e_CAN is CAN, CAN based switch diagnostic 1 is TRUE, general switch diagnostic enable 1 is TRUE	fail continuously for greater than 90.000 seconds	Special Type C 1Trip
			Cruise Control Resume switch remains applied for greater than a calibratable period of time for cruise switches hardwired to the ECM			Switch architecture CeCRZG_e_CAN is ANALOG or DISCRETE, general switch diagnostic enable 1 is TRUE	fail continuously for greater than 90.000 seconds	MIL: NO
Cruise Control Set Circuit	P0568	Detects a failure of the cruise set switch in a continuously applied state	Cruise Control Set switch remains applied for greater than a calibratable period of time for architecture where cruise switch states are received over serial data			Switch architecture CeCRZG_e_CAN is CAN, CAN based switch diagnostic 1 is TRUE, general switch diagnostic enable 1 is TRUE	fail continuously for greater than 90.000 seconds	Special Type C 1Trip
			Cruise Control Set switch remains applied for greater than a calibratable period of time for cruise switches hardwired to the ECM			Switch architecture CeCRZG_e_CAN is ANALOG or DISCRETE, general switch diagnostic enable 1 is TRUE	fail continuously for greater than 90.000 seconds	MIL: NO

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Cruise Control Input Circuit	P0575	Detects rolling count or protection value errors in Cruise Control Switch Status serial data signal	If x of y rolling count / protection value faults occur, disable cruise for duration of fault			Switch architecture CeCRZG_e_CAN is CAN, DTC enable cal 1 is TRUE	10/16 counts	Special Type C 1Trip
								MIL: NO
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if the calibration check sum is incorrect	Output state invalid		PCM State = crank or run		Diagnostic runs continuously in the background	Type A 1 trips
							Diagnostic reports a fault if 1 failure occurs on the first pass.	
							Diagnostic reports a fault if 5 failures occur after the first pass is complete.	
Control Module Not Programmed	P0602	This DTC will be stored if the PCM is a service PCM that has not been programmed.	Output state invalid		PCM State	= crank or run	Diagnostic runs at powerup	Type A 1 trips
						PCM is identified through calibration as a Service PCM		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up does not match checksum at power-down				Diagnostic runs at powerup Diagnostic reports a fault if 1 failure occurs	Type A 1 trips
ECM RAM Failure	P0604	Indicates that the ECM is unable to correctly read data from or write data to RAM	1. Primary processor data pattern written doesn't match the pattern read for a count >	1 count if found on first memory scan. 5counts if found on subsequent scans.			1. Will finish first memory scan within 30 seconds at all engine conditions - diagnostic runs continuously	Type: A 1 Trip
			2. Secondary processor battery backed RAM failed checksum twice for original values at power up and the defaulted values				2. Completion at initialization, <500 ms	
			3. Secondary processor copy of calibration area to RAM failed for a count >	2counts			3. Completion at initialization, <500 ms	
			4. Secondary Processor data pattern written doesn't match the pattern read consecutive times				4. Will finish within 30 seconds at all engine conditions.	
			5. Secondary Processor TPS or APPS minimum learned values fail compliment check continuously				5. 0.0625sec continuous	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
ECM Processor	P0606	Indicates that the ECM has detected an internal processor integrity fault						Type: A 1 Trip
1. Processor Performance Check - Throttle limiting Fault			When drag is active Secondary processor detects Primary's calculated throttle position is greater > than Secondary Processor calculated Throttle Position by	0.00%.		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	1. 0.1875sec in the Secondary Processor	
			Secondary processor detects Primary's calculated throttle position is greater > than Secondary's calculated Throttle Position when driver is commanding the throttle from APP by	7.57%.				
			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%.				
2. Processor Performance Check - ETC software is not executed or it is not executed in in proper order			Software tasks on the Primary Processor in the 12.5 ms loop were not executed or were not executed in the correct order.	0.0625sec continuous		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	2. 0.0625sec continuous	
			Software tasks on the Primary Processor in the 25 ms loop were not executed or were not executed in the correct order.	0.1250sec continuous			0.1250sec continuous	

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 50 ms loop were not executed or were not executed in the correct order.	0.2500sec continuous			0.2500sec continuous	
			Software tasks on the Primary Processor in the 100 ms loop were not executed or were not executed in the correct order.	0.5000sec continuous			0.5000sec continuous	
			Software tasks on the Primary Processor in the 250 ms loop were not executed or were not executed in the correct order.	1.2500sec continuous			1.2500sec continuous	
			The first completion of the RAM diagnostic on the Primary Processor was completed > the amount of time	360.0000sec continuous			360.0000sec continuous	
			The first completion of the ROM diagnostic on the Primary Processor was completed > the amount of time	360.0000sec continuous			360.0000sec continuous	
			Software tasks on the Secondary Processor were not executed or were not executed in the correct order.	Two Consecutive Loops (12.5ms * 2) 25ms			25 ms	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
3. Processor Performance Check - SPI Failure			Loss or invalid message of SPI communication from the Secondary Processor at initialization detected by the Primary Processor or loss or invalid message of SPI communication from the Secondary Processor after a valid message was received by the Primary Processor Loss or invalid message of SPI communication from the Primary Processor at initialization detected by the Secondary Processor or loss or invalid message of SPI communication from the Primary Processor after a valid message was received by the Secondary Processor			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	In the primary processor, 159/400 counts intermittent or 15 counts continuous; 39 counts continuous @ initialization In the secondary processor 0.4750sec at initialization, 0.1750sec continuous or 20/200 intermittent.	
4. Processor Performance Check - Secondary Processor state of health (Main)			Primary processor check of the secondary processor by verifying the hardware line toggle between the two processors toggles within the threshold values	9.3750msec and 15.6250msec		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	9counts continuous at initialization or 9 counts continuous; 12.5 msec /count in the Primary processor	
5. Processor Performance Check - Primary Processor Learn Corruption Fault			Primary Processor TPS or APPS minimum learned values fail compliment check			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	0.1000sec continuous	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
6. Processor Performance Check - Primary Processor Clock Fault			The ocillator failed for the Primary processor where the clock is outside the threshold	27.85 kHz and 37.68 kHz		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	100ms continuous	
9. Processor Performance Check - Secondary Processor ALU Fault			The secondary check of the ALU failed to compute the expected result			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	12.5ms continuous	
10. Processor Performance Check - Secondary Processor Register Configuration Fault			Secondary processor failed configuration check of the registers.			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	12.5ms continuous	
11. Processor Performance Check - Secondary Processor StackFault			Secondary processor checks stack beginning and end point for pattern written at initialization .			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	12.5ms continuous	
12. Processor Performance Check - Secondary Processor MAIN Processor Fault			Secondary processor check that the Primary processor hasn't set a select combination of internal processor faults			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	12.5ms continuous	
13. Processor Performance Check - Primary Processor ALU Fault			The primary processor check of the ALU failed to compute the expected result	Two Consecutive Times			12.5ms continuous	
14. Processor Performance Check - Primary Processor Register Configuration Fault			Primary processor failed configuration check of the registers.				12.5ms continuous	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Main & MHC state of health fault	P0607	Primary state of health (SOH) discrete line is not toggling between the two processors for a time >	0.4875sec			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	0.4875sec continuous	Type:C 1 Trip MIL: NO
Control Module Accelerator Pedal Position (APP) System Performance	P060D	Verify that the indicated accelerator pedal position calculation is correct	1. PPS sensor switch fault - When the APP sensor 2 is shorted to ground, the sensor value is >	41		1. Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions Engine Running TPS minimum learn is not active No Pedal related errors or diagnostic faults. Diagnostic is enabled (Only applicable for Legacy accelerator pedals)	Consecutive checks within 200ms or 2/2 counts; 175msec/count	Type: A 1 Trip
			2. Difference between primary processor indicated accelerator pedal position and secondary indicated accelerator pedal position is >	5		2. Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions Primary processor Pedal Sync Error is FALSE	44/40 counts or 39 counts continuous; 12.5 msec/count in the Secondary processor	
						Engine Running 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.
						Diagnostic is enabled (Only applicable for Legacy accelerator pedals)		
Control Module EEPROM Error	P062F	Indicates that the NVM Error flag has not been cleared	Last EEPROM write did not complete		Ignition State	#NAME?	1 test failure Diagnostic runs once at powerup	Type: A 1 Trip
5 Volt Reference #1 Circuit	P0641	Detects a continuous or intermittent short on the 5 volt reference circuit #1	Primary Processor Vref1 < Primary Processor Vref1 >	4.875 5.125		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	19/39 counts or 0.1875sec continuous; 12.5 msec/count in Primary processor	Type: A 1 Trip
			Secondary Processor Vref1 < Secondary Processor Vref1 >	4.875 5.125			19/39 counts or 15 counts continuous; 12.5 msec/count in Secondary processor	
Malfunction Indicator Lamp (MIL) Control Circuit (ODM)	P0650	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Remote Vehicle Start is not active	11 volts ≤ Voltage ≤ 32 volts	20 failures out of 25 samples 250 ms / sample Continuous	Type: A 1 Trip
5 Volt Reference #2 Circuit	P0651	Detects a continuous or intermittent short on the 5 volt reference circuit #2	Primary Processor Vref2 <	4.875		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	19/39 counts or 0.1875sec continuous; 12.5 msec/count in Primary processor	Type: A 1 Trip

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			or Primary Processor Vref2 >	5.125				
			Secondary Processor Vref1 < Secondary Processor Vref1 >	4.875 5.125			19/39 counts or 15counts continuous; 12.5 msec/count in Secondary processor	
Powertrain Relay Control (ODM)	P0685	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	8 failures out of 10 samples 250 ms / sample Continuous	Type B 2 trips
Powertrain Relay Feedback Circuit High	P0690	This DTC is a check to determine if the Powertrain relay is functioning properly.	PT Relay feedback voltage is when commanded 'OFF'	> 2 volts	No active DTCs:	PowertrainRelayStateOn_Error	100 ms/ sample Continuous failures ≥ 2 seconds	Type B 2 trips
Fuel Pump Control Module (FPCM) Requested MIL Illumination	P069E	Monitors the FPCM MIL request line to determine when the FPCM has detected a MIL illuminating fault.	Fuel Pump Control Module Emissions-Related DTC set			Time since power-up > 3 seconds	Continuous	Type: A 1 Trip
Transmission Control Module (TCM) Requested MIL Illumination	P0700	Monitors the TCM MIL request line to determine when the TCM has detected a MIL illuminating fault.	Transmission Emissions-Related DTC set			Time since power-up > 3 seconds	Continuous	Type: A 1 Trip

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Skip Shift Solenoid Control Circuit (Manual Transmission Only with skip shift)	P0803	Control circuit voltage is monitored during operation. It should be low during operation and near B+ when "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 Engine Speed	11 volts ≤ Voltage ≤ 18 volts > 600 RPM	20 failures out of 25 samples 250 ms / sample Continuous	Type B 2 trips
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.	Filtered Clutch Pedal Position Error when the vehicle is determined to be in gear.	> 1 % **disable** **conditions:**	N/V Ratio must Match Actual Gear (i.e. vehicle in gear) Transfer Case not in 4WD Low range Engine Torque Clutch Pedal Position No active DTCs:	> **EngTorqueThreshold** Table < **ResidualErrEnableLow** Table > *ResidualErrEnableHigh* Table ClutchPositionSensorCktLo FA ClutchPositionSensorCkitHi FA CrankSensorFA VehicleSpeedSensor_FA	25 ms loop Continuous	Type: A 1 Trip
Clutch Pedal Position Sensor Circuit Low	P0807	Detects Continuous Circuit Short to Low or Open	Clutch Position Sensor Circuit	< 4 % of Vref disable	Engine Not Cranking System Voltage No active DTCs:	> 9.0 Volts 5VoltReferenceB_FA	200 failures out of 250 samples 25 ms loop Continuous	Type: A 1 Trip

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
				conditions:				
Clutch Pedal Position Sensor Circuit High	P0808	Detects Continuous Circuit Short toHigh	Clutch Position Sensor Circuit	> 96 % of Vref disable conditions:	Engine Not Cranking System Voltage No active DTCs:	> 9.0 Volts 5VoltReferenceB_FA	200 failures out of 250 samples 25 ms loop Continuous	Type: A 1 Trip
Clutch Pedal Position Not Learned	P080A	Monitor for Valid Clutch Pedal Fully Applied Learn Position values	Fully Applied Learn Position OBD Manufacturer Enable Counter	< 9.0 or > 36.0 = 0	Clutch Pedal Position Not Learned		250 ms loop Continuous	Type: A 1 Trip
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 Engine Speed	11 volts ≤ Voltage ≤ 32 volts > 600 RPM	20 failures out of 25 samples 250 ms / sample Continuous with device off	Type B 2 trips
Skip Shift Solenoid Control Circuit High (Manual Transmission Only)	P080D	This DTC checks for a shorted high circuit while the device is commanded on.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage Engine Speed	11 volts ≤ Voltage ≤ 32 volts > 600 RPM	20 failures out of 25 samples 250 ms / sample Continuous with device on	Type B 2 trips
Traction Control Torque Request Circuit	P0856	Determines if torque request from the EBTCM is valid	**With GMLAN:** Serial Communication 2's complement message - ($140 for PPEI2 or $1C7/$1C9 for PPEI3 engine torque or $1CA for PPEI3 axle torque)		**With GMLAN:** Serial communication to EBTCM (U0108) Power Mode Engine Running	No loss of communication = Run = True	**With GMLAN:** Count of 2's complement values not equal >= 10	Special Type:C 1 Trip

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Serial Communication message ($140 for PPEI2 or $1C7/$1C9 for PPEI3 engine torque or $1CA for PPEI3 axle torque) rolling count value	Message <> 2's complement of message **OR** Message rolling count value <> previous message rolling count value plus one	Status of traction in GMLAN message ($380 for PPEI2 or $4E9 for PPEI3)	= Traction Present	**OR** 10 rolling count failures out of 10 samples	NO MIL
			OR Too many minimum limit torque request transitions occur from TRUE to FALSE to TRUE within a time period	Requested torque intervention type toggles from not increasing request to increasing request			>= 3 multi-transitions out of 5 samples	
			Torque request greater than allowed				>= 4 out of 10 samples above 250 Nm	
							Performed every 25 msec	
			With PWM: PWM Duty cycle **OR** PWM Duty cycle	< 5 Pct > 95 Pct	**With PWM:** Traction Status for PWM ($2B3C Class2 message)	= Traction Present	**With PWM:** 12 failures out of 30 samples	
					Engine Run Time	> 2 Seconds	Performed every 50 msec	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
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)	>= 450 RPM <= 8000 RPM > 70 Deg C < 125 Deg C > -20 Deg C < 125 Deg C >= 0.00 Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Estimate 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".	Continuous Calculation are performed every 12.5 msec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					No Active DTCs:	MAP_SensorCircuitFA		
						EGRValve_FP		
						EGRValvePerformance_FA		
						MAF_SensorCircuitFA		
						CrankSensorFA		
						ECT_sensor_FA ECT_Sensor_FP		
						IAT_SensorFA		
						IAT_SensorCircuitFP		
						CylDeacSystemTFTKO		
Inlet Airflow System Performance (supercharged)	P1101	Determines if there are multiple air induction problems affecting airflow and/or manifold pressure.	See table "Supercharger Intake Flow Rationality Diagnostic Failure Matrix" for combinations of model failures that can set this DTC.		Engine Speed Engine Speed	>= 450 RPM	Continuous Calculation are performed every 12.5 msec	Type B 2 trips
					Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	<= 6200 RPM > 69 Deg C < 125 Deg C > -20 Deg C < 125 Deg C		
			TPS model fails when Filtered Throttle Model Error	> 400 kPa*(g/s)		>= 0.00 Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM		
			MAF model fails when ABS(Measured Flow – Modeled Air Flow) Filtered			Modeled Air Flow multiplied by MAF		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
				> 21 grams/sec		multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Estimate		
			MAP1 model fails when					
			ABS(Measured MAP – MAP Model 1) Filtered	> 22.0 kPa		MAP Model 1 multiplied by MAP1 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost		
			MAP2 model fails when					
			ABS(Measured MAP – MAP Model 2) Filtered	> 22.0 kPa		MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost		
			SCIAP1 model fails when					
			ABS(Measured SCIAP – SCIAP Model 1) Filtered	> 14.0 kPa		SCIAP Model 1 multiplied by SCIAP1 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost		
			SCIAP2 model fails when					
			ABS(Measured SCIAP – SCIAP Model 2) Filtered	> 14.0 kPa		SCIAP Model 2 multiplied by SCIAP2 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					No Active DTCs:	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 IAT2_SensorFA IAT2_SensorCircuitFP SCIAP_SensorCircuitFA SCIAP_SensorCircuitFP AmbientAirDefault_SC		
O2S Insufficient Switching Bank 1 Sensor 1	P1133	This DTC determines if the O2 sensor is no longer sufficiently switching.	Fault condition present if Half Cycle L/R or R/L Switches are below the threshold. OR	H/C L/R switches < Threshold, or H/C R/L switches < Threshold, (refer to table named "P1133 - O2S HC L to R Switches Limit Bank 1 Sensor 1" Pass/Fail Threshold table & "P1133 - O2S	No Active DTC's	TPS_ThrottleAuthority Defaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA	Sample time is 60 seconds	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			If Slope Time L/R or R/L Switches are below the threshold.	HC R to L Switches Limit Bank 1 Sensor 1" Pass/Fail Threshold table in Supporting tables tab) OR S/T L/R switches < 3, or S/T R/L switches < 3		AmbientAirDefault_No Snsr (naturally aspirated) AmbientAirDefault_SC (supercharged) MAF_SensorFA EvapPurgeSolenoidCir cuit_FA EvapFlowDuringNonPu rge_FA EvapVentSolenoidCirc uit_FA EvapSmallLeak_FA EvapEmissionSystem_F FuelTankPressureSnsr Ckt_FA FuelInjectorCircuit_FA AIR System FA EthanolCompositionSe nsor_FA EngineMisfireDetected _FA = P0131, P0132 or P0134	Frequency: Once per trip <u>Green Sensor Delay Criteria</u> The diagnostic will not be enabled until the next ignition cycle after the following has been met: Airflow greater than 22 gps for 120000 grams of accumulated flow non-continuously. (Note that all other enable criteria must be met on the next ignition cycle for the test to run on that ignition cycle). Note: This feature is only enabled when the vehicle is new and cannot be enabled in service	
					Bank 1 Sensor 1 DTC's 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 Green O2S Condition	= False		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						= Not Valid		
					O2 Heater on for	>= 40 seconds		
					Learned Htr resistance	= Valid		
					Engine Coolant	> 60 ºC		
					IAT	> -40 ºC		
					Engine Run Time	> 160 seconds		
					Time since any AFM status change	> 0.0 seconds		
					Time since Purge On to Off change	> 0.0 seconds		
					Time since Purge Off to On change	> 0.0 seconds		
					Purge duty cycle	>= 0 % duty cycle		
					Engine airflow	20 gps <= engine airflow <= 55 gps		
					Engine speed	1200 <= RPM <= 3000		
					Fuel	< 87 % Ethanol		
					Baro	> 70 kpa		
					Throttle Position	>= 5 %		
					Low Fuel Condition Diag	= False		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					LTM fuel cell	= Enabled		
					Transient Fuel Mass	<= 100.0 mgrams		
					Baro	= Not Defaulted		
					Fuel Control State	not = Power Enrichment		
					Fuel State	DFCO not active		
					Commanded Proportional Gain	>= 0.0 %		

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	> 3.5 seconds		
O2S Insufficient Switching Bank 2 Sensor 1	P1153	This DTC determines if the O2 sensor is no longer sufficiently switching.	Fault condition present if Half Cycle L/R or R/L Switches are below the threshold. OR If Slope Time L/R or R/L Switches are below the threshold.	H/C L/R switches < Threshold, or H/C R/L switches < Threshold, (refer to table named "P1153 - O2S HC L to R Switches Limit Bank 2 Sensor 1" Pass/Fail Threshold table & "P1153 - O2S HC R to L Switches Limit Bank 2 Sensor 1" Pass/Fail Threshold table in Supporting tables tab) OR S/T L/R switches < 3, or S/T R/L switches < 3	No Active DTC's	TPS_ThrottleAuthority Defaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault_No Snsr (naturally aspirated) AmbientAirDefault_SC (supercharged) MAF_SensorFA EvapPurgeSolenoidCir cuit_FA EvapFlowDuringNonPu rge_FA EvapVentSolenoidCirc uit_FA EvapSmallLeak_FA EvapEmissionSystem_ FA FuelTankPressureSnsr Ckt_FA FuelInjectorCircuit_FA AIR System FA EthanolCompositionSe nsor_FA EngineMisfireDetected _FA	Sample time is 60 seconds Frequency: Once per trip Green Sensor Delay Criteria The diagnostic will not be enabled until the next ignition cycle after the following has been met: Airflow greater than 22 gps for 120000 grams of accumulated flow non-continuously. (Note that all other enable criteria must be met on the next ignition 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	Type B 2 trips
					Bank 2 Sensor 1 DTC's not active System Voltage EGR Device Control Idle Device Control	= P0151, P0152 or P0154 10.0 volts < system voltage< 32.0 volts = Not active = Not active		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Fuel Device Control	= Not active		
					AIR Device Control	= Not active		
					Low Fuel Condition Diag	= False		
					Green O2S Condition	= Not Valid		
					O2 Heater on for	>= 40 seconds		
					Learned Htr resistance	= Valid		
					Engine Coolant	> 60 ºC		
					IAT	> -40 ºC		
					Engine Run Time	> 160 seconds		
					Time since any AFM status change	> 0.0 seconds		
					Time since Purge On to Off change	> 0.0 seconds		
					Time since Purge Off to On change	> 0.0 seconds		
					Purge duty cycle	>= 0 % duty cycle		
					Engine airflow	20 gps <= engine airflow <= 55 gps		
					Engine speed	1200 <= RPM <= 3000		
					Fuel	< 87 % Ethanol		
					Baro	> 70 kpa		
					Throttle Position	>= 5 %		
					Low Fuel Condition Diag	= False		
					Fuel Control State	= Closed Loop		
					Closed Loop Active	= TRUE		
					LTM fuel cell	= Enabled		
					Transient Fuel Mass	<= 100.0 mgrams		
					Baro	= Not Defaulted		
					Fuel Control State	not = Power Enrichment		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Fuel State Commanded Proportional Gain **All of the above met for** Time	DFCO not active >= 0.0 % > 3.5 seconds		
EngineMetal OvertempActive	P1258	The objective of the algorithm is to protect the engine in the event of engine metal overtemperature, mainly due to loss of coolant	The ECM detects that the engine coolant has exceeded a threshold for certain amount of time.	Engine Coolant > 129 for 10 seconds	If feature was active and it set the coolant sensor fault then feature will be enabled on coolant sensor fault pending on the next trip.	KeEMOG_b_DisableOvertempProtect = 0 Feature is enabled only if KeEMOG_b_DisableOvertempProtect = 0 and Engine Run time > 10	Time that EMOP active must be true for P1258 to be set is 0 seconds	Type A 1 trip
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	Special Type C 1 Trip NO MIL
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	Special Type C 1 Trip No Mil

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Cold Start Emissions Reduction System Fault (on applications that use a catalyst light off strategy)	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) > 0.50 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) <= 0.50 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 14 seconds of accumulated qualified data.	Type: A 1 Trip
					Vehicle Speed	< 1.24 mph		
					OBD Manufacturer Enable Counter	= 0		
					Throttle Position	< 0.50 percent		
					A change in throttle position (tip-in/tip-out) will initiate a delay in the calculation of the average qualified residual value. When the delay timer > 5.00 seconds the diagnostic will continue the calculation.			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					For Manual Transmission vehicles, the clutch must be fully engaged. Clutch Pedal Position < 16.00 OR The clutch must be fully disengaged. Clutch Pedal Position > 88.00			
					General Enable			
					DTC's Not Set			
					MAF_SensorFA			
					MAP_SensorFA			
					IAT_SensorCircuitFA			
					IAT2_SensorCircuitFA			
					ECT_Sensor_FA			
					CrankSensorFaultActive			
					IAC_SystemRPM_FA			
					TPS_FA			
					VehicleSpeedSensor_FA			
					EngineMisfireDetected_FA			
					IgnitionOutputDriver_FA			
					ControllerProcessorPerf_FA			
					5VoltReferenceA_FA			
					5VoltReferenceB_FA			
					FuelInjectorCircuit_FA			
					TransmissionEngagedState_FA			
					Clutch Sensor FA			
					P050A (ColdStrt_IAC_SysPerf)			
					P050B (ColdStrtIgnTmngPerf)			
Replicated Transmission Output Speed (RTOS) Sensor (non VSES trucks and vans with ABS only)	P150A	No activity in the RTOS Signal circuit	RTOS Sensor Raw Speed	<= 60 RPM	Transmission output Speed Angular Velocity Engine Speed Hi Engine Speed Lo Time at Engine Speed	>= 1000 RPM <= 7500 RPM >= 200 RPM >= 5 sec	>= 4.5 Fail Time (Sec)	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Ignition Voltage Hi	<= 32 Volts		
					Ignition Voltage Lo	>= 9 Volts		
					Disabled for these DTC's:	VehicleSpeedSensor_FA P150B P150A ACTIVE and TFTKO		
				Disable Conditions:				
Replicated Transmission Output Speed (RTOS) Sensor (non VSES trucks and vans with ABS only)	P150B	RTOS Signal Circuit Intermittent	RTOS Sensor Loop-to-Loop speed change	>= 350 RPM			>= 3.25 Fail Time (Sec)	Type B 2 trips
					Raw Output Speed	>= 300 RPM		
					Output Speed change	<= 150 RPM		
					Transmission output Speed Angular Velocity	>= 1000 Sec		
					4WD Range Change Delay Timer	>= 6 Sec		
					Time for Positive Output Speed Change	>= 2 sec		
					Time above raw Output Speed	>= 2 sec		
					Engine Speed Hi	<= 7500 RPM		
					Engine Speed Lo	>= 200 RPM		
					Time at Engine Speed	>= 5 sec		
					Ignition Voltage Hi	<= 32 Volts		
					Ignition Voltage Lo	>= 9 Volts		
				Disable Conditions:	Disabled for these DTC's:	VehicleSpeedSensor_FA P150B ACTIVE and TFTKO		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Transmission Engine Speed Request Circuit	P150C	Determines if engine speed request from the TCM is valid	Serial Communication rolling count value Transmission engine speed protection	+ 1 from previous $19D message (PTEI3) not equal to 2's complement of transmission engine speed request + Transmission alive rolling count	Diagnostic enable bit Engine run time # of Protect Errors # of Alive Rolling Errors No idle diagnostic 506/507 code No Serial communication loss to TCM Engine Running Power mode	1 0.5 10 6 IAC_SystemRPM_FA (U0101) = TRUE Run Crank Active	Diagnostic runs in 25 ms loop	Type B 2 trips
Throttle Actuator Control - Position Performance	P1516	1) Detect a throttle positioning error	The throttle model and actual Throttle position differ by > or The throttle model and actual Throttle position differ by <	7.568%. 7.568%.	 Engine Running or Ignition Voltage > and Ignition Voltage > and Throttle is being Controlled and Communication Fault (SPI is not set) and TPS minimum learn is not active Ignition voltage failure is false (P1682)	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions 11 5.4	0.1875sec in the Secondary processor	Type: A 1 Trip
		2) Detect throttle control is driving the throttle in the incorrect direction	Throttle Position >	39.761%.		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	0.1375sec continuous	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					(Throttle is being Controlled and TPS minimum learn is active) or Reduce Engine Power is Active			
		3) Degraded Motor	Desired throttle position is stable within 0.25% for 4.0000sec and the delta between Indicated throttle position and desired throttle position in greater than 2.00%		Engine Running or Ignition Voltage >	11	0.4875sec continuous on secondary processor	
					and Ignition Voltage >	5.4		
					and Throttle is being Controlled and Communication Fault (SPI is not set)			
					and TPS minimum learn is not active			
					Ignition voltage failure is false (P1682)			
Ignition Voltage Correlation	P1682	Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage & the Powertrain Relay Ignition Voltage	|Run/Crank – ETC Run/Crank| >	3.00Volts			240/480 counts 12.5 msec/count in main processor or 0.1750sec continuous when ETC Run/Crank is lower then Run/Crank by the threshold value	Type: A 1 Trip

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Powertrain commanded on and Run/crank voltage >	Table, f(IAT). See supporting tables 5.5		
					or ETC Run/crank voltage >			
					and Run/crank voltage >	5.5		
Fuel Level Sensor 2 Performance (For use on vehicles with electric 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	Type B 2 trips
			Fuel Level in Primary and Secondary Tanks Remains in an Unreadable Range too Long					
			If fuel volume in primary tank is AND	>= 99.0 liters				
			Fuel volume in secondary tank	< 0.0 liters				
			and remains in this condition for OR	200 miles				
			During fuel transfer					
			When the enable conditions are met, 3.0 liters of fuel will be transferred from the secondary tank and 3.0 liters of fuel will be transferred into the primary tank within 180 seconds. There is a short delay of 20 seconds to allow fuel slosh to settle before the fail timer begins. If the secondary tank volume does not decrease by the cal amount but the primary volume does increase by the cal amount after the fail timer has expired, then P2066 sets.		Transfer Pump is commanded on No device control for the transfer pump Fuel Volume in Secondary Tank Vehicle Speed	< 43 liters < 0 mph		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			OR					
			After a Refuel Event					
			If the primary fuel volume changes by 45 liters from engine "off" to engine "on" the secondary volume should change by 3 liters. Otherwise, P2066 will set. OR					
			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 be stuck. OR The secondary fuel sender is stuck in the deadband AND If the vehicle is driven a distance of 100 miles without the secondary fuel level changing by 3 liters, then the sender must be stuck.	> 43 liters.	Volume in Secondary Tank and Volume in Secondary Tank Secondary Full Transfer Pump On Time	>= 3 liters < 43 liters >= 600 seconds		
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	Type B 2 trips
			Fuel Level in Secondary Tank Remains in an Unreadable Range too Long					

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			If fuel volume in primary tank is AND	>= 28.5 liters				
			Fuel volume in secondary tank and remains in this condition for	< 6.0 liters 200 miles				
			OR					
			Fuel Level is in a Readable Range for both Primary and Secondary Tanks too Long					
			Volume in Primary Tank AND	< 28.5 liters				
			Volume in Secondary Tank and remains in this condition for	> 6 liters 1800 seconds				
			OR					
			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 be stuck.		Volume in Secondary Tank >= 6.0 liters			
Fuel Level Sensor 2 Circuit Low Voltage (For use on vehicles with dual fuel tanks)	P2067	This DTC will detect a fuel sender stuck out of range low in the secondary fuel tank.	Fuel level Sender % of 5V range	< 10 %	Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	180 failures out of 225 samples 100 ms / sample Continuous	Type B 2 trips
Fuel Level Sensor 2 Circuit High Voltage (For use on vehicles with dual fuel tanks)	P2068	This DTC will detect a fuel sender stuck out of range low in the secondary fuel tank.	Fuel level Sender % of 5V range	> 60 %	Run/Crank Voltage	11 volts ≤ Voltage ≤ 32 volts	180 failures out of 225 samples 100 ms / sample Continuous	Type B 2 trips
Control Module Throttle Actuator Position Performance	P2101	1) Detect a throttle positioning error	Difference between measured throttle position and modeled throttle position >	7.57%.	TPS minimum learn is not active	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	1. 15/15 counts; 12.5 msec/count in the primary processor	Type: A 1 Trip

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Difference between measured throttle position and modeled throttle position <	7.57%.	Throttle is being Controlled and (Engine Running or Ignition Voltage > or	11		
					Ignition Voltage >) Ignition voltage failure is false (P1682)	5.5		
		2) Detect throttle control is driving the throttle in the incorrect direction or exceed the reduced power limit	Throttle Position >	39.26%.	TPS minimum learn is active		2. 11counts; 12.5 msec/count in the primary processor	
			Throttle Position >	39.06%.	Reduced Power is True			
Throttle return to default	P2119	Throttle unable to return to default throttle position after de-energizing ETC motor.	TPS1 Voltage >	1.689		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	0.4969sec continuous	Special Type: C 1 Trip
			AND TPS2 Voltage > On the Primary processor OR	1.789	Throttle de-energized No TPS circuit faults PT Relay Voltage >	5.5		No MIL
			TPS1 Voltage > AND TPS2 Voltage > On the Secondary processor	1.689 1.789				
Accelerator Pedal Position (APP) Sensor #1	P2120	Detects a continuous or intermittent short or open in APP1 circuit on the secondary processor but sensor is in range on the primary processor	Secondary APP1 Voltage <	0.463		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	19/39counts or 14counts continuous; 12.5 msec/count in the secondary processor	Type: A 1 Trip
			or Secondary APP1 Voltage >	4.75				

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					No 5 V reference 2 error No 5 V reference 2 fault (P0651)			
Accelerator Pedal Position (APP) Sensor 1 Lo	P2122	Detects a continuous or intermittent short or open in APP1 circuit on both processors or just the primary processor	1. Primary APP1 Voltage < 2. Secondary APP1 Voltage <	0.463 0.463	No 5 V reference 2 error No 5 V reference 2 fault (P0651)	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	1. 19/39counts or 14counts continuous; 12.5 msec/count in the primary processor 2. 19/39counts or 14counts continuous; 12.5 msec/count in the secondary processor	Type: A 1 Trip
Accelerator Pedal Position (APP) Sensor 1 Hi	P2123	Detect a continuous or intermittent short in the APP1 sensor on on both processors or just the primary processor	1. Primary APP1 Voltage > 2. Secondary APP1 Voltage >	4.75 4.75	 No 5 V reference 2 error No 5 V reference 2 fault (P0651)	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	1. 19/39counts or 14counts continuous; 12.5 msec/count in the primary processor 2. 19/39counts or 14counts continuous; 12.5 msec/count in the secondary processor	Type: A 1 Trip

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Accelerator Pedal Position (APP) Sensor 2	P2125	Detects a continuous or intermittent short or open in APP2 circuit on the secondary processor but sensor is in range on the primary processor	Secondary APP2 Voltage <	0.325		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	19/39counts or 14counts continuous; 12.5 msec/count in the secondary processor	Type: A 1 Trip
			or Secondary APP2 Voltage >	2.6	No 5 V reference 1 error No 5 V reference 1 fault (P0641)			
Accelerator Pedal Position (APP) Sensor 2 Lo	P2127	Detects a continuous or intermittent short or open in APP2 circuit on both processors or just the primary processor	1. Primary APP2 Voltage <	0.325		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	1. 19/39counts or 14counts continuous; 12.5 msec/count in the primary processor	Type: A 1 Trip
			2. Secondary APP2 Voltage <	0.325	No 5 V reference 1 error No 5 V reference 1 fault (P0641)		2. 19/39counts or 14counts continuous; 12.5 msec/count in the secondary processor	
Accelerator Pedal Position (APP) Sensor 2 Hi	P2128	Detect a continuous or intermittent short in the APP2 sensor on on both processors or just the primary processor	1. Primary APP2 Voltage >	2.6		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	1. 19/39 counts or 14counts continuous; 12.5 msec/count in the primary processor	Type: A 1 Trip
			2. Secondary APP2 Voltage >	2.6	No 5 V reference 1 error No 5 V reference 1 fault (P0641)		2. 19/39counts or 14counts continuous; 12.5 msec/count in the secondary processor	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Throttle Position (TP) Sensor 1-2 Correlation	P2135	Detects a continuous or intermittent correlation fault between TP sensors #1 and #2 on either processor	1. On the Primary processor, the difference between TPS1 displaced and TPS2 displaced >	6.998% offset at min. throttle position with it linearly increasing to 10% at max. throttle position		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	79/159 counts or 58 counts continuous; 3.125 msec/count in the primary processor	Type: A 1 Trip
					No TPS Sensor Faults No 5 V reference DTCs			
			On the Secondary processor, the difference between TPS1 displaced and TPS2 displaced >	7.00% offset at min. throttle position with it linearly increasing to 10% at max. throttle position				
			2. On the primary processor, the difference between (raw min TPS1) and (raw_min TPS2) >	4.999%.		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	19/39 counts or 15 counts continuous; 12.5 msec/count in the secondary processor	
					No TPS Sensor Faults No 5 V reference DTCs			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			On the secondary processor, the difference between (raw min TPS1) and (raw_min TPS2) >	5.000%.				
Accelerator Pedal Position (APP) Sensor 1-2 Correlation	P2138	Detects a continuous or intermittent correlation fault between APP sensors #1 and #2 on either processor	1. On the primary processor, the difference between APP 1 displaced and APP 2 displaced is >	10.001% offset at min. throttle position with it linearly increasing to 10% at max pedal position	No APP Sensor Faults	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	1. 19/39 counts intermittent or 15 counts continuous, 12.5 msec/count in the primary processor	Type: A 1 Trip
			On the secondary processor, the difference between APP 1 displaced and APP 2 displaced is >	10.00% offset at min. throttle position with it linearly increasing to 10% at max pedal position	No 5 V reference DTCs			
			2. On the primary processor, the difference between the learned PPS1 min and PPS2 min >	5.000%.		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	2. 19/39 counts intermittent or 15 counts continuous, 12.5 msec/count in the secondary processor	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		On the primary processor, the difference between the learned PPS1 min and PPS2 min >		5.000%.				
Transfer Case Speed Sensor Output (TCSS) (For 6-speed trans applications with a vehicle speed sensor behind the transfer case)	P2160	No activity in the TCSS Signal circuit	TCSS Raw Speed	<= 50 RPM			>= 5 Fail Time (Sec)	Type B 2 trips
					Engine Torque high	<= 8192 N-m		
					Engine Torque low	>= 60 N-m		
					Transmission Input Speed High	<= 1000 RPM		
					Transmission Input Speed Low	>= 7500 RPM		
					Throttle opening high	<= 99 %		
					Throttle opening low	>= 8.0 %		
						TPS_FA		
						EngineMisfireDetected _FA		
					Disables on these DTCs:	TCM code P0716 TFTKO (T42 only) TCM code P0717 TFTKO (T42 only)		
				Disable Conditions:				
Transfer Case Speed Sensor Output (TCSS) (For 6-speed trans applications with a vehicle speed sensor behind the transfer case)	P2161	TCSS Circuit Signal Intermittent	TCSS Loop-to-Loop change TCSS Loop-to-Loop change	>= 475 RPM >= 225 RPM			>= 4 Enable Time (Sec)	Type B 2 trips
				Disable Conditions:	Engine Speed Lo Disables on these DTCs:	>= 1000 RPM CrankSensorFA P2160		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Minimum Throttle Position Not Learned	P2176	TP sensors were not in the minimum learn window after multiple attempts to learn the minimum.	During TPS min learn on the Primary processor, TPS Voltage >	18.700%.		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	2.0secs continuous	Type: A 1 Trip
			or During TPS min learn on the Secondary processor, TPS Voltage >	18.700%.	No TPS circuit errors No TPS circuit faults Ignition voltage failure is false (P1682) Minimum TPS learn active			
			and Number of learn attempts >	10counts				
Cooling System Performance for applications with a 2nd coolant sensor	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 1.75. When above is present for more than 5 seconds, fail counts start. Engine total airgrams is accumulated when 17 ≤ AirFlow ≤ 450 grams per second. **Ratio Definition:** Current temp difference between ECT and RCT minus PwrUp difference divided by total airgrams. Note: Minimum total airgrams is 500.0 grams.		No Active DTC's Engine not run time Engine run time Fuel Condition ECT at Power Up IAT min Airflow	MAF_SensorFA IAT_SensorFA THMR_RCT_Sensor_Ckt_FA THMR_ECT_Sensor_Ckt_FA ≥ 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	30 failures out of 90 samples 1 sec/sample Once per ignition key cycle	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Air Fuel Imbalance Bank 1	P219A (P1174 on some applications)	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 OR Bank 1 AFM Filtered Length Ratio variable (AFM applications only)] AND [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.	> 0.76 > 1.00 1000 and 0 millivolts	System Voltage	*10 <= V <= 32 for >= 4 seconds*	Frequency: Continuous Monitoring of O2 voltage signal in 12.5ms loop	Type B 2 trips
		Note: The AFIM Filtered Length Ratio is determined by calculating the difference between the measured O2 voltage length (accumulated O2 voltage over a 3.13 second period) and an emissions-correlated threshold value, divided by the threshold value, and finally multiplied by a Quality Factor (the latter ranges between 0 and 1, based on robustness to false diagnosis in the current operating region). The resulting ratio is then filtered utilizing a first-order lag filter.			Engine Run Time	>= 10 seconds	AFIM Filtered Length Ratio variable is updated after every 3.13 seconds of valid data.	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					ECT	> -20 °C		
					Engine speed	*1000 <= rpm <= 4000*		
					Mass Airflow	*10.0 <= g/s <= 510.0*		
					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*		
					Air Per Cylinder	*100 <= mg/cylinder <= 680*		
					PerCent 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 < -5.0 millivolts		
					O2 sensor switches	>= 0 times during current 3.13 second sample period		
					Quality Factor	>= 0.74 in the current operating region		
					For AFM (Cylinder Deactivation) equipped vehicles only	No AFM state change during current 3.13 second sample period.		
					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.			
					The first report is delayed for 50 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.			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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			
					Closed Loop fueling enabled			
					Fuel System Status	*LONG FT Enabled*		
					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			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Air Fuel Imbalance Bank 2	P219B (P1175 on some applications)	Determines if the air-fuel delivery system is imbalanced by monitoring the pre and post catalyst O2 sensor voltage characteristics	[Bank 2 Filtered Length Ratio variable OR Bank 2 AFM Filtered Length Ratio variable (AFM applications only)] AND [Bank 2 Filtered Post catalyst O2 voltage is NOT between] Note: If the first voltage value is >= the second voltage value, this is an indication that the post catalyst O2 data is not used for	> 1.05 > 1.00 1000 and 0 millivolts	System Voltage	*10 <= V <= 32 for >= 4 seconds*	Frequency: Continuous Monitoring of O2 voltage signal in 12.5ms loop	Type B 2 trips
		Note: The AFIM Filtered Length Ratio is determined by calculating the difference between the measured O2 voltage length (accumulated O2 voltage over a 3.13 second period) and an emissions-correlated threshold value, divided by the threshold value, and finally multiplied by a Quality Factor (the latter ranges between 0 and 1, based on robustness to false diagnosis in the current operating region). The resulting ratio is then filtered utilizing a first-order lag filter.			Engine Run Time	>= 10 seconds	AFIM Filtered Length Ratio variable is updated after every 3.13 seconds of valid data.	
					ECT	> -20 °C		
					Engine speed	*1000 <= rpm <= 4000*		
					Mass Airflow	*10.0 <= g/s <= 510.0*		
					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*		
					Air Per Cylinder	*100 <= mg/cylinder <= 680*		
					PerCent 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	> 5.0 millivolts		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					O2 sensor switches	>= 0 times during current 3.13 second sample period		
					Quality Factor	>= 0.74 in the current operating region		
					For AFM (Cylinder Deactivation) equipped vehicles only	No AFM state change during current 3.13 second sample period.		
					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.			
					The first report is delayed for 50 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.			
					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			
					Closed Loop fueling enabled A Function of Coolant Temperature based on Start-up coolant temp. and a function of Time also based on Start-up coolant temp. **Please see "Supporting Tables" Tab**			
					Fuel System Status	*LONG FT Enabled*		
					No EngineMisfireDetected_FA			
					No MAP_SensorFA			
					No MAF_SensorFA			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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			
Barometric Pressure (BARO) Sensor Performance	P2227	Detects a noisy or erratic barometric pressure input	Difference between the current Baro sensor reading and the previous Baro sensor reading	> 10.0 kPa	Ignition has been on Vehicle Speed No Active DTCs:	> 10.0 seconds < 62 MPH AmbientAirPressCktFA ECT_Sensor_FA IAT_SensorFA MAF_SensorFA AfterThrottlePressure_NA or AfterThrottlePressure_SC TPS_FA	5 failures out of 25 samples 1 sample every 250 msec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						TPS_Performance_FA VehicleSpeedSensorError		
Barometric Pressure(BARO) Sensor Circuit Low	P2228	Detects a continuous short to low or open in either the signal circuit or the BARO sensor.	BARO Voltage	< 40.0 % of 5 Volt Range (2.0 Volts = 50.9 kPa)	Continuous		20 failures out of 25 samples 1 sample every 12.5 msec	Type B 2 trips
Barometric Pressure(BARO) Sensor Circuit High	P2229	Detects an open sensor ground or continuous short to high in either the signal circuit or the BARO sensor.	BARO Voltage	> 90.0 % of 5 Volt Range (4.5 Volts = 115.0 kPa)	Continuous		20 failures out of 25 samples 1 sample every 12.5 msec	Type B 2 trips
O2 Sensor Signal Stuck Lean Bank 1 Sensor 2 (For applications with Post Oxygen Sensor Performance Diagnostic)	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 < 730 mvolts AND 2) Accumulated air flow during stuck lean test > 230 grams.	No Active DTC's B1S2 Failed this key cycle System Voltage Learned heater resistance	TPS_ThrottleAuthority Defaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected _FA EthanolCompositionSensor_FA P013A, P013B, P013E, P013F, P2270 or P2271 10.0 volts < system voltage< 32.0 volts = Valid	Frequency: Once per trip Note: if NaPOPD_b_Reset FastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_Rapid ResponseActive = TRUE, multiple tests per trip are allowed. Green Sensor Delay Criteria	Type B 2 trips

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	The diagnostic will not be enabled until the next ignition cycle after the following has been met: Airflow greater than 22 gps for 120000 grams of accumulated flow non-continuously. (Note that all other enable criteria must be met on the next ignition cycle for the test to run on that ignition cycle). Note: This feature is only enabled when the vehicle is new and cannot be enabled in service	
					Green O2S Condition	= Not Valid		
					Low Fuel Condition Diag	= False		
					Engine Speed to initially enable test	1150 <= RPM <= 2500		
					Engine Speed range to keep test enabled (after initially enabled)	1075 <= RPM <= 2650		
					Engine Airflow	3 gps <= Airflow <= 20 g		
					Vehicle Speed to initially enable test	43.5 mph <= Veh Speed <= 74.6 mph		
					Vehicle Speed range to keep test enabled (after initially enabled)	41.0 mph <= Veh Speed <= 79.5 mph		
					Closed loop integral	0.74 <= C/L Int <= 1.08		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					Power Take Off	= not active		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater on Time	>= 100.0 sec		
					Predicted Catalyst temp	600 ºC <= Cat Temp <= 900 ºC		
					Fuel State	= DFCO possible		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested.		
O2 Sensor Signal Stuck Rich Bank 1 Sensor 2 (For applications with Post Oxygen Sensor Performance Diagnostic)	P2271	This DTC determines if the post catalyst O2 sensor is stuck in a normal rich voltage range and thereby can no longer be used for post oxygen sensor fuel control or for catalyst monitoring. The diagnostic is an intrusive test which requests the DFCO mode to achieve the required lean threshold.	Post O2 sensor cannot achieve the lean threshold voltage. AND The Accumulated mass air flow monitored during the Stuck Rich Voltage Test is greater than the threshold before the above voltage threshold is met.	1) Post O2S signal > 100 mvolts AND 2) Accumulated air flow during stuck rich test > 200 grams.	No Active DTC's	TPS_ThrottleAuthority Defaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA	Frequency: Once per trip Note: if NaPOPD_b_Reset FastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_Rapid ResponseActive = TRUE, multiple tests per trip are allowed.	Type B 2 trips
						FuelTrimSystemB1_FA		
						FuelTrimSystemB2_FA EngineMisfireDetected _FA		
						EthanolCompositionSe nsor_FA		
					B1S2 Failed this key cycle	P013A, P013B, P013E, P013F or P2270		
						10.0 volts < system voltage< 32.0 volts		
					System Voltage			
					Learned heater resistance	= Valid	Green Sensor Delay Criteria	
					ICAT MAT Burnoff delay Green O2S Condition	= Not Valid	The diagnostic will not be enabled until the next ignition cycle after the following has been met: Airflow greater than 22 gps for 120000 grams of accumulated flow non-continuously. (Note that all other enable criteria must be met on the next ignition cycle for the test to run on that ignition	
						= Not Valid		
					Low Fuel Condition Diag	= False		
					Engine Speed	1150 <= RPM <= 2500		
					Engine Airflow	3 gps <= Airflow <= 20 g		
					Vehicle Speed	43.5 mph <= Veh Speed <= 74.6 mph		
					Closed loop integral	0.74 <= C/L Int <= 1.08	run on that ignition	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Closed Loop Active	= TRUE	cycle). Note: This feature is only enabled when the vehicle is new and cannot be enabled in service	
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					Power Take Off	= not active		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater on Time	>= 100.0 sec		
					Predicted Catalyst temp	600 ºC <= Cat Temp <= 900 ºC		
					Fuel State	= DFCO possible		
					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 (For applications with Post Oxygen Sensor Performance Diagnostic)	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 < 730 mvolts AND 2) Accumulated air flow during stuck lean test > 230 grams.	No Active DTC's TPS_ThrottleAuthority Defaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA		Frequency: Once per trip Note: if NaPOPD_b_Reset FastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_Rapid ResponseActive = TRUE, multiple tests per trip are allowed.	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					B2S2 Failed this key cycle	FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013C, P013D, P014A, P014B, P2272 or P2273		
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					Learned heater resistance	= Valid	Green Sensor Delay Criteria	
					ICAT MAT Burnoff delay	= Not Valid	The diagnostic will not be enabled until the next ignition cycle after the following has been met: Airflow greater than 22 gps for 120000 grams of accumulated flow non-continuously. (Note that all other enable criteria must be met on the next ignition cycle for the test to run on that ignition cycle). Note: This feature is only enabled when the vehicle is new and cannot be enabled in service	
					Green O2S Condition	= Not Valid		
					Low Fuel Condition Diag	= False		
					Engine Speed to initially enable test	1150 <= RPM <= 2500		
					Engine Speed range to keep test enabled (after initially enabled)	1075 <= RPM <= 2650		
					Engine Airflow	3 gps <= Airflow <= 20 g		
					Vehicle Speed to initially enable test	43.5 mph <= Veh Speed <= 74.6 mph		
					Vehicle Speed range to keep test enabled (after initially enabled)	41.0 mph <= Veh Speed <= 79.5 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		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Post fuel cell	= enabled		
					Power Take Off	= not active		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater on Time	>= 100.0 sec		
					Predicted Catalyst temp	600 ºC <= Cat Temp <= 900 ºC		
					Fuel State	= DFCO possible		
					All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested.			
O2 Sensor Signal Stuck Rich Bank 2 Sensor 2 (For applications with Post Oxygen Sensor Performance Diagnostic)	P2273	This DTC determines if the post catalyst O2 sensor is stuck in a normal rich voltage range and thereby can no longer be used for post oxygen sensor fuel control or for catalyst monitoring. The diagnostic is an intrusive test which requests the DFCO mode to achieve the required lean threshold.	Post O2 sensor cannot achieve the lean threshold voltage. AND The Accumulated mass air flow monitored during the Stuck Rich Voltage Test is greater than the threshold before the above voltage threshold is met.	1) Post O2S signal > 100 mvolts AND 2) Accumulated air flow during stuck rich test > 200 grams.	No Active DTC's	TPS_ThrottleAuthority Defaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA	Frequency: Once per trip Note: if NaPOPD_b_Reset FastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_Rapid ResponseActive = TRUE, multiple tests per trip are allowed.	Type B 2 trips
						FuelTrimSystemB2_FA EngineMisfireDetected _FA EthanolCompositionSe nsor_FA		
					B2S2 Failed this key cycle	P013C, P013D, P014A, P014B or P2272 10.0 volts < system voltage< 32.0 volts		
					System Voltage			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Learned heater resistance	= Valid	<u>Green Sensor Delay Criteria</u> The diagnostic will not be enabled until the next ignition cycle after the following has been met: Airflow greater than 22 gps for 120000 grams of accumulated flow non-continuously. (Note that all other enable criteria must be met on the next ignition cycle for the test to run on that ignition cycle). Note: This feature is only enabled when the vehicle is new and cannot be enabled in service	
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid		
					Low Fuel Condition Diag	= False		
					Engine Speed	1150 <= RPM <= 2500		
					Engine Airflow	3 gps <= Airflow <= 20 gps		
					Vehicle Speed	43.5 mph <= Veh Speed <= 74.6 mph		
					Closed loop integral	0.74 <= C/L Int <= 1.08		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					Power Take Off	= not active		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					O2S Heater on Time	>= 100.0 sec		
					Predicted Catalyst temp	600 ºC <= Cat Temp <= 900 ºC		
					Fuel State	= DFCO possible		
					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).			
O2 Sensor Signal Stuck Lean Bank 1 Sensor 2 (For applications with Post Oxygen Sensor Voltage Diagnostic)	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 >= 805 mvolts AND 2) Accumulated air flow during stuck lean test > 550 grams.	No Active DTC's DTC passed	TPS_ThrottleAuthority Defaulted P0131, P0137, P0151, P0157 P0132, P0138, P0152, P0158 P0134, P0140, P0154, P0160 P0053, P0054, P0059, P0060 P0135, P0141, P0155, P0161 P1133, P1153, P0133, P0153 EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSensorCircuit_FA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA = P2271	Frequency: Once per trip Green Sensor Delay Criteria The diagnostic will not be enabled until the next ignition cycle after the following has been met: Airflow greater than 22 gps for 120000 grams of accumulated flow non-continuously. (Note that all other enable criteria must be met on the next ignition cycle for the test to run on that ignition cycle). Note: This feature is only enabled when the vehicle is new and cannot be enabled in service	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					System Voltage	10.0 volts < system voltage< 32.0 volts		
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay Green O2S Condition	= Not Valid		
						= Not Valid		
					Low Fuel Condition Diag	= False		
					Engine Speed	500 <= RPM <= 5000		
					Engine Airflow	3 gps <= Airflow <= 20 gps		
					Vehicle Speed	14.9 mph <= Veh Speed <= 82.0 mph		
					Closed loop integral	0.96 <= C/L Int <= 1.04		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					Power Take Off	= not active		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					All above met and then fuel is commanded Rich			
					Fuel State	= Refer to **"P2270/P2272 - O2 Sensor Signal Stuck Lean Bank 1/2 Sensor 2"** Rich Equiv Ratio table in the Supporting Tables tab.		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					During Stuck Lean test the following can cause the test to abort			
					Fuel State = DFCO			
					Fuel State = PE			
					Purge duty cycle > 0 %			
O2 Sensor Signal Stuck Rich Bank 1 Sensor 2 (For applications with Post Oxygen Sensor Voltage Diagnostic)	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 reduces delivered fuel 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 > 550 grams.	No Active DTC's	TPS_ThrottleAuthority Defaulted P0131, P0137, P0151, P0157 P0132, P0138, P0152, P0158 P0134, P0140, P0154, P0160 P0053, P0054, P0059, P0060 P0135, P0141, P0155, P0161 P1133, P1153, P0133, P0153 EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSensorCircuit_FA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA	Frequency: Once per trip Green Sensor Delay Criteria The diagnostic will not be enabled until the next ignition cycle after the following has been met: Airflow greater than 22 gps for 120000 grams of accumulated flow non-continuously. (Note that all other enable criteria must be met on the next ignition cycle for the test to run on that ignition cycle). Note: This feature is only enabled when the vehicle is new and cannot be enabled in service	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					System Voltage	EthanolCompositionSensor_FA 10.0 volts < system voltage< 32.0 volts		
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay Green O2S Condition	= Not Valid		
						= Not Valid		
					Low Fuel Condition Diag	= False		
					Engine Speed	500 <= RPM <= 5000		
					Engine Airflow	3 gps <= Airflow <= 20 gps		
					Vehicle Speed	14.9 mph <= Veh Speed <= 82.0 mph		
					Closed loop integral	0.96 <= C/L Int <= 1.04		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					Power Take Off	= not active		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					All of the above met for at least 1.0 seconds, Purge is commanded off, and then wait 5.0 seconds before a commanding lean ratio.			
					During Stuck Rich test the following can cause the test to abort			
					Piston Protection	= Active		
					Converter Mode	= Over Temperature		
					Hot Coolant Enrichment	= Active		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Fuel State = PE Purge duty cycle > 0 %			
O2 Sensor Signal Stuck Lean Bank 2 Sensor 2 (For applications with Post Oxygen Sensor Voltage Diagnostic)	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 >= 805 mvolts AND 2) Accumulated air flow during stuck lean test > 550 grams.	No Active DTC's	TPS_ThrottleAuthority Defaulted P0131, P0137, P0151, P0157 P0132, P0138, P0152, P0158 P0134, P0140, P0154, P0160 P0053, P0054, P0059, P0060 P0135, P0141, P0155, P0161 P1133, P1153, P0133, P0153 EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSensorCircuit_FA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P2273	Frequency: Once per trip <u>Green Sensor Delay Criteria</u> The diagnostic will not be enabled until the next ignition cycle after the following has been met: Airflow greater than 22 gps for 120000 grams of accumulated flow non-continuously. (Note that all other enable criteria must be met on the next ignition cycle for the test to run on that ignition cycle). Note: This feature is only enabled when the vehicle is new and cannot be enabled in service	Type B 2 trips
				DTC passed				

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		
					Low Fuel Condition Diag	= False		
					Engine Speed	500 <= RPM <= 5000		
					Engine Airflow	3 gps <= Airflow <= 20 gps		
					Vehicle Speed	14.9 mph <= Veh Speed <= 82.0 mph		
					Closed loop integral	0.96 <= C/L Int <= 1.04		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					Power Take Off	= not active		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					All above met and then fuel is commanded Rich			
					Fuel State	= Refer to **"P2270/P2272 - O2 Sensor Signal Stuck Lean Bank 1/2 Sensor 2"** Rich Equiv Ratio table in the Supporting Tables tab.		
					During Stuck Lean test the following can cause the test to abort			
					Fuel State	= DFCO		
					Fuel State	= PE		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Purge duty cycle	> 0 %		
O2 Sensor Signal Stuck Rich Bank 2 Sensor 2 (For applications with Post Oxygen Sensor Voltage Diagnostic)	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 reduces delivered fuel 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 > 550 grams.	No Active DTC's	TPS_ThrottleAuthority Defaulted P0131, P0137, P0151, P0157 P0132, P0138, P0152, P0158 P0134, P0140, P0154, P0160 P0053, P0054, P0059, P0060 P0135, P0141, P0155, P0161 P1133, P1153, P0133, P0153 EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSensorCircuit_FA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA 10.0 volts < system voltage< 32.0 volts	Frequency: Once per trip Green Sensor Delay Criteria The diagnostic will not be enabled until the next ignition cycle after the following has been met: Airflow greater than 22 gps for 120000 grams of accumulated flow non-continuously. (Note that all other enable criteria must be met on the next ignition cycle for the test to run on that ignition cycle). Note: This feature is only enabled when the vehicle is new and cannot be enabled in service	Type B 2 trips
					System Voltage			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Learned heater resistance	= Valid		
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid		
					Low Fuel Condition Diag	= False		
					Engine Speed	500 <= RPM <= 5000		
					Engine Airflow	3 gps <= Airflow <= 20 gps		
					Vehicle Speed	14.9 mph <= Veh Speed <= 82.0 mph		
					Closed loop integral	0.96 <= C/L Int <= 1.04		
					Closed Loop Active	= TRUE		
					Evap	not in control of purge		
					Ethanol	not in estimate mode		
					Post fuel cell	= enabled		
					Power Take Off	= not active		
					EGR Intrusive diagnostic	= not active		
					All post sensor heater delays	= not active		
					All of the above met for at least 1.0 seconds, Purge is commanded off, and then wait 5.0 seconds before a commanding lean ratio.			
					Fuel State	= Refer to **"P2271/P2273 - O2 Sensor Signal Stuck Rich Bank 1/2 Sensor 2"** Lean Equiv Ratio table in the Supporting Tables tab.		
					During Stuck Rich test the following can cause the test to abort			
					Piston Protection	= Active		
					Converter Mode	= Over Temperature		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Hot Coolant Enrichment = Active			
					Fuel State = PE			
					Purge duty cycle > 0 %			
Secondary AIR System Pressure Sensor Circuit Bank 1	P2430	This DTC detects a stuck in range pressure sensor signal when the AIR pump is commanded on.	Average Error and Signal Variation	< 0.50 kPa < 1.00 kPa	BARO > 60 kPa		Stuck in range cumulative time > 5.0 seconds	Type B 2 trips
					Inlet Air Temp > 5.0 deg C.			
					Coolant Temp > 5.0 deg C.			
					< 60.0 deg C.			
					Engine off time > 3600.0 seconds			
					System Voltage > 10.0 OR < 32.0			
				disable conditions:	MAP < 20 kPa for 2 seconds		Frequency: Once per trip when SAI pump commanded On	
					Engine Speed > 5000 RPM			
					MAF > 50 gm/s for 3 seconds			
					No active DTCs:	AIRValveControlCircuit FA		
						AIRPumpControlCircuit FA		
						AIRSysPressSnsrB1Ck tLoFA		
						AIRSysPressSnsrB1Ck tHiFA		
						ControllerProcessorPerf_FA		
						5VoltReferenceA_FA		
						5VoltReferenceB_FA		
Secondary AIR System Pressure Sensor Performance Bank 1	P2431	This DTC detects a skewed pressure sensor signal via a comparison of the AIR pressure sensor signal and estimated BARO, as well as an evaluation of the quality of the comparison.	Difference between AIR pressure sensor and BARO (Pump Commanded Off) OR Difference between AIR pressure sensor and BARO (Pump Commanded On)	> 20.0 kPa < -20.0 kPa > 50.0 kPa	BARO > 60 kPa		Skewed sensor cumulative test weight > 5.0 seconds	Type B 2 trips
					Inlet Air Temp > 5.0 deg C.			
					Coolant Temp > 5.0 deg C.			
					< 60.0 deg C.			
					Engine off time > 3600.0 seconds			
					System Voltage > 10.0 OR < 32.0		Continuous 6.25ms loop	
					Skewed sensor cumulatative test weight is based on distance from the last Baro update			
					Baro Skewed Sensor Weight Factor			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					MAP	< 20 kPa for 2 seconds		
				disable	Engine Speed	> 5000 RPM		
				conditions:	MAF	> 50 gm/s for 3 seconds		
						Transfer Case not in 4WD Low		
					No active DTCs:	AIRValveControlCircuit FA		
						AIRPumpControlCircuit FA		
						AIRSysPressSnsrB1CktLoFA		
						AIRSysPressSnsrB1CktHiFA		
						MAF_SensorFA		
						ControllerProcessorPerf_FA		
						5VoltReferenceA_FA		
						5VoltReferenceB_FA		
Secondary AIR System Pressure Sensor Circuit Low Voltage Bank 1	P2432	This DTC detects an out of range low AIR pressure sensor signal	AIR Pressure Sensor signal	< 5 % of 5Vref			800 failures out of 1000 samples	Type B 2 trips
				disable **conditions:**	No active DTCs:	ControllerProcessorPerf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA	6.25 ms loop Continuous	
Secondary AIR System Pressure Sensor Circuit Hi Voltage Bank 1	P2433	This DTC detects an out of range high AIR pressure sensor signal	AIR Pressure Sensor signal	> 94 % of 5Vref			800 failures out of 1000 samples	Type B 2 trips
				disable **conditions:**	No active DTCs:	ControllerProcessorPer 5VoltReferenceA_FA 5VoltReferenceB_FA	6.25 ms loop Continuous	
Secondary AIR System Shut-off Valve Stuck Open Single Bank System	P2440	This DTC detects if one or both of the AIR system control valves is stuck open	AIR pressure error	< **Bank 1 Valve Pressure Error** table or > 32.0 kPa	BARO	> 60 kPa	Phase 2 Conditional test weight > 2.0 seconds	Type B 2 trips
					Inlet Air Temp	> 5.0 deg C.		
					Coolant Temp	> 5.0 deg C.		
						< 60.0 deg C.		
		This test is run during Phase 2 (Pump commanded On, valve commanded closed)			Engine off time	> 3600.0 seconds		
					System Voltage	> 10.0 OR < 32.0		
					Stability Time	> 0.5 seconds		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		(commanded closed)				AIR diagnostic Phase 1 passed		
						Conditional test weight is calculated by multiplying the following Factors	Frequency: Once per trip when AIR pump commanded On	
						Phase 2 Baro Test Weight Factor		
						Phase 2 MAF Test Weight Factor		
						Phase 2 System Volt Test Weight Factor		
						Phase 2 Ambient Temp Test Weight Factor		
				disable	MAP	< 20 kPa for 2 seconds		
				conditions:	Engine Speed	> 5000 RPM		
					MAF	> 50 gm/s for 3 seconds		
					No active DTCs:	AIRSystemPressureSensor FA		
						AIRValveControlCircuit FA		
						AIRPumpControlCircuit FA		
						MAF_SensorFA		
						MAP_SensorFA		
						IAT_SensorFA		
						ECT_Sensor_FA		
						EngineMisfireDetected_FA		
						CatalystSysEfficiencyLoB1_FA		
						CatalystSysEfficiencyLoB2_FA		
						ControllerProcessorPerf_FA		
						5VoltReferenceA_FA		
						5VoltReferenceB_FA		
						IgnitionOutputDriver_FA		
						FuelInjectorCircuit_FA		
Secondary AIR System Pump Stuck On Single Bank System	P2444	This DTC detects if the SAI pump is stuck On	AIR pressure error	**> Bank 1 Pump Pressure Error** table	BARO	> 60 kPa	Phase 3 Cumlatative test weight > 3.0 seconds	Type A 1 trip
					Inlet Air Temp	> 5.0 deg C.		
					Coolant Temp	> 5.0 deg C.		
				or < -32 kPa		< 60.0 deg C.		
					Engine off time	> 3600.0 seconds		
		This test is run during Phase 3 (Pump commanded Off, valve			System Voltage	> 10.0 OR < 32.0		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		(Pump commanded Off, valve commanded closed)			Stability Time	> 6.0 seconds		
					AIR diagnostic Phase 1 passed AIR diagnostic Phase 2 passed		Frequency: Once per trip when AIR pump commanded On	
					Phase 3 cumulatative test weight is based on distance from the last Baro update			
					Baro Skewed Sensor Weight Factor			
				disable	MAP	< 20 kPa for 2 seconds		
				conditions:	Engine Speed	> 5000 RPM		
					MAF	> 50 gm/s for 3 seconds		
					No active DTCs:	AIRSystemPressureSensor FA		
						AIRValveControlCircuit FA		
						AIRPumpControlCircuit FA		
						MAF_SensorFA		
						MAP_SensorFA		
						IAT_SensorFA		
						ECT_Sensor_FA		
						EngineMisfireDetected_FA		
						CatalystSysEfficiencyLoB1_FA		
						CatalystSysEfficiencyLoB2_FA		
						ControllerProcessorPerf_FA		
						5VoltReferenceA_FA		
						5VoltReferenceB_FA		
						IgnitionOutputDriver_FA FuelInjectorCircuit_FA		
Transmission Control Torque Request Circuit	P2544	Determines if the torque request from the TCM is valid	**Protect error** - Serial Communication message - ($199					Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			PTEI3)				>= 16 Protect errors during key cycle	
				Message <> two's complement of message				
			OR					
			Rolling count error - Serial Communication message ($199 - PPEI3) rolling count value		Diagnostic enabled/disabled	Enabled		
				Message <> previous message rolling count value + one			>= 6 Rolling count errors out of ten samples	
			OR		Power Mode	= Run		
			RAM Error - Serial Communication message ($199 - PPEI3)		Engine Running	= True		
					Run/Crank Active	> 0.50 Sec		
				Trans torque reduction or type request portion of message 2's complement values <>			>= 3 RAM errors during key cycle	
			OR					
			Range Error - TCM Requested Torque Increase message $199	> 400 Nm			>= 3 out of 10 samples	
			OR					
			Multi-transition error - Trans torque intervention type request change	Requested torque intervention type toggles from not increasing request to increasing request			>= 3 multi-transitions out of 5 samples	
							Performed every 12.5 msec	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Torque Management Request Input Signal B	P2548	Determines if the performance launch torque request is valid	**Protect error** - Serial Communication message - ($1C8 Message) **OR** **Rolling count error** - Serial Communication message ($1C8) rolling count value	Message <> two's complement of message Message <> previous message rolling count value + one	Diagnostic enabled/disabled Run/Crank Active No active DTC's	Enabled > 0.50 Sec Fault bundles: IAC_SystemRPM_FA	>= 10 Protect errors out of 10 samples >= 3 Rolling count errors out of 10 samples Performed every 100 msec	Type B 2 trips
ECM/PCM Internal Engine Off Timer Performance	P2610	This DTC determines if the engine off timer does not initialize or count properly. Clock rate test: Checks the accuracy of the 1 second timer by comparing it with the 12.5 ms timer	Initial value test: Initial ignition off timer value OR Initial ignition off timer value Clock rate test: Time between ignition off timer increments Time between ignition off timer increments Time since last ignition off timer increment Current ignition off time < old ignition off time Current ignition off timer minus old ignition off timer	< 0 seconds > 10 seconds < 0.8 seconds > 1.2 seconds ≥ 1.375 seconds ≠ 1	ECM is powered down IAT Temperature	-40 °C ≤ Temperature ≤ 125 °C	Initial value test: 3 failures 1.375 sec / sample Clock rate test: 8 failures out of 10 samples 1second / sample test runs once each key-off	Type B 2 trips DTC sets on next key cycle if failure detected

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Four Wheel Drive Low Switch Circuit	P2771	Detects Fail Case 1: Continuous Open (Stuck Off) Fail Case 2: Ground (Stuck On) in the Four Wheel Drive Low Switch Circuit	Fail Case 1: 4WD Low Switch MTCR High MTCR Low Fail Case 2: MTCR High MTCR Low	= Open Boolean <= 3.0 ratio >= 2.4 ratio <= 1.85 ratio >= 0.65 ratio Engine Torque High Engine Torque Low Engine Speed High Engine Speed Low System Voltage High System Voltage Low Throttle Position Sensor High Throttle Position Sensor Low Transmission Temperature High Transmission Temperature Low Engine Run time Vehicle Speed	Engine Torque High Engine Torque Low Engine Speed High Engine Speed Low System Voltage High System Voltage Low Throttle Position Sensor High Throttle Position Sensor Low Transmission Temperature High Transmission Temperature Low Engine Run time Vehicle Speed	<= 8192 N-m >= 30 N-m <= 5500 RPM >= 1000 RPM <= 32 V >= 9 V <= 99 % >= 5.0 % <= 130 º C. >= -20 º C. >= 10 Sec >= 3 MPH	>= 2 Fail Time (Sec) >= 7 Fail Time (Sec)	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Disabled on these pcodes:	CrankSensorFaultActive P2160 P2161 TPS_FA VehicleSpeedSensorError EngineMisfireDetected_FA MAF_SensorTFTKO MAP_SensorTFTKO TransmissionGearDefaulted TCM code P0716 TFTKO (T42 only) TCM code P0717 TFTKO (T42 only) TransmissionGearDefaulted		
O2Sensor Circuit Range/ Performance Bank 1 Sensor 1	P2A00	This DTC determines if the O2 sensor voltage is not meeting the voltage criteria to enable closed loop fueling.	Disable Conditions: Closed Loop O2S ready flag		No Active DTC's		200 failures out of 250 samples.	Type B 2 trips
				= False		TPS_ThrottleAuthority Defaulted		
			A) O2S signal must be			MAP_SensorFA		
			1) O2S signal	> 550 mvolts		ECT_Sensor_FA		
			OR 2) O2S signal	< 350 mvolts		FuelInjectorCircuit_FA		
			To set Closed Loop ready flag			P0131, P0151	Frequency: Continuous	
				= True		P0132, P0152	100msec loop	
						10.0 volts < system voltage< 32.0 volts		
			Closed Loop O2S ready flag		System Voltage	1000 RPM <= Engine speed <= 3400 RPM		
				= True	Engine Speed			
			B) Once set to ready O2S cannot be			10.0 gps <= Engine Airflow<= 50.0 gps		
					Engine Airflow			
			1) O2S signal	> 350 mvolts	Engine Coolant	>= 70.0 ºC		
			AND 2) O2S signal	< 550 mvolts				
			for time	> 5.0 seconds				
			Then set Closed Loop ready flag		Engine Metal Overtemp Active	= False		
					Converter Overtemp Active			
				= False		= False		
					Fuel State	DFCO not active		
					AFM Status	= All Cylinders active		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Predicted Exhaust Temp (B1S1)	>= 0.0 ºC		
					Engine run time	> 100 seconds		
					Fuel Enrichment	= Not Active		
					All of the above met for			
					Time	> 5 seconds		
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*)	< -8.0 kPa > 8.0 kPa	**DIAGNOSTIC ENABLE CONDITIONS**			Type B 2 trips
					Total filtered residual weight factors	>= 0 factor		
					ECT	> -20 and < 125 Deg C		
					IAT	> -20 and < 125 Deg C		
					Engine RPM	> 450 and < 5750 RPM		
						MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM. See table IFRD Residual Weighting Factors		
					CYLINDER DEACTIVATION ENABLE CONDITIONS (Conditions below must be met for >= 0 seconds before cylinder deactivation will begin)		100 cylinder deactivation lag residual failures out of 200 samples	
					Engine running Engine RPM	> 30.0 seconds > **EngSpeedLwrLimitEnableTable** AND < **EngSpeedUprLimitEnableTable** - Details on Supporting Tables Tab (P3400 Section)	Performed once every 100 msec	
					Engine coolant	>= 36 and <= 129 Deg C		
					Ignition voltage	>= 11.0 and <= 18.0 Volts		
					Pct throttle pedal	< 5 Percent		
					Brake booster vacuum			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Engine oil temp	>= 42.0 kPa		
						>= 16 and <= 128 Deg C		
					PRNDL State			
						HalfCylDisabledPRNDL - See details on Supporting Tables Tab (P3400 Section)		
					Trans Gear			
						HalfCylDisabledTransGr - See details on Supporting Tables Tab (P3400 Section)		
					Vehicle speed	>= 12 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 pedal delta			
						<= 0.1 Percent		
					Engine oil pressure			
						>= 187 and <= 455 kPa		
					Filtered engine vacuum			
						> AllCylToHalfCylVacuum or EcoAllCylToHalfCylVacuum (in Eco mode) - See details on Supporting Tables Tab (P3400 Section) for 0 sec.		
					PRNDL state			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Oil aeration present	HalfCylDisabledPRNDL and HalfCylDisabledPRNDL DeviceControl tables (when in device control) - See details on Supporting Tables Tab (P3400 Section)		
						Aeration enabled by engine RPM > 5000 for 15 seconds, disabled by engine RPM < 4000 for 90 seconds		
					After exiting deac mode, must be in all cylinder mode for			
					DFCO mode	>= 60 seconds		
					Fuel shut off mode other than DFCO	Not currently in DFCO		
					ETC Power management mode	Not currently in fuel shut-off		
						Not active		
					Heater Perf.	Not in Heater Performance Mode		
					POSD Intrusive	POSD diagnostic not active		
					POPD Intrusive	POPD diagnostic not active		
					Low range 4WD	Not in Low Range 4WD		
					AFM is disabled at high percent ethanol			
						Ethanol concentration > 95 % disables AFM. Once disabled, ethanol concentration must be < 90 % to re-enable		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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:			
					Deac mode active	>= 600 seconds		
					OR			
					Delta vacuum	> 5 kPa or < -5 kPa		
					Engine RPM	> **EngSpeedDisableLwrLimitTable** AND < **EngSpeedDisableUprLimitTable** - Details on Supporting Tables Tab (P3400 Section)		
					Engine Power Limited Mode	Active		
					Pct throttle pedal	> 6 Percent		
					Piston protection	Active		
					Engine Oil Temperature	< 18 kPa or > 130 kPa		
					Engine Oil Pressure	< 172 kPa or > 470 kPa		
					Oil aeration present			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						Aeration enabled by engine RPM > 5000 for 15 seconds, disabled by engine RPM < 4000 for 90 seconds		
					Engine Metal Overtemp Protection			
						Active		
					Accelerator pedal delta			
						<= 0.1 percent		
					in device control only, when in Park or Neutral, engine RPM			
						<= 0.0 Mph		
					Trans Gear			
						AllCylDisabledTransGr - See details on Supporting Tables Tab (P3400 Section)		
					PRNDL state			
						HalfCylDisabledPRNDL and HalfCylDisabledPRNDL DeviceControl tables (when in device control) - See details on Supporting Tables Tab (P3400 Section)		
					Ignition voltage	< 11.0 or > 18.0 Volts		
					Engine Coolant	< 40.0 or > 125.0 Deg C		
					Vehicle speed	< 11.2 MPH		
					Brake booster vacuum			
						< 40.0 kPa		
					Pct Throttle Pedal	< 6 Percent		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Filtered engine vacuum	> HalfCylToAllCylVacuum or EcoHalfCylToAllCylVacuum (in Eco mode) - See details on Supporting Tables Tab (P3400 Section) for 0 sec.		
					ETC Power management mode	Active		
					Converter overtemp protect	Active		
					Hot Coolant Mode	Active		
					Engine running	= False		
					Engine overspeed protection	Active		
					Gear Shift	In progress		
					AC Clutch transition	In progress		
					Tip In Bump	Active		
					Engine Metal Overtemp Protect	Active		
					Cat. Temp Low	Active		
					POSD Intrusive	Active		
					FWD	In low range		
					Engine Misfire	Detected		
					Heater Performance	Active		
					POPD Intrusive	Active		
					No active DTC's	Fault bundles: Map_SensorFA VehicleSpeedSensorError ECT_Sensor_FA EOP_Sensor_FA		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						PowertrainRelayFault BrakeBoosterSensorFA CrankSensorFA CamSensorFA IAT_SensorFA CylnderDeacDriverTFTKO FourWheelDriveLowStateValid EngineTorqueEstInaccurate TransmissionGearDefaulted EnginePowerLimited		
Cylinder 1 Deactivation Solenoid Control Circuit	P3401	Checks the Solenoid Control Circuit electrical integrity for cylinder #1	The ECM detects that commanded state of driver and actual state of the control circuit do not match. (Short to ground, short to voltage, open circuit)		Engine RPM Ignition Voltage Diagnostic enabled/disabled	>= 400.0 RPM <= 32.0 and >= 11.0 Volts Enabled	20 failures out of 25 samples Performed every 250 msec	Type B 2 trips
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	20 failures out of 25 samples Performed every 250 msec	Type B 2 trips
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 Vo Enabled	20 failures out of 25 samples Performed every 250 msec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
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	20 failures out of 25 samples Performed every 250 msec	Type B 2 trips
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition Bus off failures out of these samples		≥ 5 counts ≥ 5 counts	CAN hardware is bus OFF for	≥ 0.0375 seconds	Diagnostic runs in 1000 ms loop	Type B 2 trips
Lost Communication With TCM	U0101	This DTC monitors for a loss of communication with the transmission control module Message is not received from controller for this many counts out of these samples		12 counts 12 counts	Run/Crank Voltage Power mode is RUN Communication bus is not OFF or is typed as a C code Normal Communication is enabled Normal Transmit capability is TRUE The diagnostic system is not disabled The bus has been on for A message has been selected to monitor.	11 volts ≤ Voltage ≤ 32 volts > 3.0000 seconds	The diagnostic runs in the 1000 ms loop	Type B 2 trips
Lost Communication with Transfer Case Control Module	U0102	This DTC monitors for a loss of communication with the transfer case control module Message is not received from controller for this many counts out of these samples		12 counts 12 counts	Run/Crank Voltage Power mode is RUN Communication bus is not OFF or is typed as a C code Normal Communication is enabled	11 volts ≤ Voltage ≤ 32 volts	The diagnostic runs in the 1000 ms loop	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Normal Transmit capability is TRUE The diagnostic system is not disabled The bus has been on for A message has been selected to monitor.	> 3.0000 seconds		
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 out of these samples	12 counts 12 counts	Run/Crank Voltage Power mode is RUN Communication bus is not OFF or is typed as a C code Normal Communication is enabled Normal Transmit capability is TRUE The diagnostic system is not disabled The bus has been on for A message has been selected to monitor.	11 volts ≤ Voltage ≤ 32 volts > 3.0000 seconds	The diagnostic runs in the 1000 ms loop	Type B 2 trips
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 out of these samples	12 counts 12 counts	Run/Crank Voltage Power mode is RUN Communication bus is not OFF or is typed as a C code Normal Communication is enabled Normal Transmit capability is TRUE The diagnostic system is not disabled The bus has been on for A message has been selected to monitor.	11 volts ≤ Voltage ≤ 32 volts > 3.0000 seconds	The diagnostic runs in the 1000 ms loop	Special Type C 1 trip **NO MIL**
Lost Communication With Body Control Module	U0140	This DTC monitors for a loss of communication with the Control Module.	Message is not received from controller for this many counts out of these samples	12 counts 12 counts	Run/Crank Voltage Power mode is RUN	11 volts ≤ Voltage ≤ 32 volts	The diagnostic runs in the 1000 ms loop	Special Type C 1 trip **NO MIL**

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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 A message has been selected to monitor.	> 3.0000 seconds		

Supporting Tables

P0442: EONV Pressure Threshold Table (in Pascals)

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

	0.0000	6.2485	12.4969	18.7454	24.9939	31.2424	37.4908	43.7393	49.9878	56.2363	62.4847	68.7332	74.9817	81.2302	87.4786	93.7271	99.9756
-10.0000	-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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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

P0442: Estimate of Ambient Temperature Valid Conditioning Time

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

Axis	Curve
0	200
600	200
1200	200
1800	200
2400	200
3000	200
3600	200
4200	200
4800	200
5400	200
6000	200
6600	200
7200	200
7800	200
8400	200
9000	200
9600	200
10200	200
10800	200
11700	200
12600	200
13500	200
14400	200
15300	200
16200	200
17100	200
18000	200
19200	200
20400	200
21600	200
22800	200
24000	200
25200	200

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

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

P0461, P2066, P2636: Transfer Pump Enable

TransferPumpOnTimeLimit (in seconds)
Axis is Fuel Level in %

Axis	Curve
0	0
3	220
6	220
9	220
13	220
16	275
19	330
22	385
25	440
28	495
31	550
34	605
38	660
41	715
44	771
47	826
50	881
53	936
56	991
59	1046
63	1101
66	1156
69	1211
72	1266
75	1321
78	1376
81	1431
84	1486
88	1541
91	1596
94	1651
97	1706
100	1761

CATD Section

MinimumEngineRunTime

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

MinCatTemp — X_AXIS_PTS

CATD_ExhaustWarmMin_Loc_0	430	0
CATD_ExhaustWarmMin_Loc_1	430	1
CATD_ExhaustWarmMin_Loc_2	430	2
CATD_ExhaustWarmMin_Loc_3	430	3
CATD_ExhaustWarmMin_Loc_4	430	4
CATD_ExhaustWarmMin_Loc_5	430	5
CATD_ExhaustWarmMin_Loc_6	430	6
CATD_ExhaustWarmMin_Loc_7	430	7

MinAirflowToWarmCatalyst

Engine Coolant	0	45	90
MinAirFlowToWrmCat	20	18	12

Define Close Loop

KtFSTA_T_ClosedLoopTemp

Start-Up Coolant	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Close Loop Enable Temp	85	80	75	65	45	39	39	39	39	39	39	39	39	39	39	39	39

KtFSTA_t_ClosedLoopTime

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

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	1.5	2.0	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	1.5	2.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
70	0.0	1.5	3.0	6.0	6.0	6.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
80	0.0	1.5	3.0	6.0	6.0	6.0	8.0	10.0	10.0	10.0	10.0	10.0	10.0	9.0	9.0	9.0	9.0

90	0.0	1.5	3.0	6.0	6.0	6.0	8.0	10.0	11.0	11.0	11.0	11.0	11.0	10.0	10.0	10.0	10.0
100	0.0	1.5	3.0	6.0	6.0	6.0	8.0	11.0	11.0	11.0	11.0	11.0	11.0	10.0	10.0	10.0	10.0
110	0.0	1.5	3.0	6.0	6.0	6.0	8.0	11.0	11.0	11.0	11.0	11.0	11.0	10.0	10.0	10.0	10.0
120	0.0	1.5	3.0	6.0	6.0	6.0	8.0	11.0	11.0	11.0	11.0	11.0	11.0	10.0	10.0	10.0	10.0
130	0.0	1.5	3.0	6.0	6.0	6.0	8.0	11.0	11.0	11.0	11.0	11.0	11.0	10.0	10.0	10.0	10.0
140	0.0	1.5	3.0	6.0	6.0	6.0	8.0	11.0	11.0	11.0	11.0	11.0	11.0	10.0	10.0	10.0	10.0
150	0.0	1.5	3.0	6.0	6.0	6.0	8.0	11.0	11.0	11.0	11.0	11.0	11.0	10.0	10.0	10.0	10.0
160	0.0	1.5	3.0	6.0	6.0	6.0	8.0	11.0	11.0	11.0	11.0	11.0	11.0	10.0	10.0	10.0	10.0
170	0.0	1.5	3.0	6.0	6.0	6.0	8.0	11.0	11.0	11.0	11.0	11.0	11.0	10.0	10.0	10.0	10.0
180	0.0	1.5	3.0	6.0	6.0	6.0	8.0	11.0	11.0	11.0	11.0	11.0	11.0	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	2.50	2.83	3.00	3.00	3.00	3.00	3.50	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
FastAttackCoolGain:	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.50	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.10	1.20

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

P0325/P0330 OpenCircuitThresh

E37 controller

Engine Speed (RPM):	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000
OpenCircuitThresh:	9	15	25	33	48	85	85	85	85	85	85	85	85	85	85	85

P0327/P0332 ShortLowThresh

E37 controller

Engine Oil Temperature (deg C):	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
ShortLowThresh:	34000	34000	34000	34000	34000	34000	34000	34000	34000	32000	30000	28000	26000	24000	22000

P0328P0333 ShortHiThresh

E37 controller

Engine Oil Temperature (deg C):	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160
ShortHiThresh:	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000

AFIM Section

KtOXYD_cmp_AFIM_LngthThrsh1

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000
80	90000	90000	90000	8992	8992	10432	11872	14656	13648	13648	90000	90000	90000	90000	90000	90000	90000
120	90000	90000	90000	8992	8992	10464	11872	14656	13648	13648	90000	90000	90000	90000	90000	90000	90000
160	90000	90000	90000	11616	11616	10528	11024	17376	14640	13360	15504	22320	18384	18384	90000	90000	90000
200	90000	90000	90000	9776	9776	16128	10688	18032	12144	12096	15504	22320	18384	18384	90000	90000	90000
240	90000	90000	90000	10832	10832	16704	13488	20800	12832	12320	19216	33744	21920	21920	90000	90000	90000
280	90000	90000	90000	10832	15968	21088	16608	20832	13360	12224	26320	31520	32112	32112	90000	90000	90000
320	90000	90000	90000	90000	20448	20448	20560	24048	13264	12880	21040	33312	26976	26976	90000	90000	90000
360	90000	90000	90000	90000	21472	21472	26720	32272	18304	25760	21088	37600	32304	32304	90000	90000	90000
400	90000	90000	90000	90000	20720	20720	29968	34560	25760	30512	31520	39408	33264	33264	90000	90000	90000
440	90000	90000	90000	90000	23808	23808	31920	36976	24448	32224	38752	47040	40144	33264	90000	90000	90000
480	90000	90000	90000	90000	23200	23200	30192	39424	30960	34672	46288	45360	45360	90000	90000	90000	90000
520	90000	90000	90000	90000	24464	24464	31072	39968	28960	32176	29248	48864	48864	90000	90000	90000	90000
560	90000	90000	90000	90000	24192	24192	31264	41440	29648	33472	29056	48112	48112	90000	90000	90000	90000
640	90000	90000	90000	90000	24480	24480	23792	38992	40128	34192	31616	48112	48112	90000	90000	90000	90000
720	90000	90000	90000	90000	24480	24480	23792	38992	40128	34192	34192	90000	90000	90000	90000	90000	90000
800	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000

KtOXYD_cmp_AFIM_LngthThrsh1_DoD

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

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	8560	8560	8688	9360	11616	10576	12368	12368	90000	90000	90000	90000	90000	90000	90000
120	90000	90000	8560	8560	8688	9360	11616	10576	12368	12368	90000	90000	90000	90000	90000	90000	90000
160	90000	90000	8288	8288	10560	9824	10448	14160	12528	12336	12096	13216	15392	15392	90000	90000	90000

200	90000	90000	8288	8960	9616	13952	12512	13552	13136	12128	12096	13216	15392	15392	90000	90000	90000
240	90000	90000	90000	9984	9984	18208	13824	14752	15776	12128	13296	15280	15728	15728	90000	90000	90000
280	90000	90000	90000	9984	14720	19472	18128	16000	14608	12320	15600	17152	19264	19264	90000	90000	90000
320	90000	90000	90000	90000	20272	20272	21136	16416	16592	13824	13584	19248	18816	18816	90000	90000	90000
360	90000	90000	90000	90000	20416	20416	25952	27040	20992	20736	14032	18224	21040	21040	90000	90000	90000
400	90000	90000	90000	90000	24704	24704	29440	22560	23264	23472	23712	20784	21536	21536	90000	90000	90000
440	90000	90000	90000	90000	22352	22352	29120	28416	21968	25664	33488	22624	22080	21536	90000	90000	90000
480	90000	90000	90000	90000	24768	24768	32896	26048	23040	33968	28912	25008	25008	90000	90000	90000	90000
520	90000	90000	90000	90000	23840	23840	31856	26016	24128	33520	30160	32512	32512	90000	90000	90000	90000
560	90000	90000	90000	90000	23024	23024	31680	27472	22672	33760	36176	34896	34896	90000	90000	90000	90000
640	90000	90000	90000	90000	22832	22832	29760	27808	32000	38256	37216	34896	34896	90000	90000	90000	90000
720	90000	90000	90000	90000	22832	22832	29760	27808	32000	38256	38256	90000	90000	90000	90000	90000	90000
800	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000	90000

KtOXYD_cmp_AFIM_LngthThrsh2_DoD

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

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	1.00	0.00	1.00	0.90	1.00	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	0.95	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
200	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.75	1.00	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	0.75	1.00	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	1.00	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	1.00	0.00	0.00	0.00	0.00
360	0.00	0.00	0.00	0.00	0.00	1.00	0.95	0.95	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	0.00	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	0.00	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	0.00	0.00	0.00	0.00	0.00
560	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
640	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.95	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

KtOXYD_K_AFIM_QualFactor1_DoD

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

KtOXYD_K_AFIM_QualFactor2

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0	0
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	0	0	0
120	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0	0
160	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0	0
200	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0	0	0	0
240	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0	0	0	0
280	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	0	0	0	0
320	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	0	0	0	0
360	0.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0	0	0	0
400	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	0	0	0	0
440	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0	0	0	0
480	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0	0	0	0
520	0.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0	0	0	0
560	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0	0	0	0

640	0.00	1.00	1.00	1.00	0.95	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0	0
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	0	0	0
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	0	0	0

KtOXYD_K_AFIM_QualFactor2_DoD

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

Define Close Loop

KtFSTA_T_ClosedLoopTemp

Start-Up Coolant	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Close Loop Enable Temp	85	80	75	65	45	39	39	39	39	39	39	39	39	39	39	39	39

KtFSTA_t_ClosedLoopTime

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

Tables supporting Clutch Diagnostics

P0806

EngTorqueThreshold Table — AXIS is Percent Clutch Petal Position, 0 = bottom of trave

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	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

P0806

ResidualErrorEnableLow Table — AXIS is Gear

Axis	1st	2nd	3rd	4th	5th	6th	rev	neutral
Curve	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

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

Tables supporting AIR Diagnostics

P0411

SL Threshold Bank 1 Table — axis is average engine airflow during test in gm/sec

Axis	0.0	3.0	6.0	9.0	12.0	15.0	18.0	21.0	24.0	27.0	30.0	33.0	36.0	39.0	42.0	45.0	48.0
Curve	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0

P0411

Phase 1 Baro Test Weight Factor — axis is Baro in Kpa

Axis	40	50	60	70	80	90	100	110	120
Curve	0.0	0.0	0.5	1.0	1.0	1.0	1.0	1.0	0.0

P0411

Phase 1 MAF Test Weight Factor — axis is engine airflow in gm/sec

Axis	0.0	3.0	6.0	9.0	12.0	15.0	18.0	21.0	24.0	27.0	30.0	33.0	36.0	39.0	42.0	45.0	48.0
Curve	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.5	0.0	0.0	0.0	0.0	0.0

P0411

Phase 1 System Volt Test Weight Factor — axis is engine airflow in gm/sec

Axis	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	19.0	20.0	21.0
Curve	0.0	0.0	0.0	0.0	0.0	0.5	0.8	1.0	1.0	1.0	1.0	1.0	0.8	0.5	0.5	0.5	0.5

P0411

Phase 1 Amb Temp Test Weight Factor — axis is Deg C

Axis	-30	-20	-10	0	10	20	30	40	50
Curve	0.0	0.0	0.0	0.5	1.0	1.0	1.0	1.0	1.0

P02431   **P02440**

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

Axis	0.0	2.0	4.0	6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0	32.0
Curve	1.0	0.8	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

P02440

Bank 1 Valve Pressure Error — axis weighted time in seconds

Axis	0	1	2	3	4	5	6	7	8
Curve	-6.0	-6.0	-5.0	-4.0	-3.0	-3.0	-3.0	-3.0	-3.0

P02440

Phase 2 Baro Test Weight Factor — axis is Baro in Kpa

Axis	40	50	60	70	80	90	100	110	120
Curve	0.0	0.0	0.5	1.0	1.0	1.0	1.0	1.0	0.0

P02440

Phase 2 MAF Test Weight Factor — axis is engine airflow in gm/sec

Axis	0.0	3.0	6.0	9.0	12.0	15.0	18.0	21.0	24.0	27.0	30.0	33.0	36.0	39.0	42.0	45.0	48.0
Curve	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.5	0.0	0.0

P02440

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

Axis	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	19.0	20.0	21.0
Curve	0.0	0.0	0.0	0.0	0.0	0.5	0.8	1.0	1.0	1.0	1.0	1.0	0.8	0.5	0.5	0.5	0.5

P02440

Phase 2 Amb Temp Test Weight Factor — axis is Deg C

Axis	-30	-20	-10	0	10	20	30	40	50
Curve	0.0	0.0	0.0	0.5	1.0	1.0	1.0	1.0	1.0

P02444

Bank 1 Pump Pressure Error — axis weighted time in seconds

Axis	0	1	2	3	4	5	6	7	8
Curve	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2

FASD Section

P0171 & P0174 — Long Term Trim Lean (Lean Fail threshold)

% Ethanol	0.00	6.25	12.50	18.75	24.99	31.24	37.49	43.74	49.99	56.24	62.48	68.73	74.98	81.23	87.48	93.73	99.98
Long Term Fuel Trim Lean Threshold	1.245	1.245	1.245	1.245	1.245	1.245	1.245	1.245	1.245	1.245	1.245	1.245	1.245	1.245	1.245	1.245	1.245

P0172 & P0175 — Non Purge Rich Limit (Rich Fail threshold)

% Ethanol	0.00	6.25	12.50	18.75	24.99	31.24	37.49	43.74	49.99	56.24	62.48	68.73	74.98	81.23	87.48	93.73	99.98
Long Term Fuel Non-Purge Rich Thre	0.790	0.790	0.790	0.790	0.790	0.790	0.790	0.790	0.790	0.790	0.790	0.790	0.790	0.790	0.790	0.790	0.790

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

% Ethanol	0.00	6.25	12.50	18.75	24.99	31.24	37.49	43.74	49.99	56.24	62.48	68.73	74.98	81.23	87.48	93.73	99.98
Long Term Fuel Purge Rich Threshold	0.795	0.795	0.795	0.795	0.795	0.795	0.795	0.795	0.795	0.795	0.795	0.795	0.795	0.795	0.795	0.795	0.795

The following tables define when the engine goes closed loop

P0171, P0172, P0174 & P0175 — Closed Loop Enable Temp vrs Coolant Temp

Start-Up Coolant	-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
Close Loop Enable Temp	85	80	75	65	45	39	39	39	39	39	39	39	39	39	39	39	39

P0171, P0172, P0174 & P0175 — Closed Loop Enable Time vrs Coolant Temp

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

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

Long-Term Fuel Trim Cell Usage

Cell I.D.	CeFADR_e_Cel	CeFADR_e_C	CeFADR_e_C	CeFADR_e_C	CeFADR_e_C	CeFADR_e_C	CeFADR_e_C	CeFADR_e_C	CeFADR_e_C	CeFADR_e_C	CeFADR_e_C	CeFADR_e_C	CeFADR_e_C	CeFADR_e_C	CeFADR_e_Cell15_PurgOffDecel
FASD Cell Usage	CeFADD_e_Sel	CeFADD_e_	CeFADD_e_	CeFADD_e_S	CeFADD_e_S	CeFADD_e_S	CeFADD_e_S	CeFADD_e_S	CeFADD_e_S	CeFADD_e_S	CeFADD_e_S	CeFADD_e_S	CeFADD_e_S	CeFADD_e_S	CeFADD_e_SelectedNonPurgeCell
FASD Enabled In Cell?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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	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	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

P0101, P0106, P0121, P012B, P1101: IFRD Residual Weighting Factors (Supercharged applications

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	1.000	1.000	1.000	1.000	1.000	0.833	0.714	0.625	0.556	0.500	0.500	0.500	0.500

MAF Residual Weight Factor based on RPM

RPM	0	250	750	1250	1750	2250	2750	3250	3750	4250	4750	5250	5750	6250	6750	7250	9000
	1.000	1.000	1.000	0.833	0.833	0.733	0.696	0.500	0.400	0.300	0.300	0.300	0.200	0.200	0.200	0.714	0.714

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
	0.625	0.625	0.625	0.625	0.625	0.625	0.625	0.714	0.625	0.556	0.500	0.455	0.417	0.385	0.357	0.333	0.313

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
	0.556	0.556	0.556	0.556	0.556	0.556	0.500	0.455	0.455	0.455	0.455	0.417	0.417	0.385	0.385	0.385	0.385

SCIAP1 Residual Weight Factor based on RPM

RPM	0	250	750	1250	1750	2250	2750	3250	3750	4250	4750	5250	5750	6250	6750	7250	9000
	0.625	0.625	0.625	0.625	1.000	1.000	1.000	0.556	0.556	0.556	0.556	0.556	0.556	0.556	0.556	0.556	0.556

SCIAP2 Residual Weight Factor based on RPM

RPM	0	250	750	1250	1750	2250	2750	3250	3750	4250	4750	5250	5750	6250	6750	7250	9000
	0.556	0.556	0.556	0.556	1.000	1.000	1.000	0.625	0.625	0.625	0.625	0.625	0.625	0.600	0.600	0.600	0.600

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
P0121	T	F	F	T	T	T
P1101	T	F	T	F	F	F
P0121	T	F	T	F	F	T
P1101	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
P0121	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
P1101	T	T	F	F	T	F
P1101	T	T	F	F	T	T
P0121	T	T	F	T	F	F
P1101	T	T	F	T	F	T
P0121	T	T	T	F	T	F
P1101	T	T	T	F	T	T

P0108, P012D: MAP/SCIAP Cold Run Time Threshold

X axis is Engine Coolant Temperature in Deg C

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

P0108, P012D: MAP/SCIAP Cold Run Time Threshold (Supercharged applications)

X axis is Engine Coolant Temperature in Deg C

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

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

Z axis is the Fast Failure temp difference (° C)

for applications with a 2nd coolant sensor

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
79.50	79.50	79.50	60.00	60.00	39.75	39.75	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00

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
79.50	79.50	79.50	60.00	60.00	39.75	39.75	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00

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

for applications with a single coolant sensor

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	17626	17626	17626	17626	17626	15882	14137	12392	10648	8903	7159
Alternate	-7.0 ° C	10.0 ° C	16976	16976	16976	15517	14060	12600	11142	9684	8225	8225	8225

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

for applications with a 2nd coolant sensor

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

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

		400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
load	8	400	400	340	200	140	110	100	90	50	32767	32767	32767	32767
Load	9	400	400	340	200	140	110	100	90	50	32767	32767	32767	32767
	11	400	400	340	200	140	110	100	90	50	32767	32767	32767	32767
	12	400	400	340	200	150	110	100	90	50	32767	32767	32767	32767
	13	400	400	340	200	150	110	100	90	50	32767	32767	32767	32767
	14	400	400	340	220	150	110	100	90	50	32767	32767	32767	32767
	15	400	400	350	220	180	110	100	85	50	32767	32767	32767	32767
	16	400	400	350	240	180	110	100	85	50	32767	32767	32767	32767
	17	400	400	350	240	180	130	100	85	50	32767	32767	32767	32767
	18	425	425	300	240	170	130	90	85	50	32767	32767	32767	32767
	19	450	450	325	240	160	120	90	75	50	32767	32767	32767	32767
	21	475	475	350	250	170	120	90	75	55	32767	32767	32767	32767
	22	500	500	400	300	180	125	90	70	53	32767	32767	32767	32767
	24	525	525	500	300	200	130	95	70	55	32767	32767	32767	32767
	25	550	550	550	350	200	140	80	55	50	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

		400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
load	8	450	450	340	200	140	110	100	95	50	32767	32767	32767	32767
	9	450	450	340	200	140	110	100	95	50	32767	32767	32767	32767
	11	450	450	330	200	140	110	100	95	50	32767	32767	32767	32767
	12	450	450	300	200	150	110	100	95	50	32767	32767	32767	32767
	13	450	450	300	200	150	110	100	95	50	32767	32767	32767	32767
	14	400	400	300	220	150	110	100	95	50	32767	32767	32767	32767
	15	400	400	300	220	180	110	100	95	50	32767	32767	32767	32767
	16	440	440	300	240	180	110	100	95	50	32767	32767	32767	32767
	17	460	460	300	220	180	130	100	95	50	32767	32767	32767	32767
	18	500	500	300	220	170	110	85	85	50	32767	32767	32767	32767
	19	500	500	325	220	160	100	80	75	50	32767	32767	32767	32767
	21	525	525	350	220	150	100	80	60	45	32767	32767	32767	32767
	22	550	550	400	260	160	100	80	60	40	32767	32767	32767	32767
	24	600	600	500	300	180	110	90	60	40	32767	32767	32767	32767

		400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
	25	650	650	500	350	200	120	90	65	40	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))

		400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
load	8	400	400	275	220	160	130	90	70	60	32767	32767	32767	32767
Load	9	400	400	250	200	150	120	85	65	55	32767	32767	32767	32767
	11	400	375	250	200	160	120	85	65	50	32767	32767	32767	32767
	12	400	350	260	200	160	115	85	60	50	32767	32767	32767	32767
	13	425	425	320	220	160	115	80	65	52	32767	32767	32767	32767
	15	450	400	360	240	180	115	90	70	55	32767	32767	32767	32767
	17	500	500	380	260	180	120	90	70	60	32767	32767	32767	32767
	19	600	600	425	300	200	150	110	80	70	32767	32767	32767	32767
	22	750	750	500	350	220	160	120	90	80	32767	32767	32767	32767
	25	900	900	750	400	275	180	150	120	100	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

		400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
load	8	400	400	275	200	170	130	85	65	55	32767	32767	32767	32767
	9	400	400	250	180	150	120	80	60	50	32767	32767	32767	32767
	11	375	375	225	180	150	110	80	60	45	32767	32767	32767	32767
	12	350	350	250	200	160	115	80	60	50	32767	32767	32767	32767
	13	425	425	280	220	160	115	80	60	50	32767	32767	32767	32767
	15	400	400	350	240	170	115	90	70	55	32767	32767	32767	32767
	17	500	500	375	260	180	120	90	70	55	32767	32767	32767	32767
	19	600	600	450	300	200	150	110	80	65	32767	32767	32767	32767
	22	750	750	500	350	220	160	120	90	80	32767	32767	32767	32767
	25	900	900	750	400	275	180	150	120	100	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)

		400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
load	8	1000	1000	650	450	350	250	225	150	120	100	75	68	60
Load	9	1100	1100	650	450	350	250	225	150	130	100	75	68	60
	11	1100	1100	700	450	350	250	225	150	130	100	75	68	60
	12	1200	1200	800	450	350	250	225	150	130	100	75	68	60
	13	1200	1200	800	450	350	250	225	150	130	100	75	68	60
	14	1100	1100	800	550	350	250	225	150	130	100	75	68	60
	15	1000	1000	800	650	400	275	225	150	130	100	75	68	60
	16	1000	1000	800	650	425	275	225	150	130	100	75	68	60
	17	1200	1200	800	600	425	325	225	175	110	110	75	68	60
	18	1300	1300	800	600	400	300	220	175	150	110	80	68	60
	19	1400	1400	850	575	400	260	220	175	130	110	80	68	60
	21	1500	1500	900	600	400	280	230	170	130	100	85	78	70
	22	1600	1600	1000	650	400	280	220	170	130	115	100	88	75
	24	1700	1700	1000	750	450	300	240	180	140	130	110	95	80
	25	1800	1800	1050	750	450	300	230	190	150	135	130	110	90
	27	1900	1900	1100	800	500	300	275	190	150	140	140	120	100
	29	2000	2000	1150	900	550	350	300	225	160	150	170	140	110

P0300-P0308: Idle Cyl Mode ddt

		400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
load	8	1100	1100	600	450	350	250	200	150	125	100	75	68	60
	9	1100	1100	600	450	350	250	200	150	125	100	75	68	60
	11	1100	1100	650	450	350	250	200	150	125	100	75	68	60
	12	1100	1100	700	450	350	250	200	150	125	100	75	68	60
	13	1100	1100	700	450	350	250	200	150	125	100	75	68	60
	14	1000	1000	700	450	350	250	200	150	125	100	75	68	60
	15	900	900	700	550	400	275	200	150	125	100	75	68	60
	16	1000	1000	700	550	425	275	200	150	125	100	75	68	60
	17	1200	1200	700	500	425	300	200	150	100	100	75	68	60
	18	1300	1300	650	500	400	250	200	150	130	100	75	68	60
	19	1400	1400	700	525	350	225	180	150	110	80	80	68	60
	21	1500	1500	750	525	350	250	200	140	100	75	75	73	70
	22	1600	1600	900	600	350	250	190	150	100	90	80	75	65
	24	1700	1700	1000	700	400	275	200	150	100	100	90	85	80
	25	1800	1800	1050	700	400	275	210	150	100	100	100	95	90
	27	1900	1900	1100	800	500	275	250	160	110	100	100	95	90
	29	2000	2000	1150	900	550	350	275	200	150	150	150	125	110

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

		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

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
load	8	1100	1000	800	650	360	275	200	170	160	110	60	50	36	26	20	14	13	11	4.5	3.5	3.5	3.5	2.0	2.0	2.0	2.0
Load	9	1100	1000	750	600	360	275	200	170	160	100	60	50	36	26	20	14	13	11	4.5	4.0	4.0	3.5	2.0	2.0	2.0	2.0
	11	1000	900	600	450	360	275	200	150	125	90	55	42	32	24	18	14	12	11	4.5	3.0	4.0	3.5	2.5	2.5	2.5	2.5
	12	900	800	625	550	375	275	200	140	120	90	55	38	28	22	18	13	12	10	4.0	3.5	4.0	3.5	2.5	2.5	2.5	2.5
	13	1000	900	650	550	350	250	175	150	125	85	55	40	32	26	20	16	13	10	4.5	3.5	4.0	3.5	2.5	2.5	2.5	2.5
	15	1000	900	850	600	400	275	200	150	140	85	60	47	36	28	22	18	14	11	4.5	4.0	4.0	3.5	2.5	2.5	2.5	2.5
	17	1100	1100	900	600	400	300	225	160	150	90	65	50	42	30	24	19	16	13	5.0	4.0	4.0	3.5	2.5	2.5	2.5	2.5
	19	1200	1100	1000	700	500	325	275	175	160	120	82	62	46	35	26	20	16	14	5.5	4.5	4.0	3.5	2.5	2.5	2.5	2.5
	22	1300	1200	1100	800	500	350	300	200	200	135	90	65	50	35	26	20	16	15	6.0	4.5	4.0	3.5	2.5	2.5	2.5	2.5
	25	1400	1300	1200	900	700	450	350	250	220	150	100	70	55	42	32	24	20	15	7.0	5.0	4.5	3.5	2.5	2.5	2.5	2.5
	29	1400	1400	1300	1000	800	550	400	300	230	150	110	80	60	45	35	24	20	16	8.0	5.5	4.5	3.5	2.5	2.5	2.5	2.5
	33	1600	1600	1400	1200	900	650	500	400	235	160	130	90	60	45	34	28	22	17	10.0	6.5	5.0	4.0	3.0	3.0	3.0	3.0
	38	1800	1800	1600	1400	1000	750	600	400	250	180	140	100	70	60	40	35	30	22	11.0	7.0	5.5	4.5	3.0	3.0	3.0	3.0
	42	2000	2000	1800	1600	1100	850	700	500	300	235	150	110	80	60	40	35	30	25	13.0	9.0	6.0	5.0	4.0	4.0	4.0	4.0
	48	2000	2000	1800	1600	1200	1000	800	550	375	235	150	125	95	70	50	40	35	25	16.0	10.0	8.0	6.0	4.0	4.0	4.0	4.0
	54	2000	2000	1800	1600	1200	1000	800	600	400	235	180	125	100	80	60	50	40	30	18.0	12.0	9.0	7.0	5.0	5.0	5.0	5.0
	61	2000	2000	1800	1600	1200	1000	800	700	500	325	250	175	140	100	80	65	50	35	20.0	14.0	10.0	8.0	7.0	7.0	7.0	7.0

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
load	8	1100	1000	800	650	350	280	200	170	160	110	50	45	35	25	17	13	10	9	9	0	0	0	0	0	0	0
	9	1000	1000	750	600	350	280	200	170	160	100	50	45	35	25	17	13	10	9	9	0	0	0	0	0	0	0
	11	1000	900	575	400	360	275	200	150	110	80	50	40	26	22	15	12	10	9	0	0	0	0	0	0	0	0
	12	1000	900	625	550	350	260	200	120	100	70	50	35	24	20	16	12	10	8	0	0	0	0	0	0	0	0
	13	1000	900	650	550	350	250	175	150	110	75	50	35	28	22	18	14	11	10	0	0	0	0	0	0	0	0
	15	1000	900	800	550	400	275	200	150	120	75	50	40	30	25	20	15	12	10	0	0	0	0	0	0	0	0
	17	1100	1000	800	600	400	300	225	160	120	75	50	43	35	28	20	16	13	11	0	0	0	0	0	0	0	0
	19	1300	1200	1100	800	500	325	275	175	140	100	70	52	38	30	24	18	14	11	0	0	0	0	0	0	0	0
	22	1400	1300	1200	800	500	400	300	200	180	120	75	55	40	35	24	20	16	13	0	0	0	0	0	0	0	0
	25	1500	1400	1300	1000	700	450	350	250	200	140	90	65	50	40	30	22	18	14	0	0	0	0	0	0	0	0
	29	1600	1500	1400	1100	900	550	400	300	200	150	90	70	50	40	30	22	20	16	0	0	0	0	0	0	0	0
	33	1600	1600	1500	1200	1000	750	500	400	225	160	110	80	60	45	34	28	22	17	0	0	0	0	0	0	0	0
	38	1800	1800	1600	1400	1100	850	600	400	300	200	140	100	70	60	40	35	30	24	0	0	0	0	0	0	0	0
	42	2000	2000	1800	1600	1200	1000	700	500	325	250	150	120	80	60	40	40	35	30	0	0	0	0	0	0	0	0
	48	2000	2000	1800	1600	1200	1000	800	550	450	250	175	125	95	80	60	50	45	30	0	0	0	0	0	0	0	0
	54	2000	2000	1800	1600	1200	1000	800	600	450	250	180	125	100	80	60	50	40	30	0	0	0	0	0	0	0	0
	61	2000	2000	1800	1600	1200	1000	800	700	525	400	250	180	150	120	100	80	60	40	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
load	8	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	75	45	35	25	24	16	16	16	16
	9	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	80	55	40	32	26	18	18	18	18
	11	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	95	60	40	32	26	22	22	22	22
	12	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	105	60	45	32	26	22	22	22	22
	13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	110	70	50	40	28	24	24	24	24
	15	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	115	80	55	45	32	26	26	26	26
	17	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	120	90	65	50	35	32	32	32	32
	19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	140	100	80	55	45	35	35	35	35
	22	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	160	120	90	65	50	40	40	40	40
	25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	170	140	100	75	60	50	50	50	50
	29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	180	150	110	85	70	55	55	55	55
	33	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	220	180	130	110	80	60	60	60	60
	38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	280	220	140	125	90	70	70	70	70
	42	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	320	260	150	140	100	80	80	80	80
	48	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	350	290	180	160	120	90	90	90	90
	54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	370	320	200	180	135	100	100	100	100
	61	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	400	350	240	200	150	140	140	140	140

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

load		400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3500	4000	4500	5000	5500	6000	6500	7000
load	8	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
Load	9	32767	32767	32767	32767	32767	32767	32767	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: Zero torque engine load

Zero Torque: All Cylinders active						Zero Torque: Active Fuel Management (AFM)	
RPM	Pct load		Baro KPa	Multiplier		RPM	Pct load
400	11.70		65	0.82		400	11.70
500	10.70		70	0.85		500	10.70
600	9.70		75	0.88		600	9.70
700	9.20		80	0.90		700	9.20

RPM	Value		Value		RPM	Value
800	8.90	85	0.93		800	8.90
900	8.80	90	0.95		900	8.80
1000	8.70	95	0.97		1000	8.70
1100	8.60	100	1.00		1100	8.60
1200	8.50	105	1.03		1200	8.50
1400	8.40				1400	8.40
1600	8.40				1600	8.40
1800	8.50				1800	8.50
2000	8.60				2000	8.60
2200	8.70				2200	8.70
2400	8.80				2400	8.80
2600	8.90				2600	8.90
2800	9.00				2800	9.00
3000	9.10				3000	9.10
3500	11.92				3500	11.92
4000	14.13				4000	14.13
4500	16.35				4500	16.35
5000	18.57				5000	18.57
5500	20.79				5500	20.79
6000	23.00				6000	23.00
6500	25.22				6500	25.22
7000	27.44				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

	0	1000	2000	3000	4000	5000	6000	7000
0	10.6	10.6	10.6	7.1	6.3	5.0	5.0	5.0
10	10.6	10.6	8.3	6.3	5.5	5.0	5.0	5.0
20	10.6	10.6	8.3	6.3	5.0	5.0	5.0	5.0
30	10.6	10.6	8.3	5.5	5.0	5.0	5.0	5.0
40	10.6	10.6	8.3	5.0	5.0	5.0	5.0	5.0
50	10.0	8.3	6.3	5.0	5.0	5.0	5.0	5.0
60	8.3	8.3	5.0	5.0	5.0	5.0	5.0	5.0
70	7.1	6.3	5.0	5.0	5.0	5.0	5.0	5.0
80	6.3	5.5	5.0	5.0	5.0	5.0	5.0	5.0
90	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0
100	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

(Row labels at left: load / Load)

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	0.030	0.040	0.050	0.060	0.070	0.080	0.090	0.150	0.160	0.170	0.180	0.190	0.200	0.210	0.215	2.000
0.000	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
0.030	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
0.040	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
0.050	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.060	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
0.070	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
0.080	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
0.090	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.140	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.150	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.160	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.170	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0
0.180	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
0.190	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0
0.200	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0
0.215	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	0.030	0.040	0.050	0.060	0.070	0.080	0.090	0.150	0.160	0.170	0.180	0.190	0.200	0.210	0.215	2.000
0.000	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
0.030	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
0.040	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
0.050	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.060	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
0.070	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
0.080	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
0.090	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.140	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0

0.150	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.160	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0
0.170	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0
0.180	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0
0.190	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0
0.200	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0
0.215	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

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

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

	0.0	10.0	20.0	50.0	80.0
0.0	39	39	39	39	39
6.3	39	39	39	39	39
12.5	39	39	39	39	39
18.8	39	39	39	39	39
25.0	40	40	40	40	40
31.3	40	40	40	40	40
37.5	40	40	40	40	40
43.8	40	40	40	40	40
50.0	40	40	40	40	40
56.3	40	40	40	40	40
62.5	40	40	40	40	40
68.8	40	40	40	40	40
75.0	40	40	40	40	40
81.3	40	40	40	40	40
87.5	40	40	40	40	40
93.8	40	40	40	40	40
100.0	40	40	40	40	40

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

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

	0.0	10.0	20.0	50.0	80.0
0.0	39	39	39	39	39
6.3	39	39	39	39	39
12.5	39	39	39	39	39
18.8	39	39	39	39	39
25.0	40	40	40	40	40
31.3	40	40	40	40	40
37.5	40	40	40	40	40
43.8	40	40	40	40	40
50.0	40	40	40	40	40
56.3	40	40	40	40	40
62.5	40	40	40	40	40
68.8	40	40	40	40	40
75.0	40	40	40	40	40
81.3	40	40	40	40	40
87.5	40	40	40	40	40
93.8	40	40	40	40	40
100.0	40	40	40	40	40

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

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

	0.0	10.0	20.0	50.0	80.0
0.0	39	39	39	39	39
6.3	39	39	39	39	39
12.5	39	39	39	39	39
18.8	39	39	39	39	39
25.0	40	40	40	40	40
31.3	40	40	40	40	40
37.5	40	40	40	40	40
43.8	40	40	40	40	40
50.0	40	40	40	40	40
56.3	40	40	40	40	40
62.5	40	40	40	40	40
68.8	40	40	40	40	40
75.0	40	40	40	40	40
81.3	40	40	40	40	40
87.5	40	40	40	40	40
93.8	40	40	40	40	40
100.0	40	40	40	40	40

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

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

	0.0	10.0	20.0	50.0	80.0
0.0	39	39	39	39	39
6.3	39	39	39	39	39
12.5	39	39	39	39	39
18.8	39	39	39	39	39
25.0	40	40	40	40	40
31.3	40	40	40	40	40
37.5	40	40	40	40	40
43.8	40	40	40	40	40
50.0	40	40	40	40	40
56.3	40	40	40	40	40
62.5	40	40	40	40	40
68.8	40	40	40	40	40
75.0	40	40	40	40	40
81.3	40	40	40	40	40
87.5	40	40	40	40	40
93.8	40	40	40	40	40
100.0	40	40	40	40	40

P2270/P2272 - O2 Sensor Signal Stuck Lean Bank 1/2 Sensor 2 Rich Equiv Ratio
(For applications with Post Oxygen Sensor Voltage Diagnostic)

	0.0	500.0	1000.0	1500.0	2000.0
0.0	1.120117	1.120117	1.120117	1.120117	1.120117
25.0	1.120117	1.120117	1.120117	1.120117	1.120117
50.0	1.129883	1.129883	1.129883	1.129883	1.129883
75.0	1.140137	1.140137	1.140137	1.140137	1.140137
100.0	1.149902	1.149902	1.149902	1.149902	1.149902

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

P2271/P2273 - O2 Sensor Signal Stuck Rich Bank 1/2 Sensor 2 Lean Equiv Ratio
(For applications with Post Oxygen Sensor Voltage Diagnostic)

	0.0	500.0	1000.0	1500.0	2000.0
0.0	0.899902	0.899902	0.899902	0.899902	0.899902
25.0	0.899902	0.899902	0.899902	0.899902	0.899902
50.0	0.899902	0.899902	0.899902	0.899902	0.899902
75.0	0.899902	0.899902	0.899902	0.899902	0.899902
100.0	0.899902	0.899902	0.899902	0.899902	0.899902

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

Tables supporting Engine Oil Temperature Sensor

P0196

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

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

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

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

Tables supporting Deactivation System Performance

P3400

EngSpeedLwrLimitEnableTable — AXIS is Gear State, Curve is Nm Torque

Axis	1st Gear	2nd Gear	3rd Gear	4th Gear	5thGear	6th Gear	Neutral	Reverse	Park
Curve	700.0	700.0	700.0	700.0	700.0	700.0	700.0	700.0	700.0

EngSpeedUprLimitEnableTable — AXIS is Gear State, Curve is Nm Torque

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

EngSpeedLwrLimitDisableTable — AXIS is Gear State, Curve is Nm Torque

Axis	1st Gear	2nd Gear	3rd Gear	4th Gear	5thGear	6th Gear	Neutral	Reverse	Park
Curve	625	625	625	625	625	625	625	625	625

EngSpeedUprLimitDisableTable — AXIS is Gear State, Curve is Nm Torque

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

EngSpeedDisableLwrLimitTable — AXIS is Gear State, Curve is Nm Torque

Axis	1st Gear	2nd Gear	3rd Gear	4th Gear	5thGear	6th Gear	Neutral	Reverse	Park
Curve	625	700	700	700	700	700	700	700	700

EngSpeedDisableUprLimitTable — AXIS is Gear State, Curve is Nm Torque

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

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

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

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

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

HalfCylDisabledPRNDL

PRNDL Drive 1			1	
PRNDL Drive 2			1	
PRNDL Drive 3			1	
PRNDL Drive 4			0	
PRNDL Drive 5			1	
PRNDL Drive 6			1	
PRNDL Neutral			1	
PRNDL Reverse			1	
PRNDL Park			1	
PRNDL Transitional 1			1	
PRNDL Transitional 2			1	
PRNDL Transitional 4			1	
PRNDL Transitional 7			1	

HalfCylDisabledPRNDLDeviceControl

PRNDL Drive 1			1	
PRNDL Drive 2			1	
PRNDL Drive 3			1	
PRNDL Drive 4			0	
PRNDL Drive 5			1	
PRNDL Drive 6			1	
PRNDL Neutral			0	
PRNDL Reverse			1	
PRNDL Park			0	
PRNDL Transitional 1			1	
PRNDL Transitional 2			1	
PRNDL Transitional 4			1	
PRNDL Transitional 7			1	

PRNDL Transitional 8				1		PRNDL Transitional 8			1
PRNDL Transitional 11				1		PRNDL Transitional 11			1
PRNDL Transitional 13				1		PRNDL Transitional 13			1
PRNDL Transitional Illega				1		PRNDL Transitional Illega			1
PRNDL Transitional Between State				1		PRNDL Transitional Between State			1

HalfCylDisabledTransGr Table — AXIS is Gear State

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

AllCylDisabledTransGr Table — AXIS is Gear State

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

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

RPM	1st Gear	2nd Gear	3rd Gear	4th Gear	5th Gear	6th Gear	Neutral	Park	Reverse
0.0	48	48	48	48	48	48	48	48	48
100.0	48	48	48	48	48	48	48	48	48
200.0	48	48	48	48	48	48	48	48	48
300.0	48	48	48	48	48	48	48	48	48
400.0	48	48	48	48	48	48	48	48	48
500.0	48	48	48	48	48	48	48	48	48
600.0	48	48	48	48	48	48	48	48	48
700.0	48	48	48	48	48	48	48	48	48
800.0	48	48	48	48	48	48	48	48	48
900.0	46	46	46	46	46	46	46	46	46
1000.0	46	46	46	46	46	46	46	46	46
1100.0	46	46	46	46	46	46	46	46	46
1200.0	45	45	45	45	45	45	45	45	45
1300.0	45	45	45	45	45	45	45	45	45
1400.0	44	44	44	44	44	44	44	44	44
1500.0	44	44	44	44	44	44	44	44	44
1600.0	43	43	43	43	43	43	43	43	43
1700.0	43	43	43	43	43	43	43	43	43
1800.0	44	44	44	44	44	44	44	44	44
1900.0	45	45	45	45	45	45	45	45	45
2000.0	45	45	45	45	45	45	45	45	45
2100.0	46	46	46	46	46	46	46	46	46
2200.0	46	46	46	46	46	46	46	46	46
2300.0	47	47	47	47	47	47	47	47	47
2400.0	47	47	47	47	47	47	47	47	47
2500.0	47	47	47	47	47	47	47	47	47
2600.0	44	44	44	44	44	44	44	44	44
2700.0	43	43	43	43	43	43	43	43	43
2800.0	43	43	43	43	43	43	43	43	43
2900.0	43	43	43	43	43	43	43	43	43
3000.0	43	43	43	43	43	43	43	43	43
3100.0	43	43	43	43	43	43	43	43	43
3200.0	43	43	43	43	43	43	43	43	43

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

RPM	1st Gear	2nd Gear	3rd Gear	4th Gear	5th Gear	6th Gear	Neutral	Park	Reverse
0.0	48	48	48	48	48	48	48	48	48
100.0	48	48	48	48	48	48	48	48	48
200.0	48	48	48	48	48	48	48	48	48
300.0	48	48	48	48	48	48	48	48	48
400.0	48	48	48	48	48	48	48	48	48
500.0	48	48	48	48	48	48	48	48	48
600.0	48	48	48	48	48	48	48	48	48
700.0	48	48	48	48	48	48	48	48	48
800.0	48	48	48	48	48	48	48	48	48
900.0	46	46	46	46	46	46	46	46	46
1000.0	46	46	46	46	46	46	46	46	46
1100.0	46	46	46	46	46	46	46	46	46
1200.0	45	45	45	45	45	45	45	45	45
1300.0	45	45	45	45	45	45	45	45	45
1400.0	44	44	44	44	44	44	44	44	44
1500.0	44	44	44	44	44	44	44	44	44
1600.0	43	43	43	43	43	43	43	43	43
1700.0	43	43	43	43	43	43	43	43	43
1800.0	44	44	44	44	44	44	44	44	44
1900.0	45	45	45	45	45	45	45	45	45
2000.0	45	45	45	45	45	45	45	45	45
2100.0	46	46	46	46	46	46	46	46	46
2200.0	46	46	46	46	46	46	46	46	46
2300.0	47	47	47	47	47	47	47	47	47
2400.0	47	47	47	47	47	47	47	47	47
2500.0	47	47	47	47	47	47	47	47	47
2600.0	44	44	44	44	44	44	44	44	44
2700.0	43	43	43	43	43	43	43	43	43
2800.0	43	43	43	43	43	43	43	43	43
2900.0	43	43	43	43	43	43	43	43	43
3000.0	43	43	43	43	43	43	43	43	43
3100.0	43	43	43	43	43	43	43	43	43
3200.0	43	43	43	43	43	43	43	43	43

P0521

EngSpeedWeightFactorTable — AXIS is Engine RPM, Curve is Weight Facto

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

EngOilPredictionWeightFacotrTable — AXIS is Predicted Oil Pressure, Curve is Engine Oil Prediction Weight Factor Rati

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

CSED Section

KnIDLC_T_ECT_Axis

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

KaIDLC_n_CLO_ThrshOfst[CilDLR_DR]

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

KaIDLC_n_CLO_ThrshOfst[CilDLR_PN]

l Offset to be considered Cat Light Off	1000	125	125	125	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	800	800	800	800	780	750	705	665	625	575	550	550	550	570	580	600	620

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	800	800	800	800	780	750	705	665	625	575	550	550	550	570	580	600	620

Phaser Section

KtPHSD_phi_CamPosErrorLimIc1

X axis is Deg C
Y axis is RPM

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

KtPHSD_phi_CamPosErrorLimEc1

X axis is Deg C
Y axis is RPM

	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
800	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
1200	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
1600	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
2000	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
2400	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
2800	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
3200	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
3600	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
4000	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
4400	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
4800	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
5200	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
5600	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
6000	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
6400	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
6800	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500

KtPHSD_t_StablePositionTimeIc1

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

KtPHSD_t_StablePositionTimeEc1

	X axis is Deg C																
	Y axis is RPM																
	-40.0000	-28.0000	-16.0000	-4.0000	8.0000	20.0000	32.0000	44.0000	56.0000	68.0000	80.0000	92.0000	104.0000	116.0000	128.0000	140.0000	152.0000
400	3.000	3.000	3.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	3.000
800	3.000	3.000	3.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	3.000
1200	3.000	3.000	3.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	3.000
1600	3.000	3.000	3.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	3.000
2000	3.000	3.000	3.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	3.000
2400	3.000	3.000	3.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	3.000
2800	3.000	3.000	3.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	3.000
3200	3.000	3.000	3.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	3.000
3600	3.000	3.000	3.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	3.000
4000	3.000	3.000	3.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	3.000
4400	3.000	3.000	3.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	3.000
4800	3.000	3.000	3.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	3.000
5200	3.000	3.000	3.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	3.000
5600	3.000	3.000	3.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	3.000
6000	3.000	3.000	3.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	3.000
6400	3.000	3.000	3.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	3.000
6800	3.000	3.000	3.000	3.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	3.000

P0068: MAP / MAF / TPS Correlation

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

X-axis	5.0003	10.0006	14.9994	19.9997	25.0000	30.0003	35.0006	39.9994	99.9985
Data	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	6.0000	7.0000	8.0000	9.0000	10.0000	11.0000	12.0000	13.0000	14.0000
Data	0.0000	18.0000	40.0000	75.0000	135.0000	250.0000	500.0000	500.0000	500.0000

P1682: Ignition Voltage Correlation

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

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

Fault Bundle Definitions

Cert Doc Bundle Name	Pcodes										
CatalystSysEfficiencyLoB1_FA	P0420										
CatalystSysEfficiencyLoB2_FA	P0430										
FuelTrimSystemB1_FA	P0171	P0172									
FuelTrimSystemB2_FA	P0174	P0175									
A/F Imbalance Bank1	P1174 or	P219A									
A/F Imbalance Bank2	P1175 or	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								
EvapPurgeSolenoidCircuit_FA	P0443										
EvapFlowDuringNonPurge_FA	P0496										
EvapVentSolenoidCircuit_FA	P0449										
EvapSmallLeak_FA	P0442										
EvapEmissionSystem_FA	P0455	P0446									
FuelTankPressureSnsrCkt_FA	P0452	P0453									
CoolingFanSpeedTooHigh_FA	P0495										
FuelLevelDataFault	P0461	P0462	P0463	P2066	P2067	P2068					
PowertrainRelayFault	P1682										
PowertrainRelayStateOn_FA	P0685										
PowertrainRelayStateOn_Error	P0685										
IgnitionOffTimer_FA	P2610										
IgnitionOffTimeValid	P2610										
TimeSinceEngineRunningValid	P2610										

VehicleSpeedSensor_FA	P0502	P0503	P0722	P0723							
VehicleSpeedSensorError	P0502	P0503	P0722	P0723							
EngineMisfireDetected_TFTKO	P0300	P0301	P0302	P0303	P0304	P0305	P0306	P0307	P0308		
EngineMisfireDetected_FA	P0300	P0301	P0302	P0303	P0304	P0305	P0306	P0307	P0308		
KS_Ckt_Perf_B1B2_FA	P0324	P0325	P0326	P0327	P0328	P0330	P0332	P0333			
IgnitionOutputDriver_FA	P0351	P0352	P0353	P0354	P0355	P0356	P0357	P0358			
O2S_Bank_ 1_TFTKO	P0131	P0132	P0134	P2A00							
O2S_Bank_ 2_TFTKO	P0151	P0152	P0154	P2A03							
O2S_Bank_1_Sensor_1_FA	P2A00	P0131	P0132	P0133	P0134	P0135	P0053	P1133			
O2S_Bank_1_Sensor_2_FA	P013A	P013B	P013E	P013F	P2270	P2271	P0137	P0138	P0140	P0141	P0054
O2S_Bank_2_Sensor_1_FA	P2A03	P0151	P0152	P0153	P0154	P0155	P0059	P1153			
O2S_Bank_2_Sensor_2_FA	P013C	P013D	P014A	P014B	P2272	P2273	P0157	P0158	P0160	P0161	P0060
ECT_Sensor_Ckt_FA	P0117	P0118									
ECT_Sensor_Ckt_TPTKO	P0117	P0118									
ECT_Sensor_Ckt_TFTKO	P0117	P0118									
ECT_Sensor_DefaultDetected	P0117	P0118	P0116	P0125							
ECT_Sensor_FA	P0117	P0118	P0116	P0125	P0128						
ECT_Sensor_TFTKO	P0117	P0118	P0116	P0125							
ECT_Sensor_Perf_FA	P0116										
ECT_Sensor_Ckt_FP	P0117	P0118									
ECT_Sensor_Ckt_High_FP	P0118										
ECT_Sensor_Ckt_Low_FP	P0117										
AmbientAirPressCktFA	P2228	P2229									
AmbientAirPressCktFA_NoSnsr	P0106	P0107	P0108								
AmbientAirDefault_NA	P0106	P0107	P0108	P2227	P2228	P2229					
AmbientAirDefault_SC	P012B	P012C	P012D	P2227	P2228	P2229					
AmbientAirDefault_NoSnsr	P0106	P0107	P0108								
AmbientAirDefault	NA is has Baro Sensor and Normally Aspirated, SC if suprecharged, NoSnsr is Normally Aspirated with no Baro Sensor										
IAT_SensorCircuitTFTKO	P0112	P0113									
IAT_SensorCircuitFA	P0112	P0113									
IAT_SensorCircuitFP	P0112	P0113									
IAT_SensorTFTKO	P0111	P0112	P0113								
IAT_SensorFA	P0111	P0112	P0113								
IAT2_SensorCktTFTKO	P0097	P0098									
IAT2_SensorCktTFTKO_NoSnsr	P0112	P0113									

IAT2_SensorCircuitFA	P0097	P0098										
IAT2_SensorCircuitFA_NoSnsr	P0112	P0113										
IAT2_SensorcircuitFP	P0097	P0098										
IAT2_SensorcircuitFP_NoSnsr	P0112	P0113										
IAT2_SensorTFTKO	P0096	P0097	P0098									
IAT2_SensorTFTKO_NoSnsr	P0111	P0112	P0113									
IAT2_SensorFA	P0096	P0097	P0098									
IAT2_SensorFA_NoSnsr	P0111	P0112	P0113									
SuperchargerBypassValveFA	P2261											
CylDeacSystemTFTKO	P3400											
MAF_SensorPerfFA	P0101											
MAF_SensorPerfTFTKO	P0101											
MAP_SensorPerfFA	P0106											
MAP_SensorPerfTFTKO	P0106											
SCIAP_SensorPerfFA	P012B											
SCIAP_SensorPerfTFTKO	P012B											
ThrottlePositionSnsrPerfFA	P0121											
ThrottlePositionSnsrPerfTFTKO	P0121											
MAF_SensorFA	P0101	P0102	P0103									
MAF_SensorTFTKO	P0101	P0102	P0103									
MAF_SensorFP	P0102	P0103										
MAF_SensorCircuitFA	P0102	P0103										
MAF_SensorCircuitTFTKO	P0102	P0103										
MAP_SensorTFTKO	P0106	P0107	P0108									
MAP_SensorFA	P0106	P0107	P0108									
SCIAP_SensorFA	P012B	P012C	P012D									
SCIAP_SensorTFTKO	P012B	P012C	P012D									
SCIAP_SensorCircuitFP	P012C	P012D										
AfterThrottlePressureFA_NA	P0106	P0107	P0108									
AfterThrottlePressureFA_SC	P012B	P012C	P012D									
AfterThrottleVacuumTFTKO_NA	P0106	P0107	P0108									
AfterThrottleVacuumTFTKO_SC	P012B	P012C	P012D									
SCIAP_SensorCircuitFA	P012C	P012D										
AfterThrottlePressTFTKO_NA	P0106	P0107	P0108									
AfterThrottlePressTFTKO_SC	P012B	P012C	P012D									
MAP_SensorCircuitFA	P0107	P0108										
MAP_EngineVacuumStatus	MAP_SensorFA OR P0107, P0108 Pending											
CrankCamCorrelationTFTKO	P0016	P0017	P0018	P0019								
CrankSensorFA	P0335	P0336										
CrankSensorTFTKO	P0335	P0336										
CamSensorFA	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391

CamSensorTFTKO	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391
CrankIntakeCamCorrelationFA	P0016	P0018										
CrankExhaustCamCorrelationFA	P0017	P0019										
IntakeCamSensorTFTKO	P0016	P0018	P0340	P0341	P0345	P0346						
IntakeCamSensorFA	P0016	P0018	P0340	P0341	P0345	P0346						
ExhaustCamSensorTFTKO	P0017	P0019	P0365	P0366	P0390	P0391						
ExhaustCamSensorFA	P0017	P0019	P0365	P0366	P0390	P0391						
IntakeCamSensor_FA	P0016	P0018	P0340	P0341	P0345	P0346						
IntakeCamSensor_TFTKO	P0016	P0018	P0340	P0341	P0345	P0346						
ExhaustCamSensor_FA	P0017	P0019	P0365	P0366	P0390	P0391						
ExhaustCamSensor_TFTKO	P0017	P0019	P0365	P0366	P0390	P0391						
CrankIntakeCamCorrFA	P0016	P0018										
CrankExhaustCamCorrFA	P0017	P0019										
CrankSensorFaultActive	P0335	P0336										
CrankSensor_FA	P0335	P0336										
CrankSensorTestFailedTKO	P0335	P0336										
CrankSensor_TFTKO	P0335	P0336										
CamSensor_FA	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391
CamSensorAnyLocationFA	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391
CamSensor_TFTKO	P0016	P0017	P0018	P0019	P0340	P0341	P0345	P0346	P0365	P0366	P0390	P0391
AnyCamPhaser_FA	P0010	P0011	P0013	P0014	P0020	P0021	P0023	P0024				
AnyCamPhaser_TFTKO	P0010	P0011	P0013	P0014	P0020	P0021	P0023	P0024				
IntkCamPhaser_FA	P0010	P0011	P0020	P0021								
EGRValvePerformance_FA	P0401	P042E										
EGRValveCircuit_FA	P0403	P0404	P0405	P0406								
EGRValve_FP	P0405	P0406	P042E									
EGRValveCircuit_TFTKO	P0403	P0404	P0405	P0406								
EGRValvePerformance_TFTKO	P0401	P042E										
EngineMetalOvertempActive	P1258											
A/C_FailedOn	P0645											
EngOilTempSensorCircuitFA	P0197	P0198										
EngOilModeledTempValid	ECT_Sensor_FA or IAT_SensorCircuitFA											
EngOilValid (sensor application)	No EngOilTempSensorCircuitFA											
EngOilValid (modeled application)	EngOilModeledTempValid											
EngOilPressureSensorCktFA	P0522	P0523										
EngOilPressureSensorFA	P0521	P0522	P0523									

CylnderDeacDriverTFTKO	P3401		P3409	P3417	P3425	P3433	P3441	P3449			
BrakeBoosterSensorFA	P0556		P0557	P0558							
BrakeBoosterVacuumValid	P0556		P0557	P0558							
BrakeBoosterVacuumValid	VehicleSpeedSensorError or MAP_SensorFA										
FuelInjectorCircuit_FA	P0201		P0202	P0203	P0204	P0205	P0206	P0207	P0208		
FuelInjectorCircuit_TFTKO	P0201		P0202	P0203	P0204	P0205	P0206	P0207	P0208		
ControllerProcessorPerf_FA	P0606										
ControllerRAM_Error_FA	P0604										
TPS_Performance_FA	P0068		P0121	P1516	P2101						
EnginePowerLimited	P0068		P0606	P0120	P0122	P0123	P0220	P0222	P0223	P0641	P0651	
	P1516		P2101	P2120	P2122	P2123	P2125	P2127	P2128	P2135	P2138	P2176
TPS1_OutOfRange_Composite	P0120		P0122	P0123							
TPS2_OutOfRange_Composite	P0220		P0222	P0223							
TPS_FA	P2135		(TPS1_OutOfRange_Composite and TPS2_OutOfRange_Composite)								
TPS_FaultPending	Always set to FALSE, As ETC diagnostics are set within 200 msec there is no real need for a pending flag										
TPS_ThrottleAuthorityDefaulted	P0068		P0606	P1516	P2101	P2135	P2176	V5B_OutOfRange_Composite			
	(TPS1_OutOfRange_Composite and TPS2_OutOfRange_Composite)										
	(MAP_OutOfRange_Composite and MAF_OutOfRange_Composite)										
AcceleratorEffectivePstnValid	Always set to TRUE, no P codes will set to FALSE										
5VoltReferenceA_FA	P0641										
5VoltReferenceB_FA	P0651										
IAC_SystemRPM_FA	P0506		P0507								
TransmissionGearDefaulted	MYD/MYC/MYB:		P182E	P1915							
	MT1/MN8:		P1810	P1816	P1818						
	M30/M32/M70:		P1915	P182A	P182C	P182D	P182E	P182F			
TransmissionEngagedState_FA	MYD/MYC/MYB:		P182E	P1915							
	MT1/MN8:		P1810	P1816	P1818						
	M30/M32/M70:		P1915	P182A	P182C	P182D	P182E	P182F			
FourWheelDriveLowStateValid	P2771										
EngineTorqureInaccurate	EngineMisfireDetected_FA or										
	FuelInjectorCircuit_FA or										

	FuelInjectorCircuit_TFTKO or										
	FuelTrimSystemB1_FA or										
	FuelTrimSystemB2_FA or										
	MAF_SensorTFTKO or										
	MAP_SensorTFTKO or										
	EGRValvePerformance_FA										
Long Name	**Short Name**										
Bank	B										
Brake	Brk										
Circuit	Ckt										
Engine	Eng										
Fault Active	FA										
Intake	Intk										
Naturally Aspirated	NA										
Performance	Perf										
Position	Pstn										
Pressure	Press										
Sensor	Snsr										
Supercharged	SC										
System	Sys										
Test Failed This Key On	TFTKO										
LowFuelConditionDiagnostic	Flag set to TRUE if the fuel level < 10 %										
	AND										
	No Active DTCs:		FuelLevelDataFault								
			P0462								
			P0463								
	for at least 30 seconds.										
Transfer Pump is Commanded On	Fuel Volume in Primary Fuel Tank < 50.0 liters										
	AND										
	Fuel Volume in Secondary Fuel Tank ≥ 3.0 liters										
	AND										
	Transfer Pump on Time < **TransferPumpOnTimeLimit** Table										
	AND										
	Transfer Pump had been Off for at least 5.0 seconds										
	AND										
	Evap Diagnostic (Purge Valve Leak Test, Large Leak Test, and Waiting for Purge) is not running										
	AND										
	Engine Running										

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Fuel Rail Pressure (FRP) Sensor Performance (Rationality)	P018B	This DTC detects if the fuel pressure sensor is stuck within the normal operating range	Absolute value of change in fuel pressure as sensed during intrusive test.	<= 30 kPa			Frequency: Continuous; 12.5 ms loop. 60 seconds between intrusive tests that pass	DTC Type A 1 trip
							Intrusive test requested if fuel system is clamped for >= 5 seconds or fuel pressure error variance <= typically (0.3 to 0.6) (calculated over a 2.5sec period); otherwise report pass	
					1. FRP Circuit Low DTC (P018C)	not active		
					2. FRP Circuit High DTC (P018D)	not active		
					3. FuelPump Circuit Low DTC (P0231)		Duration of intrusive test is fueling related (5 to 12 seconds).	
						not active		
					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 (Typical values in the range of 11 to 50 g/s)	
					6. Reference Voltage DTC (P0641)	not active		
					7. Reference Voltage DTC (P06A6)	not active		
					8. Fuel Pump Control Module Driver Over-temperature DTC's (P064A, P1255)	not active		
					9. Control Module Internal Performance DTC (P0606)	not active		
					10. Engine run time	>=5 seconds		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					11. Emissions fuel level (PPEI $3FB)	not low		
					12. Fuel pump control	enabled		
					13. Fuel pump control state	normal or FRP Rationality control		
					14. Engine fuel flow	> 0.047 g/s		
					15. ECM fuel control system failure (PPEI $1ED)	failure has not occurred		
Fuel Rail Pressure (FRP) Sensor Circuit Low Voltage	P018C	This DTC detects if the fuel pressure sensor circuit is shorted to low	FRP sensor voltage	< 0.14 V	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Rail Pressure (FRP) Sensor Circuit High Voltage	P018D	This DTC detects if the fuel pressure sensor circuit is shorted to high	FRP sensor voltage	> 4.86 V	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
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 HS Comm OR Fuel Pump Control AND Ignition Run/Crank Voltage	Run or Crank enabled enabled 9V < voltage < 18V	72 test failures in 80 test samples if Fuel Pump Current <100A 3 test failures in 15 test samples if Fuel Pump Current >=100A 1 sample/12.5 ms	DTC Type A
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 A

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Fuel Pump Control Circuit (Open)	P023F	This DTC detects if the fuel pump control circuit is open	Fuel Pump Current AND Fuel Pump Duty Cycle	<=0.5A >20%	Ignition OR HS Comm OR Fuel Pump Control AND Ignition Run/Crank Voltage	Run or Crank enabled enabled 9V < voltage < 18V	72 test failures in 80 test samples; 1 sample/12.5ms	DTC Type A
Fuel System Control Module Enable Control Circuit	P025A	This DTC detects if there is a fault in the fuel pump control enable circuit	PPEI (PPEI (Powertrain Platform Electrical Interface) Fuel System Request ($1ED)	≠ Fuel Pump Control Module Enable Control Circuit	Ignition AND PPEI Fuel System Request ($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 HS Comm OR Fuel Pump Control	Run or Crank enabled 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 HS Comm OR Fuel Pump Control	Run or Crank enabled 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	Run or Crank	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 ILLUM.
					HS Comm OR Fuel Pump Control	enabled enabled		
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 HS Comm OR Fuel Pump Control	Run or Crank enabled 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
Performance 1. Main Processor Configuration Register Test 2. Processor clock test 3. External watchdog test	P0606	This DTC indicates the FSCM has detected an internal processor fault or external watchdog fault (PID 2032 can tell what causes the fault.)	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 HS Comm 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)	Run or Crank enabled enabled TRUE TRUE TRUE 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 ILLUM.
					3. For External Watchdog Fault: •Control Module RAM(P0604)	not active		
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 HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 test failure Once on controller power-up	DTC Type A 1 trip
5 Volt Reference Circuit (Short High/Low)	P0641	Detects a continuous short 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
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 (Tier 1 supplier Continental responsibility)	Module Range of Operation **AND** Fuel Pump Driver Temp	1. Module is within Acceptable Operation Range (Motorola's responsibility - FSCM is in normal operating range for module voltage versus PWM duty cycle. Linear range from 100% @ 12.5V to 70% @ 18V.) > 190C	Ignition OR HS Comm OR Fuel Pump Control KeFRPD_b_FPOverTempDiagEnbl Ignition Run/Crank	Run or Crank enabled enabled TRUE 9V<voltage<18V	3 failures out of 15 samples 1 sample/12.5 ms	DTC Type B 2 trips
5 Volt Reference Circuit (Out of Range)	P06A6	Detects that the #1 5 V sensor reference circuit is out of range	Reference voltage	> 102.5% nominal (i.e. 5.125V) OR	Ignition	Run or Crank	80 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 ILLUM.
				< 97.5% nominal (i.e. 4.875V)				
Fuel Pump Control Module - Driver Over-temperature 2	P1255	This DTC detects if an internal fuel pump driver overtemperature condition exists under extreme operating conditions (GM's responsibility)	Module Range of Operation	Outside normal range (FSCM is NOT in normal operating range for module voltage versus PWM duty cycle. Linear range from 100% @ 12.5V to 70% @ 18V.)			3 failures out of 15 samples 1 sample/12.5 ms	DTC Type B 2 trips
					Ignition	Run or Crank		
					OR			
			AND		HS Comm	enabled		
					OR			
					Fuel Pump Control	enabled		
			Driver Temp		KeFRPD_b_FPOverTempDiagEnbl	TRUE		
				> 190C	Ignition Run/Crank	9V<voltage<18V		
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
Fuel Pump Flow Performance	P2635	This DTC detects degradation in the performance of the PFI electronic return-less fuel system	Filtered fuel rail pressure error	<= Low Threshold (function of desired fuel rail pressure and fuel flow rate. 15% of resultant Target Pressure in the range of -28.4 to -193.5 kPa.) . **OR**	1. FRP Circuit Low DTC (P018C)	not active	pressure error Time Constant = 12.5 seconds Frequency: Continuous 12.5 ms loop	DTC Type B 2 trips
				<= High Threshold (function of desired fuel rail pressure and fuel flow rate. 15% of resultant Target Pressure in the range of +19.5 to +166.5 kPa.) .	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		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					7. Reference Voltage DTC (P0641)	not active		
					8. Reference Voltage DTC (P06A6)	not active		
					9. Fuel Pump Control Module Driver Over-temperature DTC's (P064A, P1255)	not active		
					10. Control Module Internal Performance DTC (P0606)	not active		
					11. An ECM fuel control system failure (PPEI $1ED)	has not occurred		
					12. The Barometric pressure (PPEI $4C1) signal	valid (for absolute fuel pressure sensor)		
					13. Engine run time	>= 30 seconds		
					14. Emissions fuel level (PPEI $3FB)	not low		
					15. Fuel pump control	enabled		
					16. Fuel pump control state	normal		
					17. Battery Voltage	11V<=voltage=<18V		
					18. Fuel flow rate	> 0.047 g/s **AND**		
						<= Max allowed fuel flow rate as a function of desired rail pressure & Vbatt (Typical values in the range of 11 to 50 g/s)		
					19. 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	1. Power mode	Run/Crank	5 failures out of 5 samples (5 seconds)	DTC Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
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 (11 – 18 V) not active	12 failures out of 12 samples (12 seconds)	DTC Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Fuel Rail Pressure (FRP) Sensor Performance (Rationality)	P0191	This DTC detects if the fuel pressure sensor is stuck within the normal operating range	Absolute value of change in fuel pressure as sensed during intrusive test.	<= 30 kPa			Frequency: Continuous; 12.5 ms loop. 60 seconds between intrusive tests that pass	DTC Type A 1 trip
							Intrusive test requested if fuel system is clamped for >= 5 seconds or fuel pressure error variance <= typically (0.3 to 0.6) (calculated over a 2.5sec period); otherwise	
					1. FRP Circuit Low DTC (P0192)	not active		
					2. FRP Circuit High DTC (P0193)	not active		
					3. Fuel Pump Driver Ignition Circuit DTC (P129D)		Duration of intrusive test is fueling related (5 to 12 seconds).	
						not active		
					4. Fuel Pump Circuit Frequency Out of Range (P129F)	not active		
					5. Fuel Pump Circuit DC Low DTC (P12A0)	not active		
					6. Fuel Pump Circuit DC High DTC (P12A1)	not active	Intrusive test is run when fuel flow is < 21.445 g/s	
					7. Fuel Pump Circuit Rationality DTC (P12A2)	not active		
					8. Fuel Pump Enable Circuit Low DTC (P12A4)	not active		
					9. Fuel Pump Enable Circuit High DTC (P12A5)	not active		
					10. Fuel Pump Enable Circuit Rationality DTC (P12A6)	not active		
					11. Fuel Pump Output Circuit DTC (P12A7)	not active		
					12. Reference Voltage DTC (P0641)	not active		
					13. Reference Voltage DTC (P06A6)	not active		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					14. Fuel Pump Control Module Driver Over-temperature DTC's	not active		
					15. Control Module Internal Performance DTC (P0606)	not active		
					16. Engine run time	>=5 seconds		
					17. Emissions fuel level (PPEI $3FB)	not low		
					18. Fuel pump control	enabled		
					19. Fuel pump control state	normal or FRP Rationality control		
					20. Engine fuel flow	> 0.047 g/s		
					21. ECM fuel control system failure (PPEI $1ED)	failure has not occurred		
Fuel Rail Pressure (FRP) Sensor Circuit Low Voltage	P0192	This DTC detects if the fuel pressure sensor circuit is shorted to low	FRP sensor voltage	< 0.1 V			72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
					Ignition	Run or Crank		
Fuel Rail Pressure (FRP) Sensor Circuit High Voltage	P0193	This DTC detects if the fuel pressure sensor circuit is shorted to high	FRP sensor voltage	> 4.9 V			72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
					Ignition	Run or Crank		
Fuel System Control Module Enable Control Circuit	P025A	This DTC detects if there is a fault in the fuel pump control enable circuit	PPEI (PPEI (Powertrain Platform Electrical Interface) Fuel System Request ($1ED)	≠ Fuel Pump Control Module Enable Control Circuit			72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
					Ignition AND	Run or Crank		
					PPEI Fuel System Request ($1ED)	valid		
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)			1 failure if it occurs during the first ROM test of the ignition cycle, otherwise 5 failures	DTC Type A 1 trip
					Ignition OR	Run or Crank	Frequency: Runs continuously in the background	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					HS Comm	enabled		
					OR			
					Fuel Pump Control	enabled		
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	Run or Crank	Runs once at power up	DTC Type A 1 trip
					OR			
					HS Comm	enabled		
					OR			
					Fuel Pump Control	enabled		
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up	≠ checksum at power-down			1 failure	DTC Type A 1 trip
							Frequency: Once at power-up	
					Ignition	Run or Crank		
					OR			
					HS Comm	enabled		
					OR			
					Fuel Pump Control	enabled		
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			1 failure if it occurs during the first RAM test of the ignition cycle, otherwise 5 failures	DTC Type A 1 trip
					Ignition	Run or Crank	Frequency:	
					OR		Runs continuously in the background.	
					HS Comm	enabled		
					OR			
					Fuel Pump Control	enabled		
Performance 1. Main Processor Configuration Register Test	P0606	This DTC indicates the FSCM has detected an internal processor fault or external watchdog fault (PID 2032 can tell what causes the fault.)	faults:				Tests 1 and 2 1 failure Frequency: Continuously (12.5ms)	DTC Type A 1 trip
			•Register contents	Incorrect value.	Ignition	Run or Crank		
					OR			
					HS Comm	enabled		
					OR			
					Fuel Pump Control	enabled		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
2. Processor clock test 3. External watchdog test			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	 0x5A5A 0x5A Control Lost	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)	TRUE TRUE TRUE not active not active	Test 3 3 failures out of 15 samples 1 sample/12.5 ms	
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 HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 test failure Once on controller power-up	DTC Type A 1 trip
5 Volt Reference Circuit (Short High/Low)	P0641	Detects a continuous short 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
5 Volt Reference Circuit (Out of Range)	P06A6	Detects that the #1 5 V sensor reference circuit is out of range	Reference voltage	> 102.5% nominal (i.e. 5.125V) OR < 97.5% nominal (i.e. 4.875V)	Ignition	Run or Crank	80 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 ILLUM.
Fuel Pump Control Module - Driver Over-temperature 2	P1255	This DTC detects if an fuel pump driver overtemperature condition exists under extreme operating conditions	Module Range of Operation **AND** Driver Temp	Outside normal range (FSCM is NOT in normal operating range for module voltage versus PWM duty cycle.) > 130C	Ignition OR HS Comm OR Fuel Pump Control KeFRPD_b_FPOverTempDiagEnbl Ignition Run/Crank	Run or Crank enabled enabled TRUE 9V<voltage<18V	3 failures out of 15 samples 1 sample/12.5 ms	DTC Type B 2 trips
Fuel Pump Driver Control Module Ignition 1 Switch Circuit Low Voltage	P129D	This DTC detects if the Ignition1 Switch circuit is shorted to low or open	Ignition 1 voltage	<= 6 V	Engine	Running	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Pump Driver Control Module PWM Control Circuit Frequency	P129F	This DTC detects if there is a fault in the fuel pump control PWM circuit frequency	PWM Frequency	<384 Hz or >416Hz	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Pump Driver Control Module PWM Control Circuit Duty Cycle Low	P12A0	This DTC detects if there is a Low Duty Cycle fault in the fuel pump control PWM circuit	PWM Duty Cycle	< 5%	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Pump Driver Control Module PWM Control Circuit Duty Cycle High	P12A1	This DTC detects if there is a High Duty Cycle fault in the fuel pump control PWM circuit	PWM Duty Cycle	>95%	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Pump Driver Control Module PWM Control Circuit Rationality	P12A2	This DTC detects if there is a rationality fault in the fuel pump control PWM circuit	Absolute Value of (Duty Cycle Feedback - Duty Cycle Commanded) Absolute Value of (Frequency Feedback - Frequency Commanded)	> 5% > 20 Hz	Ignition	Run or Crank	180 failures out of 200 samples; 1 sample/12.5ms	DTC Type B 2 trips
Fuel Pump Driver Control Module Enable Control Circuit	P12A4	This DTC detects if there is a Low fault in the fuel pump control enable circuit	Enable Circuit Voltage	< 2.0 Volts	Ignition	Run or Crank	72 failures out of 80 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 ILLUM.
Fuel Pump Driver Control Module Enable Control Circuit	P12A5	This DTC detects if there is a high fault in the fuel pump control enable circuit	Enable Circuit Voltage	> 2.0 Volts	Ignition	Run or Crank	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Pump Driver Control Module Enable Control Circuit	P12A6	This DTC detects if there is a rationality fault in the fuel pump control enable circuit	Enable Circuit Feedback	Enable Feedback <> Enable Command	Ignition	Run or Crank	180 failures out of 200 samples; 1 sample/12.5ms	DTC Type A 1 trip
Fuel Pump Pump Driver Phase U-V-W Circuit	P12A7	This DTC detects if there is a fault in the fuel pump Output Phase Circuit	Phase 1, 2, or 3 Output	Transition through 1 to 4 volt region	Ignition	Run or Crank	Diagnostic runs continuously in the background	DTC Type A 1 trip
Fuel Pump Driver Control Module Read Only Memory (ROM)	P164B	This DTC will be stored if any software or calibration check sum is incorrect	Calculated Checksum	≠ stored checksum for firmware	Ignition	Run or Crank	Diagnostic runs continuously in the background Diagnostic reports a fault if 1 failure occurs on the first pass.	DTC Type A 1 trip
Fuel Pump Driver Control Module Random Access Memory (RAM)	P164C	Indicates that control module is unable to correctly write and read data to and from RAM	Data read	≠ Data written	Ignition	Run or Crank	Diagnostic runs continuously in the background Diagnostic reports a fault if 1 failure occurs on the first pass.	DTC Type A 1 trip
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	160 samples 1 sample/12.5 ms	DTC Type A 1 trip
Fuel Pump Flow Performance	P2635	This DTC detects degradation in the performance of the PFI electronic return-less fuel system	Filtered fuel rail pressure error	<= Low Threshold (function of desired fuel rail pressure and fuel flow rate. 15% of resultant Target Pressure in the range of -10.4 to -167.7 kPa.) . **OR** <= High Threshold (function of desired fuel rail pressure and fuel flow rate. 15% of resultant Target Pressure in the range of +11.7 to +144.3 kPa.) .	1. FRP Circuit Low DTC (P0192) 2. FRP Circuit High DTC (P0193)	not active not active	pressure error Time Constant = 12.5 seconds Frequency: Continuous 100 ms loop	DTC Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					3. Fuel Rail Pressure Sensor Performance DTC (P0191)	not active		
					4. Fuel Pump Driver Ignition Circuit DTC (P129D)	not active		
					5. Fuel Pump Circuit Frequency Out of Range (P129F)	not active		
					6. Fuel Pump Circuit DC Low DTC (P12A0)	not active		
					7. Fuel Pump Circuit DC High DTC (P12A1)	not active		
					8. Fuel Pump Circuit Rationality DTC (P12A2)	not active		
					9. Fuel Pump Enable Circuit Low DTC (P12A4)	not active		
					10. Fuel Pump Enable Circuit High DTC (P12A5)	not active		
					11. Fuel Pump Enable Circuit Rationality DTC (P12A6)	not active		
					12. Fuel Pump Output Circuit DTC (P12A7)	not active		
					13. Reference Voltage DTC (P0641)	not active		
					14. Reference Voltage DTC (P06A6)	not active		
					15. Fuel Pump Control Module Driver Over-temperature DTC's (P1255)	not active		
					16. Control Module Internal Performance DTC (P0606)	not active		
					17. An ECM fuel control system failure (PPEI $1ED)	has not occurred		
					18. The Barometric pressure (PPEI $4C1) signal	valid (for absolute fuel pressure sensor)		
					19. Engine run time	>= 30 seconds		
					20. Emissions fuel level (PPEI $3FB)	not low		
					21. Fuel pump control	enabled		
					22. Fuel pump control state	normal		
					23. Battery Voltage	11V<=voltage=<18V		
					24. Fuel flow rate	> 0.047 g/s **AND**		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						<= Max allowed fuel flow rate as a function of desired rail pressure & Vbatt (Typical values in the range of 51 to 58 g/s)		
					25. 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	1. 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	Run/Crank	12 failures out of 12 samples (12 seconds)	DTC Type B 2 trips
					2. Ignition Run/Crank Voltage	(11 – 18 V)		
					3. U0073	not active		
Control Module Communication Bus "A" Off	U1802	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	1. Power mode	Run/Crank	5 test failures in 5 samples (5 seconds)	DTC Type B 2 trips