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 < 18 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 < 18 Volts Desired cam position cannot vary more than 7.5 Cam Deg for at least KtPHSD_t_StablePositionTimeIc1 seconds (see Supporting Table)	200 failures out of 1000 samples 100 ms /sample	Type B 2 trips
Exhaust Camshaft Actuator Solenoid Circuit – Bank 1 (for applications with a Bank 1 exhaust cam phaser)	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 < 18 Volts	19 failures out of 30 samples 250 ms /sample, continuous	Type B 2 trips
Exhaust Camshaft System Performance – Bank 1 (for applications with a Bank 1 exhaust cam phaser)	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 Engine is running VVT is enabled Desired camshaft position > 0 Power Take Off (PTO) not active	System Voltage > 11 Volts, and System Voltage < 18 Volts Desired cam position cannot vary more than 1.0 Cam Deg for at least KtPHSD_t_StablePositionTimeEc1 seconds (see Supporting Table)	135 failures out of 150 samples 100 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.
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:	< 2000 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 (for applications with a Bank 1 exhaust cam phaser)	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 -700 crank degrees before or 700 crank degrees after nominal position in one cam revolution.		Engine Speed Crankshaft and camshaft position signals are synchronized Cam phaser is in "parked" position No Active DTCs: No Pending DTCs:	< 1200 P0335, P0336 P0365, P0366 5VoltReferenceA_FA 5VoltReferenceB_FA P0366	4 failures out of 5 samples if the engine is being assisted by the starter 24 failures out of 30 samples if the engine is running without assistance from the starter One sample per cam rotation	Type B 2 trips
O2S Heater Control Circuit Bank 1 Sensor 1	P0030	This DTC checks the Heater Output Driver circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit) or voltage high during driver closed state (indicates short to voltage).		Ign Switch position Ignition Voltage Engine Speed	= Crank or Run position 11.0 volts < Ign Voltage < 18.0 volts > 400 RPM	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Supercharger Bypass Valve Control Circuit (Supercharger applications only)	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 <= 18.00 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 < 18.0 volts > 400 RPM	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
O2S Heater Control Circuit Bank 2 Sensor 1	P0050	This DTC checks the Heater Output Driver circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit) or voltage high during driver closed state (indicates short to voltage).		Ign Switch position Ignition Voltage Engine Speed	= Crank or Run position 11.0 volts < Ign Voltage < 18.0 volts > 400 RPM	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
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 < 2.8 ohms -OR- Calculated Heater Resistance > 9.5 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	2 trips Type B
HO2S Heater Resistance Bank 1 Sensor 2	P0054	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Learned Heater Resistance.	Calculated Heater Resistance < 4.1 ohms -OR- Calculated Heater Resistance > 10.8 ohms	No Active DTC's Coolant – IAT 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	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
O2S Heater Control Circuit Bank 2 Sensor 2	P0056	This DTC checks the Heater Output Driver circuit for electrical integrity.	Voltage low during driver open state (indicates short-to-ground or open circuit) or voltage high during driver closed state (indicates short to voltage).		Ign Switch position Ignition Voltage Engine Speed	= Crank or Run position 11.0 volts < Ign Voltage < 18.0 volts > 400 RPM	20 failures out of 25 samples 250 ms /sample Continuous	2 trips Type B
HO2S Heater Resistance Bank 2 Sensor 1	P0059	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Learned Heater Resistance.	Calculated Heater Resistance < 2.8 ohms -OR- Calculated Heater Resistance > 9.5 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	2 trips Type B
HO2S Heater Resistance Bank 2 Sensor 2	P0060	Detects an oxygen sensor heater having an incorrect or out of range resistance value.	Learned Heater Resistance.	Calculated Heater Resistance < 4.1 ohms -OR- Calculated Heater Resistance > 10.8 ohms	No Active DTC's Coolant – IAT 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	2 trips Type B
MAP / MAF / Throttle Position Correlation	P0068	Detect when MAP and MAF do not match estimated engine airflow as established by the TPS	1) Difference between measured MAP and estimated MAP exceeds threshold (kPa), or P0651 (5 Volt Ref), or P0107 (MAP circuit low), or P0108 (MAP circuit high) have failed this key cycle, then MAP portion of diagnostic fails 2) Difference between measured MAF and estimated MAF exceed threshold (grams/sec), or P0102	Table, f(TPS). See supporting tables Table, f(TPS). See supporting tables	Engine Speed	> 800 RPM Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	Continuously fail MAP and MAF portions of diagnostic for 0.1875 ms Continuous in MAIN processor	Type: A MIL: YES Trips: 1

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			(MAF circuit low), or P0103 (MAF circuit hi) have failed this key cycle, or battery voltage < 10.0 volts, then MAF portion of diagnostic fails					
Barometric Pressure (BARO) - Supercharger Inlet Pressure Correlation (Supercharger applications only)	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 Difference between baro sensor reading and estimated baro when distance since last estimated baro update	> 15.0 kPa <= 23.00 kilometers > 20.0 kPa > 23.00 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
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 > 28800 seconds No Active DTCs:	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

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
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 KPH 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 <= 512 KPH >= 512 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
Mass Air Flow System Performance (naturally aspirated)	P0101	Determines if the MAF sensor is stuck within the normal operating range	Filtered Throttle Model AND ABS(Measured Flow – Modeled Air Flow) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered	<= 230 kPa/(g/s) > 12 grams/sec > 15.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 450 RPM <= 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	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.
						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. Filtered Throttle Model AND ABS(Measured Flow – Modeled Air Flow) Filtered AND ABS(Measured MAP – MAP Model 1) Filtered	 > 300 kPa/(g/s) > 10 grams/sec > 15.0 kPa	No Active DTCs: 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 > -7 Deg C < 125 Deg C > -7 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	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.
			AND ABS(Measured MAP – MAP Model 2) Filtered AND ABS(Measured SCIAP – SCIAP Model 1) Filtered AND ABS(Measured SCIAP – SCIAP Model 2) Filtered	> 15.0 kPa > 15.0 kPa > 15.0 kPa	No Active DTCs:	MAF Residual Weight Factor Based on MAF Estimate 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 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 Supercharger application". MAP_SensorCircuitFA		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						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		
Mass Air Flow Sensor Circuit Low Frequency	P0102	Detects a continuous short to low or a open in either the signal circuit or the MAF sensor	MAF Output	<= 1500 Hertz (~ 1.061 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 (~ 386.83 gm/sec)	Engine Run Time Engine Speed Ignition Voltage Above criteria present for a period of time	> 1.0 seconds >= 300 RPM >= 8.0 Volts >= 1.0 seconds	400 failures out of 500 samples 1 sample every cylinder firing event	Type B 2 trips
Manifold Absolute Pressure Sensor Performance (naturally aspirated)	P0106	Determines if the MAP sensor is stuck within the normal operating range	Filtered Throttle Model AND ABS(Measured MAP – MAP Model 1) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered	<= 230 kPa/(g/s) > 15.0 kPa > 15.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	 >= 450 RPM <= 8000 RPM > 70 Deg C < 125 Deg C > -20 Deg C < 125 Deg C < 0.00	Continuous Calculations are performed every 12.5 msec	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM MAP Model 1 multiplied by MAP1 Residual Weight Factor based on RPM MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM See table "IFRD Residual Weighting Factors". MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensorFA ECT_sensor_FA ECT_Sensor_FP IAT_SensorFA IAT_SensorCircuitFP CylDeacSystemTFTKO		
Manifold Absolute Pressure Sensor 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. Filtered Throttle Model AND	 > 300 kPa/(g/s)	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 > -7 Deg C < 125 Deg C > -7 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.
			ABS(Measured Flow – Modeled Air Flow) Filtered AND ABS(Measured MAP – MAP Model 1) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered AND ABS(Measured SCIAP – SCIAP Model 1) Filtered AND ABS(Measured SCIAP – SCIAP Model 2) Filtered	> 10 grams/sec > 15.0 kPa > 15.0 kPa > 15.0 kPa > 15.0 kPa		Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Estimate MAP Model 1 multiplied by MAP1 Residual Weight Factor based on RPM 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 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		

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 Supercharger Application". 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		
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 = 115.3 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.
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 P0116 is Failing	> 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 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 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 KPH 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 <= 512 KPH <= 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:		No Active DTC's	VehicleSpeedSensor_FA IAT_SensorFA	1 failure	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			1) ECT at power up > IAT at power up by an IAT based table lookup value after a minimum 28800 second soak (fast fail). 2) ECT at power up > IAT at power up by 15.0 C after a minimum 28800 second soak and a block heater has not been detected. 3) ECT at power up > IAT at power up by 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	See "P0116: Fail if power up ECT exceeds IAT by these values" in the Supporting tables section = False	Non-volatile memory initization Test complete this trip Test aborted this trip IAT Low Fuel Condition Diag **Diagnostic is aborted when Block Heater is detected. Block Heater is detected when the following occurs:** 1) ECT at power up > IAT at power up by 2) Cranking time 3) Power up IAT 4a) Vehicle drive time 4b) Vehicle speed 4c) IAT drops from power up IAT	ECT_Sensor_Ckt_FA IgnitionOffTimeValid TimeSinceEngineRunningValid = Not occurred = False = False ≥ -7 ºC = False > 15.0 ºC < 10.0 Seconds > -7 ºC > 400 Seconds > 14.9 MPH ≥ 8.0 ºC	500 msec/sample Once per valid cold start	
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	2 trips Type B
Engine Coolant Temp Sensor Circuit High	P0118	Circuit Continuity This DTC detects a short to high or open in the ECT signal circuit or the ECT sensor.	ECT Resistance (@ -60ºC)	> 450000 Ohms (~ -60° C)	Engine run time Or IAT min	> 10.0 seconds ≥ 0.0 °C	5 failures out of 6 samples 1 sec/sample Continuous	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
TPS1 Circuit	P0120	Detects a continuous or intermittent short or open in TPS1 circuit on the secondary processor but sensor is in range on the primary processor	Secondary TPS1 Voltage < or Secondary TPS1 Voltage >	0.325 4.75		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions No 5 V reference error No 5 V reference DTCs	19/39 counts or 14 counts continuous; 12.5 msec/count in the secondary processor	Type: A MIL: YES Trips: 1
Throttle Position Sensor Performance (naturally aspirated)	P0121	Determines if the Throttle Position Sensor input is stuck within the normal operating range	Filtered Throttle Model AND ABS(Measured Flow – Modeled Air Flow) Filtered	> 230 kPa/(g/s) > 12 grams/sec	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together) No Active DTCs:	>= 450 RPM <= 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 See table "IFRD Residual Weighting Factors". MAP_SensorCircuitFA EGRValve_FP	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.
						EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensorFA ECT_sensor_FA ECT_Sensor_FP IAT_SensorFA IAT_SensorCircuitFP CylDeacSystemTFTKO		
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 Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 450 RPM <= 8000 RPM > -7 Deg C < 125 Deg C > -7 Deg C < 125 Deg C < 0.00	Continuous Calculation are performed every 12.5 msec	Type B 2 trips
			Filtered Throttle Model AND ABS(Measured Flow – Modeled Air Flow) Filtered	> 300 kPa/(g/s) > 10 grams/sec		Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM		
			AND ABS(Measured MAP – MAP Model 1) Filtered	> 15.0 kPa		Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Estimate		
			AND ABS(Measured MAP – MAP Model 2) Filtered	> 15.0 kPa				
			AND ABS(Measured SCIAP – SCIAP Model 1) Filtered	> 15.0 kPa		MAP Model 1 multiplied by MAP1 Residual Weight Factor based on RPM and Boost Residual Weight Factor based on % of Boost		
			AND ABS(Measured SCIAP – SCIAP Model 2) Filtered	> 15.0 kPa				

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM 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 Supercharger Applications". No Active DTCs: 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		
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 No 5 V reference error	79/159 counts; 57 counts continuous; 3.125 msec /count in the Primary processor	Type: A MIL:
			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	YES Trips: 1
TPS1 Circuit High	P0123	Detects a continuous or intermittent short in TPS1 circuit on both processors or just the primary processor	Primary TPS1 Voltage >	4.75		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions No 5 V reference error	79/159 counts; 57 counts continuous; 3.125 msec /count in the Primary processor	Type: A MIL:
			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	YES Trips: 1
Engine Coolant Temperature Below Stat Regulating Temperature	P0128	This DTC detects if the engine coolant temperature rises too slowly due to an ECT or Cooling system fault	Actual accumulated airflow is > predicted accumulated airflow before: 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_ThrottleAuthority Defaulted IAT_SensorFA ECT_Sensor_Ckt_FA ECT_Sensor_Perf_FA	30 failures to set DTC 1 sec/sample Once per ignition cycle	2 trips Type B

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.			VehicleSpeedSensor_FA		
					Engine run time	120 ≤ Eng Run Tme ≤ 1370 seconds		
			Range #2 (Alternate) ECT reaches 55.0 °C when IAT min is < 10.0°C and ≥ -7.0°C.		Fuel Condition	Ethanol ≤ 87%		
					Range #1 (Primary) Test			
					ECT at start run	≤ 70.0 °C		
					Average Airflow	≥ 10.0 gps		
					Vehicle speed	> 5 mph for at least 2.4 miles		
					Range #2 (Alternate) Test			
					ECT at start run	≤ 50.0 °C		
					Average Airflow	≥ 10.0 gps		
					Vehicle speed	> 5 mph for at least 2.4 miles		
					Accumulated Airflow Adjustments			
					1) Max. airflow amount added when accumulating airflow is	70.0 gps		
					2) Zero Airflow accumulated when airflow is	< 17.0 gps		
					3) With AFM active Airflow added to acculmulated is multiplyed by	50.00%		
					4) With Decel Fuel Cut Off active, acculmulated airflow is reduced by multiplying actual airflow by	1.00 times		
Supercharger Inlet Absolute Pressure (SCIAP) Sensor Performance (Supercharged applications only)	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.		Engine Speed	>= 450 RPM	Continuous	Type B 2 trips
					Engine Speed	<= 8000 RPM	Calculation are performed every 12.5 msec	
					Coolant Temp	> -7 Deg C		
					Coolant Temp	< 125 Deg C		
					Intake Air Temp	> -7 Deg C		
					Intake Air Temp	< 125 Deg C		
					Minimum total weight factor (all factors multiplied together)			
			Filtered Throttle Model AND	> 300 kPa/(g/s)		< 0.00		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			ABS(Measured Flow – Modeled Air Flow) Filtered AND ABS(Measured MAP – MAP Model 1) Filtered AND ABS(Measured MAP – MAP Model 2) Filtered AND ABS(Measured SCIAP – SCIAP Model 1) Filtered AND ABS(Measured SCIAP – SCIAP Model 2) Filtered	> 10 grams/sec > 15.0 kPa > 15.0 kPa > 15.0 kPa > 15.0 kPa		Filtered Throttle Model multiplied by TPS Residual Weight Factor based on RPM Modeled Air Flow multiplied by MAF Residual Weight Factor based on RPM and MAF Residual Weight Factor Based on MAF Estimate MAP Model 1 multiplied by MAP1 Residual Weight Factor based on RPM 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 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		

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 Supercharger Applications". 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 (sensor with deadbands) (Supercharged applications only)	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 (sensor with deadbands) (Supercharged applications only)	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 = 115.3 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 MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA	380 failures out of 475 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 18.0 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	0.992188 <= equiv. ratio <= 1.013672		
					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 <= 92%		
					Fuel State	DFCO not active		
					All of the above met for Time	> 2.0 seconds		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
O2S Circuit High Voltage Bank 1 Sensor 1	P0132	This DTC determines if the O2 sensor circuit is shorted to high.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is > 1050 mvolts	No Active DTC's	TPS_ThrottleAuthority Defaulted MAP_SensorFA MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 18.0 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	0.992188 <= equiv. ratio <= 1.013672		
					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 <= 92%		
					All of the above met for Time	> 2 seconds		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
O2S Slow Response Bank 1 Sensor 1	P0133	This DTC determines if the O2 sensor response time is degraded.	The average response time is caluclated over the test time, and compared to the threshold. Refer to **"P0133 - O2S Slow Response Bank 1 Sensor 1"** Pass/Fail Threshold table in the Supporting Tables tab.		No Active DTC's	TPS_ThrottleAuthority Defaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA EthanolCompositionSensor_FA EngineMisfireDetected_FA	Sample time is 70 seconds Frequency: Once per trip <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	2 trips Type B
					Bank 1 Sensor 1 DTC's not active	= P0131, P0132 or P0134		
					System Voltage	10.0 volts < system voltage< 18.0 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		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Engine airflow	20 gps <= engine airflow <= 55 gps		
					Engine speed	1200 <= RPM <= 3000		
					Fuel	< 92 % 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. Minimum of 0 delta TPS changes required to report fail. Delta TPS is incremented when the TPS % change >= 0.0 % Frequency: Continuous 100msec loop	2 trips Type B
					System Voltage	10.0 volts < system voltage< 18.0 volts		
					AFM Status	= All Cylinders active		
					Heater Warm-up delay	= Complete		
					Predicted Exhaust Temp (by location)	= Wamed Up		
					Engine Run Time	> 300 seconds		
					Fuel	<= 92 % Ethanol		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
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< 18.0 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	2 trips Type B
O2S Circuit Low Voltage Bank 1 Sensor 2	P0137	This DTC determines if the O2 sensor circuit is shorted to low.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is < 50 mvolts	No Active DTC's AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Diag Equivalence Ratio Throttle Position Fuel Control State	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 = Not active 10.0 volts < system voltage< 18.0 volts = Not active = Not active = Not active = Not active = False 0.992188 <= equiv. ratio <= 1.013672 3 % <= Throttle <= 70 % = Closed Loop	430 failures out of 540 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Closed Loop Active	= TRUE		
					All Fuel Injectors for active Cylinders	Enabled (On)		
					Fuel Condition	Ethanol <= 92%		
					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 FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 18.0 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	0.992188 <= equiv. ratio <= 1.013672		
					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 <= 92%		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					All of the above met for Time	> 2 seconds		
O2 Sensor Slow Response Rich to Lean Bank 1 Sensor 2 (For applications with Post Oxygen Sensor Performance Diagnostic)	P013A	This DTC determines if the post catalyst O2 sensor has Slow Response in a predefined Rich to Lean voltages range during Rich to Lean transition. The diagnostic is an intrusive test which runs in a DFCO mode to achieve the required response.	The EWMA of the Post O2 sensor normalized integral value is greater than the threshold. OR The Accumulated mass air flow monitored during the Slow Response Test (between the upper and lower voltage thresholds) is greater than the airflow threshold.	1) B1S2 EWMA normalized integral value > 8.0 units OR 2) Accumulated air flow during slow rich to lean test > 49 grams (upper threshold is 450 mvolts and lower threshold is 150 mvolts)	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 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 P013B, P013E, P013F, P2270 or P2271 10.0 volts < system voltage< 18.0 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 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	1 trips Type A EWMA
					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 > 8.0 units OR 2) Accumulated air flow during slow lean to rich test > 75 grams (lower threshold is 350 mvolts and upper threshold is 650 mvolts)	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 Post fuel cell DTC's Passed DTC's Passed DTC's Passed DTC's Passed DTC's Passed After above conditions are met: Fuel Enrich mode continued.	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 10.0 volts < system voltage< 18.0 volts = Valid = Not Valid = Not Valid = False = enabled = P2270 (and P2272 (if applicable)) = P013E (and P014A (if applicable)) = P013A (and P013C (if applicable)) = P2271 (and P2273 (if applicable)) = P013F (and P014B (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 is only enabled	1 trips Type A EWMA

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
							when the vehicle is new and cannot be enabled in service	
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 > 8.0 units OR 2) Accumulated air flow during slow rich to lean test > 49 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< 18.0 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	1 trips Type A EWMA
					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.
							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 > 8.0 units OR 2) Accumulated air flow during slow lean to rich test > 75 grams (lower threshold is 350 mvolts and upper threshold is 650 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 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 P013C, P014A, P014B, P2272 or P2273 10.0 volts < system voltage< 18.0 volts = Valid = Not Valid = Not Valid = False = enabled = P2270 (and P2272 (if applicable)) = P013E (and P014A (if applicable)) = P013A (and P013C (if applicable)) = P2271 (and P2273 (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	1 trips Type A EWMA

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					DTC's Passed	= P013F (and P014B (if applicable))	the next ignition cycle for the test to run on that ignition cycle). Note: This feature is only enabled when the vehicle is new and cannot be enabled in service	
					After above conditions are met: Fuel Enrich mode continued.			
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 > 42 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 EthanolCompositionSensor_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	2 trips Type B
					B1S2 Failed this key cycle	P013A, P013B, P013F, P2270 or P2271		
					System Voltage	10.0 volts < system voltage< 18.0 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	
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid		
					Low Fuel Condition Diag	= False		
					Post fuel cell	= enabled		
					DTC's Passed	= P2270 and P2272 (if applicable)		
					After above conditions are met:			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					DFCO mode entered (wo driver initiated pedal input).		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	
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 > 200 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 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 P013A, P013B, P013E, P2270 or P2271 10.0 volts < system voltage< 18.0 volts = Valid = Not Valid = Not Valid = False = enabled = P2270 (and P2272 (if	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed <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	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					DTC's Passed DTC's Passed DTC's Passed After above conditions are met: Fuel Enrich mode entered.	applicable)) = P013E (and P014A (if applicable)) = P013A (and P013C (if applicable)) = P2271 (and P2273 (if applicable))	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	
O2S Circuit Insufficient Activity Bank 1 Sensor 2	P0140	This DTC determines if the O2 sensor circuit is open.	Measure Oxygen Sensor Signal.	410 mvolts < Oxygen Sensor signal < 490 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< 18.0 volts = All Cylinders active = Complete = Wamed Up > 300 seconds <= 92 % 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	2 trips Type B
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	ECT_Sensor_FA 10.0 volts < system voltage< 18.0 volts = Complete	8 failures out of 10 samples Frequency: 1 tests per trip	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					O2S Heater device control B1S1 O2S Heater Duty Cycle **All of the above met for** Time	= Not active > zero > 120 seconds	5 seconds delay between tests and 1 second execution rate	
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 > 42 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< 18.0 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 is only enabled	2 trips Type B
					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.
							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 > 200 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 DTC's Passed 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 P013C, P013D, P014A, P2272 or P2273 10.0 volts < system voltage< 18.0 volts = Valid = Not Valid = Not Valid = False = enabled = P2270 (and P2272 (if applicable)) = P013E (and P014A (if applicable)) = P013A (and P013C (if applicable)) = P2271 (and P2273 (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	2 trips Type B
					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.
							cycle). Note: This feature is only enabled when the vehicle is new and cannot be enabled in service	
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 MAP_SensorFA AIR System FA Ethanol Composition Sensor FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA	380 failures out of 475 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 18.0 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	0.992188 <= equiv. ratio <= 1.013672		
					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 <= 92%		
					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 MAP_SensorFA MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B
					AIR intrusive test	= Not active		
					Fuel intrusive test	= Not active		
					Idle intrusive test	= Not active		
					EGR intrusive test	= Not active		
					System Voltage	10.0 volts < system voltage< 18.0 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	0.992188 <= equiv. ratio <= 1.013672		
					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 <= 92%		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					All of the above met for Time	> 2 seconds		
O2S Slow Response Bank 2 Sensor 1	P0153	This DTC determines if the O2 sensor response time is degraded.	The average response time is caluclated over the test time, and compared to the threshold. Refer to **"P0153 - O2S Slow Response Bank 2 Sensor 1"** Pass/Fail Threshold table in the Supporting Tables tab.		No Active DTC's	TPS_ThrottleAuthority Defaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA EthanolCompositionSensor_FA EngineMisfireDetected_FA	Sample time is 70 seconds Frequency: Once per trip 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	2 trips Type B
					Bank 2 Sensor 1 DTC's not active	= P0151, P0152 or P0154		
					System Voltage	10.0 volts < system voltage< 18.0 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		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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	< 92 % 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 MAF_SensorFA EthanolCompositionSensor_FA	400 failures out of 500 samples. Minimum of 0 delta TPS changes required to report fail. Delta TPS is incremented when the TPS % change >= 0.0 % Frequency: Continuous 100msec loop	2 trips Type B
					System Voltage	10.0 volts < system voltage< 18.0 volts		
					AFM Status	= All Cylinders active		
					Heater Warm-up delay	= Complete		
					Predicted Exhaust Temp (by location)	= Wamed Up		
					Engine Run Time	> 300 seconds		
					Fuel	<= 92 % Ethanol		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
O2S Heater Performance Bank 2 Sensor 1	P0155	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	Measured Heater Current.	Measured Heater current < 0.3 amps -OR- Measured Heater current > 3.1 amps	No Active DTC's System Voltage Heater Warm-up delay O2S Heater device control B1S1 O2S Heater Duty Cycle **All of the above met for** Time	ECT_Sensor_FA 10.0 volts < system voltage< 18.0 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	2 trips Type B
O2S Circuit Low Voltage Bank 2 Sensor 2	P0157	This DTC determines if the O2 sensor circuit is shorted to low.	Measure Oxygen Sensor Signal.	Oxygen Sensor signal is < 50 mvolts	No Active DTC's AIR intrusive test Fuel intrusive test Idle intrusive test EGR intrusive test System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Diag Equivalence Ratio Throttle Position Fuel Control State	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 = Not active 10.0 volts < system voltage< 18.0 volts = Not active = Not active = Not active = Not active = False 0.992188 <= equiv. ratio <= 1.013672 3 % <= Throttle <= 70 % = Closed Loop	430 failures out of 540 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Closed Loop Active	= TRUE
					All Fuel Injectors for active Cylinders	Enabled (On)
					Fuel Condition	Ethanol <= 92%
					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 MAP_SensorFA MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA	100 failures out of 125 samples Frequency: Continuous in 100 milli - second loop	2 trips Type B
					AIR intrusive test	= Not active
					Fuel intrusive test	= Not active
					Idle intrusive test	= Not active
					EGR intrusive test	= Not active
					System Voltage	10.0 volts < system voltage< 18.0 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	0.992188 <= equiv. ratio <= 1.013672
					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 <= 92%

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					All of the above met for Time	> 2 seconds		
O2S Circuit Insufficient Activity Bank 2 Sensor 2	P0160	This DTC determines if the O2 sensor circuit is open.	Measure Oxygen Sensor Signal.	410 mvolts < Oxygen Sensor signal < 490 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< 18.0 volts = All Cylinders active = Complete = Wamed Up > 300 seconds <= 92 % 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	2 trips Type B
O2S Heater Performance Bank 2 Sensor 2	P0161	This DTC determines if the O2 sensor heater is functioning properly by monitoring the current through the heater circuit.	Measured Heater Current.	Measured Heater current < 0.3 amps -OR- Measured Heater current > 2.9 amps	No Active DTC's System Voltage Heater Warm-up delay O2S Heater device control B1S1 O2S Heater Duty Cycle **All of the above met for** Time	ECT_Sensor_FA 10.0 volts < system voltage< 18.0 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	2 trips Type B
Fuel System Too Lean Bank 1	P0171	Determines if the fuel control system is in a lean condition, based on the filtered long-term fuel trim.	The filtered long-term fuel trim metric	≥ **Long Term Trim Lean** Table	Engine speed BARO Coolant Temp MAP Inlet Air Temp MAF VSS Fuel Level	375 <rpm< 7000 > 70 kPa -40 <°C< 150 10 <kPa< 255 -20 <°C< 150 1.0 <g/s< 510.0 < 83 mph > 10 % or if fuel sender is faulty	> 100 ms Frequency: Continuous Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically	Type B 2 Trip(s)

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Long Fuel Trim data accumulation:	> 25 seconds of data must accumulate on each trip, with at least 10 seconds of data in the current fuel trim cell before a pass or fail decision can be made.	(TASD) is typically enabled during 93 % 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.	
					Closed loop fueling Enabled			
					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)		
				disable **conditions:**	Engine speed Fuel Level	rpm< 375 or rpm> 7000 < 10 % for at least 30 seconds		
					EGR Flow Diag. Intrusive Test Active Catalyst Monitor Diag. Intrusive Test Active Post O2 Diag. Intrusive Test Active Device Control Active EVAP Diag. “tank pull down” portion of the test Active fuel trim metric is not updated during decels on some			
					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		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						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 Coolant Temp MAP IAT MAF VSS Fuel Level Long Fuel Trim data accumulation:	> 70 kPa -40 <°C< 150 10 <kPa< 255 -20 <°C< 150 1.0 <g/s< 510.0 < 83 mph < 10 % for at least 30 seconds > 25 seconds of data must accumulate on each trip, with at least 10 seconds of data in the current fuel trim cell before a pass or fail decision can be made.		Type B 2 Trip(s)
					Closed loop fueling Enabled			
					Long Fuel Trim enabled	Closed Loop Enabled and coolant temp > 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	≤ **Non Purge Rich Limit** Table			> 100 ms Frequency: Continuous	
		Intrusive Test- When the Purge Long Term fuel trim metric is ≤ **the Purge Rich Limit Table,** Purge is ramped off to determine if excess purge vapor is the cause of the Rich condition. If the filtered Purge-on Long Term fuel trim > **Purge Rich Limit Table** the test passes without checking the Non-Purge Long	If the Purge Long Term Fuel Trim metric AND The filtered Non-Purge Long Term Fuel Trim metric	≤ **Purge Rich Limit** Table ≤ **Non Purge Rich Limit** Table		Passive Test decision cannot be made. A passive decision cannot be made when Purge is enabled.	Fail determinations require that the Malfunction Criteria be satisfied for 3 out of 5 intrusive segments.	
			Segment Definition -					
				disable **conditions:**	Engine speed EGR Flow Diag. Intrusive Test Not Active	rpm< 375 or rpm> 7000	Development data indicates that the	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Fuel Level Catalyst Monitor Diag. Intrusive Test Not Active Post O2 Diag. Intrusive Test Not Active Device Control Not Active EVAP Diag. “tank pull down” portion of the test Not Active fuel trim metric is not updated during decels on some No active DTCs:	< 10 % for at least 30 seconds 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	Fuel Adjustment System Diagnostic (FASD) is typically enabled during 93 % 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.	
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 BARO Coolant Temp MAP Inlet Air Temp MAF VSS Fuel Level	375 <rpm< 7000 > 70 kPa -40 <°C< 150 10 <kPa< 255 -20 <°C< 150 1.0 <g/s< 510.0 < 83 mph > 10 % or if fuel sender is faulty	> 100 ms Frequency: Continuous Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically	Type B 2 Trip(s)

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Long Fuel Trim data accumulation:	> 25 seconds of data must accumulate on each trip, with at least 10 seconds of data in the current fuel trim cell before a pass or fail decision can be made.	(TASD) is typically enabled during 93 % 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.	
					Closed loop fueling Enabled			
					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)		
				disable	Engine speed	rpm< 375 or rpm> 7000		
				conditions:	Fuel Level	< 10 % for at least 30 seconds		
					EGR Flow Diag. Intrusive Test Active Catalyst Monitor Diag. Intrusive Test Active Post O2 Diag. Intrusive Test Active Device Control Active EVAP Diag. “tank pull down” portion of the test Active fuel trim metric is not updated during decels on some			
					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		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						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 Fuel Level Long Fuel Trim data accumulation:	> 70 kPa -40 <°C< 150 10 <kPa< 255 -20 <°C< 150 1.0 <g/s< 510.0 < 83 mph > 10 % or if fuel sender is faulty > 25 seconds of data must accumulate on each trip, with at least 10 seconds of data in the current fuel trim cell before a pass or fail decision can be made.	> 100 ms Frequency: Continuous	Type B 2 Trip(s)
					Closed loop fueling Enabled			
					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	≤ **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	If the Purge Long Term Fuel Trim metric AND The filtered Non-Purge Long Term Fuel Trim metric	≤ **Purge Rich Limit** Table ≤ **Non Purge Rich Limit** Table		Passive Test decision cannot be made. A passive decision cannot be made when Purge is enabled.	Fail determinations require that the Malfunction Criteria be satisfied for 3 out of 5 intrusive segments.	
			Segment Definition -					
				disable **conditions:**	Engine speed EGR Flow Diag. Intrusive Test Not Active Fuel Level	rpm< 375 or rpm> 7000 < 10 % for at least 30 seconds	Development data indicates that the Fuel Adjustment System Diagnostic (FASD) is typically	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Catalyst Monitor Diag. Intrusive Test Not Active Post O2 Diag. Intrusive Test Not Active Device Control Not Active EVAP Diag. “tank pull down” portion of the test Not Active fuel trim metric is not updated during decels on some 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	enabled during 93 % 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.	
Injector 1	P0201	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 18 volts greater than 1 seconds	8 failures out of 10 samples 250 ms /sample Continuous	Type B 2 trips
Injector 2	P0202	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 18 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 3	P0203	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 18 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 ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 18 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 ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 18 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 ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 18 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 ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 18 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 ciruit do not match		Powertrain Relay Voltage within range and stable according to Enable Conditions Engine Running	11 volts ≤ Voltage ≤ 18 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 No 5 V reference DTCs	19/39 counts or 14 counts continuous; 12.5 msec/count in the Secondary processor	Type: A MIL: YES Trips: 1

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
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 MIL:
			Secondary TPS2 Voltage <	0.25		No 5 V reference DTCs	19/39 counts or 14 counts continuous; 12.5 msec/count in the Secondary	YES Trips: 1
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 MIL:
			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	YES Trips: 1
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 ≤ 18 volts ≥ 0 RPM	8 failures out of 10 samples 250 ms /sample Continuous	2 trips Type B
Supercharger Intercooler Coolant Pump Control Circuit (Supercharged applications only)	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 <= 18.00 Volts > 0	1 failures out of 0 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	P0300 P0301 P0302	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	**(>**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)	Engine Run Time ECT If ECT at startup	> 2 crankshaft revolutions -7ºC < ECT < 130ºC < -7ºC	Emission Exceedence = (5) failed 200 rev blocks of 16. Failure reported with (1) Exceedence in 1st (16) 200 rev block	2 Trips Type B (Mil Flashes with Catalyst Damaging Misfire)

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Cylinder 4 Misfire Detected Cylinder 5 Misfire Detected Cylinder 6 Misfire Detected Cylinder 7 Misfire Detected Cylinder 8 Misfire Detected	P0303 P0304 P0305 P0306		that are not max of range. Undetectable region at a given speed/load point is where all tables are max of range point. see Algorithm Description Document for additional details.	Idle Cyl Mode ddt Tables) **OR** (>Cyl Mode AND > Cyl Mode ddt Tables) **OR** (>Rev Mode Table) **OR** (> AFM Table in Cyl Deact mode)	ECT System Voltage + Throttle delta - Throttle delta	21ºC < ECT < 130ºC 9.00<volts<18.00 < 75.00% per 25 ms < 75.00% per 25 ms	(4) 200 rev block, or (4) Exceedences thereafter. 1st Catalyst Exceedence = (1) 200 rev block as data supports for catalyst damage.	
	P0307 P0308		Misfire Percent Emission Failure Threshold Misfire Percent Catalyst Damage	≥ 1.00% P0300 ≥ 1.04% emission >"Catalyst Damaging Misfire Percentage" Table, except 1 cyl out below 10.625% misfire below 1200 rpm and 20% load.	Engine Speed	375 < rpm < (Engine Speed Limit) - 400 Engine speed limit is a function of inputs like Gear and temperature typical Engine Speed Limit = 5300 rpm	Continuous	
				disable conditions:	No active DTCs:	TPS_FA EnginePowerLimited MAF_SensorTFTKO n IAT_SensorTFTKO ECT_Sensor_Ckt_TFTKO 5VoltReferenceB_FA CrankSensorTestFailedTKO	4 cycle delay	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						CrankSensorFaultActive CrankIntakeCamCorrelationFA CrankExhaustCamCorrelationFA CrankCamCorrelationTFTKO AnyCamPhaser_FA AnyCamPhaser_TFTKO		
					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% > 48 KPH	4 cycle delay	
					EGR Intrusive test	Active	0 cycle delay	
					Manual Trans	Clutch shift	4 cycle delay	
					Throttle Position AND Automatic transmission shift	> 95.00%	7 cycle delay	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Driveline Ring Filter active After a low level misfire, another misfire may not be detectable until driveline ringing ceases. If no ringing seen, stop filter early. Filter Driveline ring: Stop filter early: Abnormal engine speed oscillations: (Rough road etc) Off Idle, number of consecutive decelerating cylinders after accelerating,: (Number of decels can vary with misfire detection equation) TPS Engine Speed Veh Speed SCD Cyl Mode Rev Mode Monitor ABS ABS/TCS system RoughRoad	 4 engine cycles after misfire 3 Engine cycles after > 3 % > 950 rpm > 5 kph = 4 consecutive cyls = 4 consecutive cyls 1 (1=Yes) not active not detected (wheel sensor)		
Crankshaft Position System Variation Not Learned	P0315	Monitor for valid crankshaft error compensation factors	Sum of Compensation factors	≥ 4.0040 OR ≤ 3.9960	OBD Manufacturer Enable Counter	0	0.50 seconds Frequency Continuous 100 msec	1 Trips Type A

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Knock Sensor (KS) Module Performance (E38/E67 controllers only)	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 MIL: YES Trips: 2
Knock Sensor (KS) Circuit Bank 1 (E38/E67 controllers)	P0325	This diagnostic checks for an open in the knock sensor circuit	Gated Low Pass Filter Voltage	> 4.0 Volts or < 1.24 Volts	Diagnostic Enabled (1 = Enabled) Engine Speed ECT Enginer Run Time 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 MIL: YES Trips: 2
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 Enginer Run Time No Active DTC's Power Take-Off	= 1 ≥ 1800 RPM ≥ -40 deg. C ≥ 1 seconds KS_Ckt_Perf_B1B2_FA Disabled	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
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) >	> (FastRtdMax + 6.0 degrees - 3.5) degrees spark See Supporting Tables for FastRtdMax	Diagnostic Enabled (1 = Enabled) Knock Detection Enabled	= 1 > 0 **Knock Detection Enabled** is calculated by multiplying the following three factors: FastAttackRate FastAttackCoolGain FastAttackBaroGain (see Supporting Tables)	31 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Engine Speed MAP No Active DTC's Power Take-Off Disabled	≥ 400 RPM ≥ 10 kPa TPS_ThrottleAuthority Defaulted Disabled		
Knock Sensor (KS) Circuit Low Bank 1 (E38/E67 controller)	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 Enginer Run Time Engine Oil Temp No Active DTC's	≥ -40 deg. C ≥ 2 seconds < 256 deg. C EngOilModeledTempValid	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
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 Enginer Run Time Engine Oil Temp No Active DTC's	≥ -40 deg. C ≥ 1 seconds < 150 deg. C EngOilModeledTempValid	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
Knock Sensor (KS) Circuit High Bank 1 (E38/E67 controller)	P0328	This diagnostic checks for an out of range high knock sensor signal	Sensor Input Signal Line **or** Sensor Return Signal Line	< 2.02 Volts > 3.76 Volts	ECT Enginer Run Time Engine Oil Temp No Active DTC's	≥ -40 deg. C ≥ 2 seconds < 256 deg. C EngOilModeledTempValid	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
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 Enginer Run Time Engine Oil Temp No Active DTC's	≥ -40 deg. C ≥ 1 seconds < 150 deg. C EngOilModeledTempValid	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Knock Sensor (KS) Circuit Bank 2 (E38/E67 controller)	P0330	This diagnostic checks for an open in the knock sensor circuit	Gated Low Pass Filter Voltage	> 4.0 Volts or < 1.24 Volts	Diagnostic Enabled (1 = Enabled) Engine Speed ECT Enginer Run Time No Active DTC's Power Take-Off 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 MIL: YES Trips: 2
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 Enginer Run Time No Active DTC's Power Take-Off	= 1 ≥ 1800 RPM ≥ -40 deg. C ≥ 1 seconds KS_Ckt_Perf_B1B2_FA Disabled	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
Knock Sensor (KS) Circuit Low Bank 2 (E38/E67 controller)	P0332	This diagnostic checks for an out of range low knock sensor signal	Sensor Input Signal Line **or** Sensor Return Signal Line	> 2.86 Volts < 1.48 Volts	ECT Enginer Run Time Engine Oil Temp No Active DTC's	≥ -40 deg. C ≥ 2 seconds < 256 deg. C EngOilModeledTempValid	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
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 Enginer Run Time Engine Oil Temp No Active DTC's	≥ -40 deg. C ≥ 1 seconds < 150 deg. C EngOilModeledTempValid	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
Knock Sensor (KS) Circuit High Bank 2 (E38/E67 controller)	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 Enginer Run Time Engine Oil Temp No Active DTC's	≥ -40 deg. C ≥ 2 seconds < 256 deg. C EngOilModeledTempValid	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Knock Sensor (KS) Circuit High Bank 2 (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 Enginer Run Time Engine Oil Temp No Active DTC's	≥ -40 deg. C ≥ 1 seconds < 150 deg. C EngOilModeledTempValid	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
Crankshaft Position (CKP) Sensor A Circuit	P0335	Determines if a fault exists with the crank position sensor signal	<u>Engine-Cranking Crankshaft Test:</u> Time since last crankshaft position sensor pulse received <u>Time-Based Crankshaft Test:</u> No crankshaft pulses received <u>Event-Based Crankshaft Test:</u> No crankshaft pulses received	 >= 4.0 seconds >= 0.1 seconds	<u>Engine-Cranking Crankshaft Test:</u> Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow <u>Time-Based Crankshaft Test:</u> Engine is Running Starter is not engaged No DTC Active: <u>Event-Based Crankshaft Test:</u> Engine is Running OR Starter is engaged No DTC Active:	 = FALSE = FALSE = FALSE > 3.0 grams/second)) 5VoltReferenceB_FA 5VoltReferenceA_FA 5VoltReferenceB_FA P0340 P0341	<u>Engine-Cranking Crankshaft Test:</u> Continuous every 100 msec <u>Time-Based Crankshaft Test:</u> Continuous every 12.5 msec <u>Event-Based Crankshaft Test:</u> 2 failures out of 10 samples One sample per engine revolution	Type A 1 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 Performance	P0336	Determines if a performance fault exists with the crank position sensor signal	Crank Re-synchronization Test: Time in which 25 or more crank re-synchronizations occur Time-Based Crankshaft Test: No crankshaft synchronization gap found Engine Start Test during Crank: Time since starter engaged without detecting crankshaft synchronization gap Event-Based Crankshaft Test: Crank Pulses received in one engine revolution OR Crank Pulses received in one engine revolution	< 20.0 seconds >= 0.4 seconds >= 1.5 seconds < 53 > 63	Crank Re-synchronization Test: Engine Air Flow Cam-based engine speed No DTC Active: Time-Based Crankshaft Test: Engine is Running Starter is not engaged No DTC Active: Engine Start Test during Crank: Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow Event-Based Crankshaft Test: Engine is Running OR Starter is engaged No DTC Active:	>= 3.0 grams/second > 450 RPM 5VoltReferenceB_FA P0335 5VoltReferenceB_FA = FALSE = FALSE = FALSE > 3.0 grams/second)) 5VoltReferenceA_FA 5VoltReferenceB_FA P0340 P0341	Crank Re-synchronization Test: Continuous every 250 msec Time-Based Crankshaft Test: Continuous every 12.5 msec Engine Start Test during Crank: Continuous every 100 msec Event-Based Crankshaft Test: 8 failures out of 10 samples One sample per engine revolution	Type A 1 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor A	P0340	Determines if a fault exists with the cam position bank 1 sensor A signal	Engine Cranking Camshaft Test: Time since last camshaft position sensor pulse received OR Time that starter has been engaged without a camshaft sensor pulse Time-Based Camshaft Test: Fewer than 4 camshaft pulses received in a time Fast Event-Based Camshaft Test: No camshaft pulses received during first 24 MEDRES events (There are 24 MEDRES events per engine cycle) Slow Event-Based Camshaft Test: The number of camshaft pulses received during 100 engine cycles	 >= 5.5 seconds >= 4.0 seconds > 3.0 seconds = 0	Engine Cranking Camshaft Test: Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow Time-Based Camshaft Test: Engine is Running Starter is not engaged No DTC Active: Fast Event-Based Camshaft Test: Crankshaft is synchronized 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: 	 = FALSE = FALSE = FALSE > 3.0 grams/second)) 5VoltReferenceA_FA 5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA 5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	Engine Cranking Camshaft Test: Continuous every 100 msec Time-Based Camshaft Test: Continuous every 100 msec 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

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 V6 with waste spark)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	**> 6.00 Volts**	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #2 CIRCUIT	P0352	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 2 (Cylinders 2 and 5 for V6 with waste spark)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	**> 6.00 Volts**	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
IGNITION CONTROL #3 CIRCUIT	P0353	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 3 (Cylinders 3 and 6 for V6 with waste spark)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	**> 6.00 Volts**	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #4 CIRCUIT	P0354	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 4 (if applicable)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	**> 6.00 Volts**	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #5 CIRCUIT	P0355	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 5 (if applicable)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	**> 6.00 Volts**	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
IGNITION CONTROL #6 CIRCUIT	P0356	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 6 (if applicable)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	**> 6.00 Volts**	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2
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 MIL: YES Trips: 2
IGNITION CONTROL #8 CIRCUIT	P0358	This diagnostic checks the circuit for electrical integrity during operation. Monitors EST for Cylinder 8 (if applicable)	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running Ignition Voltage	**> 6.00 Volts**	50 Failures out of 63 Samples 100 msec rate	Type: B MIL: YES Trips: 2

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Camshaft Position (CMP) Sensor Circuit Bank 1 Sensor B (For applications with a bank 1 sensor B CMP sensor)	P0365	Determines if a fault exists with the cam position bank 1 sensor B signal	Engine Cranking Camshaft Test: Time since last camshaft position sensor pulse received OR Time that starter has been engaged without a camshaft sensor pulse Time-Based Camshaft Test: Fewer than 4 camshaft pulses received in a time Fast Event-Based Camshaft Test: No camshaft pulses received during first 10 MEDRES events (There are 10 MEDRES events per engine cycle) Slow Event-Based Camshaft Test: The number of camshaft pulses received during 100 engine cycles	 >= 5.5 seconds >= 4.0 seconds > 3.0 seconds	Engine Cranking Camshaft Test: Starter engaged AND (cam pulses being received OR (DTC P0101 AND DTC P0102 AND DTC P0103 AND Engine Air Flow Time-Based Camshaft Test: Engine is Running Starter is not engaged No DTC Active: 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:	 = FALSE = FALSE = FALSE > 3.0 grams/second)) 5VoltReferenceA_FA 5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA 5VoltReferenceA_FA	Engine Cranking Camshaft Test: Continuous every 100 msec Time-Based Camshaft Test: Continuous every 100 msec Fast Event-Based Camshaft Test: Continuous every MEDRES event Slow Event-Based Camshaft Test: 8 failures out of 10 samples	Type B 2 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
				= 0		5VoltReferenceB_FA CrankSensor_FA	Continuous every engine cycle	
Camshaft Position (CMP) Sensor Performance Bank 1 Sensor B (For applications with a bank 1 sensor B CMP sensor)	P0366	Determines if a performance fault exists with the cam position bank 1 sensor B signal	<u>Fast Event-Based Camshaft Test:</u> 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) <u>Slow Event-Based Camshaft Test:</u> The number of camshaft pulses received during 100 engine cycles AND	 < 398 > 402	<u>Fast Event-Based Camshaft Test:</u> 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: <u>Slow Event-Based Camshaft Test:</u> Crankshaft is synchronized No DTC Active:	 5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA 5VoltReferenceA_FA 5VoltReferenceB_FA CrankSensor_FA	<u>Fast Event-Based Camshaft Test:</u> Continuous every MEDRES event <u>Slow Event-Based Camshaft Test:</u> 8 failures out of 10 samples Continuous every engine cycle	Type B 2 trips
Secondary AIR Incorrect Airflow Single Bank Systems (For applications with AIR)	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	Predicted System Pressure versus Actual System Pressure Error OR System Pressure Error while the Average String Length	> 5.0 kPa or < -3.4 kPa > 0.0 kPa or < 0.0 kPa **>SL Threshold Bank 1** Table	BARO Inlet Air Temp Coolant Temp Engine off time System Voltage SL Stability time SL Range **Conditional test weight is calculated by <u>multiplying the following Factors</u> Phase 1 Baro Test Weight Factor Phase 1 MAF Test Weight Factor Phase 1 System Volt Test Weight Factor**	> 60 kPa > 5.0 deg C. > 5.0 deg C. < 60.0 deg C. > 3600.0 seconds > 10.0 OR < 18.0 Volts > 3.0 seconds rpm < 5600 and > 6400	Phase 1 Conditional test weight > 4.0 seconds Total 'String Length' accumulation time > 10 seconds	2 trip(s) Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		pressure data accumulated every 6.25ms, then averaged over the duration of the test. Low SL values are indicative of downstream leaks or blockages.			**Phase 1 Ambient Temp Test Weight Factor**			
				disable **conditions:**	MAP Engine Speed MAF No active DTCs:	< 20 kPa for 2 seconds > 5000 RPM > 50 gm/s for 3 seconds AIRSystemPressureSensor FA AIRValveControlCircuit FA AIRPumpControlCircuit FA MAF_SensorFA MAP_SensorFA IAT_SensorFA ECT_Sensor_FA EngineMisfireDetected_FA CatalystSysEfficiencyLoB1_FA CatalystSysEfficiencyLoB2_FA ControllerProcessorPerf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA IgnitionOutputDriver_FA FuelInjectorCircuit_FA	Frequency: Once per trip when AIR pump commanded On	
Secondary AIR Solenoid Control Circuit (For applications with AIR)	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 < 18.0 Volts	50 failures out of 63 samples 250 ms loop Continuous	2 trip(s) Type B
Secondary AIR Pump Control Circuit (For applications with AIR)	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 < 18.0 Volts	50 failures out of 63 samples 250 ms loop Continuous	2 trip(s) Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Catalyst System Low Efficiency Bank 1	P0420	Oxygen Storage	Normalized Ratio OSC Value (EWMA filtered)	< 0.350	***Valid Idle Period Criteria***		1 test attempted per valid idle period Minimum of 1 test per trip Maximum of 8 tests per trip Frequency: Fueling Related : 12.5 ms OSC Measurements: 100 ms Temp Prediction:	Type A 1 Trip(s)
		The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts			Throttle Position	< 2.00 %		
		The Catalyst Monitoring Test is done during idle. Several conditions			Vehicle Speed	*< 2.00 Kph*		
					Engine speed	> 975 RPM for a minimum of 19 seconds since end of last idle period.		
					Engine run time	> MinimumEngineRunTime**, This is a function of Coolant Temperture, please see Supporting Tables**		
					Tests attempted this trip	< 255		
					The catalyst diagnostic has not yet completed for the ***Catalyst Idle Conditions Met Criteria***			
					General Enable met and the			
					Green Converter Delay	Not Active		
					Induction Air	*-20 < ° C < 250*		
					Intrusive test(s):	Not Active		
					Fueltrim			
					Post O2			
					EVAP			
					EGR			
					RunCrank Voltage	> 10.90 Volts		
					Ethanol Estimation	NOT in Progress		
					ECT	*45 < ° C < 129*		
					Barometric Pressure	> 70 KPA		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Idle Time before going intrusive is	< 50 Seconds		
					Idle time is incremented if Vehicle speed	< 2 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			
					Closed loop fueling Enabled			
					PRNDL			
					Idle Stable Criteria :: Must hold true from after			
					MAF	*4.00 < g/s < 22.00*		
					Predicted catalyst temperature	< 900 degC		
					Engine Fueling Criteria at Beginning of Idle Period			
					The following fueling related must also be met from			
					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			
					If the difference between current EWMA value and the			
					Maximum of 24 RSR tests to detect failure when RSR is			
					Green Converter Delay Criteria			
					This is part of the check for the Catalyst Idle Conditions			
					The diagnostic will not be enabled until the following has			
					Predicted catalyst temperature > 550 ° C for 3600			
					PTO Not Active			
					General Enable			
					DTC's Not Set			
					MAF_SensorFA			
					AmbientAirDefault_SC			
					IAT_SensorCircuitFA			
					ECT_Sensor_FA			
					O2S_Bank_1_Sensor_1_FA			
					O2S_Bank_1_Sensor_2_FA			
					O2S_Bank_2_Sensor_1_FA			
					O2S_Bank_2_Sensor_2_FA			
					FuelTrimSystemB1_FA			
					FuelTrimSystemB2_FA			
					EngineMisfireDetected_FA			
					EvapPurgeSolenoidCircuit_FA			
					IAC_SystemRPM_FA			
					EGRValvePerformance_FA			
					EGRValveCircuit_FA			
					CamSensor_FA			
					CrankSensorFaultActive			
					TPS_Performance_FA			
					EnginePowerLimited			
					VehicleSpeedSensor_FA			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Catalyst System Low Efficiency Bank 2	P0430	Oxygen Storage	Normalized Ratio OSC Value (EWMA filtered)	< 0.350	***Valid Idle Period Criteria***		1 test attempted per valid idle period Minimum of 1 test per trip Maximum of 8 tests per trip Frequency: Fueling Related : 12.5 ms OSC Measurements: 100 ms Temp Prediction:	Type A 1 Trip(s)
		The catalyst washcoat contains Cerium Oxide. Cerium Oxide reacts			Throttle Position	< 2.00 %		
		The Catalyst Monitoring Test is done during idle. Several conditions			Vehicle Speed	*< 2.00 Kph*		
					Engine speed	> 975 RPM for a minimum of 19 seconds since end of last idle period.		
					Engine run time	>= MinimumEngineRunTime**, This is a function of Coolant Temperture, please see Supporting Tables**		
					Tests attempted this trip	< 255		
					The catalyst diagnostic has not yet completed for the ***Catalyst Idle Conditions Met Criteria***			
					General Enable met and the			
					Green Converter Delay	Not Active		
					Induction Air	*-20 < ° C < 250*		
					Intrusive test(s):	Not Active		
					Fueltrim			
					Post O2			
					EVAP			
					EGR			
					RunCrank Voltage	> 10.90 Volts		
					Ethanol Estimation	NOT in Progress		
					ECT	*45 < ° C < 129*		
					Barometric Pressure	> 70 KPA		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Idle Time before going intrusive is	< 50 Seconds		
					Idle time is incremented if Vehicle speed	< 2 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			
					Closed loop fueling Enabled			
					PRNDL			
					Idle Stable Criteria :: Must hold true from after			
					MAF	*4.00 < g/s < 22.00*		
					Predicted catalyst temperature	< 900 degC		
					Engine Fueling Criteria at Beginning of Idle Period			
					The following fueling related must also be met from			
					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			
					If the difference between current EWMA value and the			
					Maximum of 24 RSR tests to detect failure when RSR is			
					Green Converter Delay Criteria			
					This is part of the check for the Catalyst Idle Conditions			
					The diagnostic will not be enabled until the following has			
					Predicted catalyst temperature > 550 ° C for 3600			
					PTO Not Active			
					General Enable			
					DTC's Not Set			
					MAF_SensorFA			
					AmbientAirDefault_SC			
					IAT_SensorCircuitFA			
					ECT_Sensor_FA			
					O2S_Bank_1_Sensor_1_FA			
					O2S_Bank_1_Sensor_2_FA			
					O2S_Bank_2_Sensor_1_FA			
					O2S_Bank_2_Sensor_2_FA			
					FuelTrimSystemB1_FA			
					FuelTrimSystemB2_FA			
					EngineMisfireDetected_FA			
					EvapPurgeSolenoidCircuit_FA			
					IAC_SystemRPM_FA			
					EGRValvePerformance_FA			
					EGRValveCircuit_FA			
					CamSensor_FA			
					CrankSensorFaultActive			
					TPS_Performance_FA			
					EnginePowerLimited			
					VehicleSpeedSensor_FA			
Evaporative Emission	P0442	This DTC will detect a small leak	The total delta from peak		Fuel Level	10 % ≤ Percent ≤ 90 %	Once per trip,	1 trip

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
(EVAP) System Small Leak Detected		(≥ 0.020") in the EVAP system between the fuel fill cap and the purge solenoid. The engine off natural vacuum method (EONV) is used. EONV is an evaporative system leak detection diagnostic that runs when the vehicle is shut off when enable conditions are met. Prior to sealing the system and performing the diagnostic, the fuel volatility is analyzed. In an open system (Canister Vent Solenoid [CVS] open) high volatility fuel creates enough flow to generate a measurable pressure differential relative to atmospheric. After the volatility check, the vent solenoid will close. After the vent is closed, typically a build up of pressure from the hot soak begins (phase-1). The pressure typically will peak and then begin to decrease as the fuel cools. When the pressure drops (-62.27) Pa from peak pressure, the vent is then opened for 60 seconds to normalize the system pressure. The vent is again closed to begin the vacuum portion of the test (phase-2). As the fuel temperature continues to fall, a vacuum will begin forming. The vacuum will continue until it reaches a vacuum peak. When the pressure rises 62.27 Pa from vacuum peak, the test then completes. If the key is turned on while the diagnostic test is in progress, the test will abort.	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). When EWMA is , the DTC light is illuminated. The DTC light can be turned off if the EWMA is and stays below the EWMA fail threshold for 2 additional consecutive trips.	> 0.51 (EWMA Fail Threshold) ≤ 0.35 (EWMA Re-Pass Threshold)	Drive Time Drive length ECT Baro Odometer Time since last complete test if normalized result and EWMA is passing OR Time since last complete test if normalized result or EWMA is failing Estimated ambient temperature at end of drive Estimate of Ambient Air Temperature Valid	≥ 600 seconds ≥ 3.1 miles ≥ 70 °C ≥ 70 kPa ≥ 10.0 miles ≥ 17 hours ≥ 10 hours 0 °C ≤ Temperature ≤ 34 °C	during hot soak (up to 2400 sec.). No more than 2 unsuccessful attempts between completed tests.	Type A EWMA Average run length is 7 under normal conditions Run length is 2 to 6 trips after code clear or non-volatile reset
					Conditions for Estimate of Ambient Air Temperature			
					1. Cold Start Startup delta deg C (ECT-IAT) OR **2. Short Soak and Previous EAT Valid** Previous time since engine off OR **3. Not a Cold Start and Previous EAT Valid and** Previous time since engine off AND Must expire Estimate of Ambient Temperature Valid Conditioning Time. **Please see "P0442: Estimate of Ambient Temperature Valid Conditioning Time" in Supporting Tables Tab.** **4. Not a Cold Start and Previous EAT Not Valid and**	≤ 8 °C ≤ 7200 seconds 7200 seconds < Time < 25200 seconds Vehicle Speed ≥ 19.3 mph AND Mass Air Flow ≥ 0 g/sec		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Previous time since engine off AND Must expire maximum value in Estimate of Ambient Temperature Valid Conditioning Time. **Please see "P0442: Estimate of Ambient Temperature Valid Conditioning Time" in Supporting Tables Tab.** OR **5. Long Soak** Previous time since engine off	< 25200 seconds Vehicle Speed ≥ 19.3 mph AND Mass Air Flow ≥ 0 g/sec ≥ 25200 seconds		
				Abort Conditions:	**1. High Fuel Volatility** During the volatility phase, pressure in the fuel tank is integrated vs. time. If the integrated pressure is then test aborts and unsuccessful attempts is incremented. OR **2. Vacuum Refueling Detected** See P0454 Fault Code for information on vacuum refueling algorithm. OR **3. Fuel Level Refueling Detected** See P0464 Fault Code for information on fuel level refueling. 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 0.50 seconds		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					OR **7. Key up during EONV test** No active DTCs:	 FuelLevelDataFault MAF_SensorFA ECT_Sensor_FA IAT_SensorFA VehicleSpeedSensor_FA IgnitionOffTimeValid AmbientAirDefault P0443 P0446 P0449 P0452 P0453 P0455 P0496		
Evaporative Emission (EVAP) Canister Purge Solenoid Valve Circuit (ODM)	P0443	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage	11 volts ≤ Voltage ≤ 18 volts	20 failures out of 25 samples 250 ms /sample Continuous with solenoid operation	2 trips Type B
Evaporative Emission (EVAP) Vent System Performance	P0446	This DTC will determine if a restriction is present in the vent solenoid, vent filler, vent hose or EVAP canister. This test runs with normal purge and vent valve is open.	Vent Restriction Prep Test: Vented Vacuum or Vented Vacuum for 60 seconds Vent Restriction Test: Tank Vacuum for 5 seconds BEFORE Purge Volume 2 liters of fuel must be consumed after setting the DTC active the first time to set the DTC active the	 < -623 Pa > 1245 Pa > 2989 Pa ≥ 10 liters	Fuel Level System Voltage Startup IAT Startup ECT BARO No active DTCs:	10% ≤ Percent ≤ 90% 11 volts ≤ Voltage ≤ 18 volts 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C ≥ 70 kPa MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443	Once per Cold Start Time is dependent on driving conditions Maximum time before test abort is 1000 seconds	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			second time.			P0449 P0452 P0453 P0454		
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 ≤ 18 volts	20 failures out of 25 samples 250 ms / sample Continuous with solenoid operation	2 trips Type B
Fuel Tank Pressure (FTP) Sensor Circuit Performance	P0451	The DTC will be set if the fuel tank vacuum sensor is out of range when it tries to re-zero prior to the phase-1 or phase-2 portions of the engine-off natural vacuum small leak test.	The tank vacuum sensor voltage is compared to a window about the nominal sensor voltage offset (~1.5 volts) Upper voltage threshold (voltage addition above the nominal voltage) Lower voltage threshold (voltage subtraction below the nominal voltage) The difference between tank vacuum sensor voltage and the nominal offset voltage is then normalized against the appropriate threshold listed above to produce a ratio between 0.0 and 1.0. This normalized re-zero ratio is then filtered with a EWMA (with 0= perfect pass and 1=perfect fail). When EWMA is , the DTC light is illuminated. The DTC light can be turned off if the EWMA is and stays below the EWMA fail	0.2 volts 0.2 volts > 0.73 (EWMA Fail Threshold) ≤ 0.40 (EWMA Re-Pass Threshold)	This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off natural vacuum small leak test. The number of times that it executes can range from zero to two per engine-off period. The length of the test is determined by the refueling rationality test, which can take up to 600 seconds to complete.	1 trip Type A EWMA Average run length: 6 Run length is 2 trips after code clear or non-volatile reset

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			threshold for 2 additional consecutive trips.					
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	2 trips Type B
Fuel Tank Pressure (FTP) Sensor Circuit High Voltage	P0453	This DTC will detect a fuel tank pressure sensor signal that is too high out of range.	Fuel tank pressure sensor signal The normal operating range of the fuel tank pressure sensor is 0.5 volts (~1245 Pa) to 4.5 volts (~ -3736 Pa).	> 4.85 volts (97% of Vref or ~ -4172 Pa)	Time delay after sensor power up for sensor warm-up ECM State ≠ crank	is 0.10 seconds	80 failures out of 100 samples 100 ms / sample Continuous	2 trips Type B
Fuel Tank Pressure (FTP) Sensor Circuit Intermittent	P0454	This DTC will detect intermittent tank vacuum sensor signals that would have caused the engine-off natural vacuum small leak test to abort due to an apparent re-fueling event.	If an abrupt change in tank vacuum is detected the engine-off natural vacuum test is aborted due to an apparent refueling event. Subsequent to the abort, a refueling rationality test is executed to confirm that a refueling event occurred. If a refueling is confirmed, then the test sample is considered passing. Otherwise, the sample is considered failing indicating an intermittent signal problem. The abrupt change is defined as a change in vacuum: in the span of 1.0 seconds. A refueling event is confirmed if the fuel level has a persistent change	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 1 out of 3 samples are failures.	1 trips Type A

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			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. <u>Weak Vacuum Follow-up Test</u> (fuel cap replacement test) Weak Vacuum Test failed. Passes if tank vacuum Note: Weak Vacuum Follow-up Test can only report a pass.	> 14 liters ≤ 2740 Pa ≥ 2740 Pa	Fuel Level System Voltage BARO No active DTCs: <u>Cold Start Test</u> If ECT > IAT, Startup temperature delta (ECT-IAT): Cold Test Timer Startup IAT Temperature Startup ECT <u>Weak Vacuum Follow-up Test</u> This test can run following a weak vacuum failure or on a hot restart.	10% ≤ Percent ≤ 90% 11 volts ≤ Voltage ≤ 18 volts ≥ 70 kPa MAP_SensorFA TPS_FA VehicleSpeedSensor_FA IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454 ≤ 8 °C ≤ 1000 seconds 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C	Once per cold start Time is dependent on driving conditions Maximum time before test abort is 1000 seconds <u>Weak Vacuum Follow-up Test</u> With large leak detected, the follow-up test is limited to 1300 seconds. Once the MIL is on, the follow-up test runs indefinitely.	2 trips Type B
Fuel Level Sensor 1 Performance	P0461	This DTC will detect a fuel sender stuck in range in the primary fuel tank.	Delta Fuel Volume change over an accumulated 150 miles.	< 3 liters	Engine Running No active DTCs:	 VehicleSpeedSensor_FA	250 ms / sample Continuous	2 trips Type B
Fuel Level Sensor 1 Performance (For use on vehicles with electric transfer pump dual fuel tanks)	P0461	This DTC will detect a fuel sender stuck in range in the primary fuel tank.			Engine Running No active DTCs:	 VehicleSpeedSensor_FA	250 ms / sample Continuous	2 trips Type B
			Fuel Level in Primary 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	>= 1024.0 liters < 0.0 liters 124 miles				

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			OR					
			During fuel tranfer					
			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 transfered into the primary tank within 0 seconds. There is a short delay of 0 seconds to allow fuel slosh to settle before the fail timer		Transfer Pump is commanded on No device control for the transfer pump Fuel Volume in Secondary Tank Vehicle Speed	 < 10 liters < 0 kph		
			OR					
			Distance Traveled without a Primary Fuel Level Change					
			Delta Fuel Volume change over an accumulated 150 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	2 trips Type B
			Fuel Level in Primary Tank Remains in an Unreadable Range too Long					
			If fuel volume in primary tank is AND Fuel volume in secondary tank and remains in this condition for OR	>= 1024.0 liters < 0.0 liters 124 miles				
			After Refuel Event					
			If the secondary fuel volume changes by 20.0 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	 < 1024.0 liters		
			Distance Traveled without a Primary Fuel Level Change					
			Delta Fuel Volume change over an accumulated 150 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 ≤ 18 volts	180 failures out of 225 samples 100 ms / sample Continuous	2 trips Type B
Fuel Level Sensor 1 Circuit High Voltage	P0463	This DTC will detect a fuel sender stuck out ofrange high in the primary fuel tank.	Fuel level Sender % of 5V range	> 60 %	Run/Crank Voltage	11 volts ≤ Voltage ≤ 18 volts	180 failures out of 225 samples 100 ms / sample Continuous	2 trips Type B
Fuel Level Sensor 1 Circuit Intermittent	P0464	This DTC will detect intermittent fuel level sensor signals that would have caused the engine-off	If a change in fuel level is detected, the engine-off natural vacuum test is aborted due to an		This test will execute whenever the engine-off natural vacuum small leak test (P0442) executes		This test is executed during an engine-off natural	1 trip Type A

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		natural vacuum small leak test to abort due to an apparent re-fueling event.	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. An intermintant change in fuel level is defined as: The fuel level changes and does not remain for 30 seconds during a 600 second refueling rationality test.	 by 10 % > 10 %			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 1 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 ≤ 18 volts ≥ 400 RPM	20 failures out of 25 samples 100 ms / sample Continuous with fan operation	2 trips Type B
Cooling Fan 1 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 ≤ 18 volts ≥ 400 RPM	20 failures out of 25 samples 100 ms / sample Continuous with fan operation	2 trips Type B
Evaporative Emission (EVAP) System Flow During Non-Purge	P0496	This DTC will determine if the purge solenoid is leaking to engine manifold vacuum. This test will run with the purge valve closed and the vent valve closed.	Tank Vacuum for 5 seconds BEFORE Test time	> 2491 Pa ≥ refer to "P0496: Purge Valve Leak Test Engine Vacuum Test Time (Cold Start) as a Function of Fuel Level table" in Supporting Tables Tab.	Fuel Level System Voltage BARO Startup IAT Temperature Startup ECT Engine Off Time No active DTCs:	10% ≤ Percent ≤ 90% 11 volts ≤ Voltage ≤ 18 volts ≥ 70 kPa 4 °C ≤ Temperature ≤ 30 °C ≤ 35 °C ≥ 28800.0 seconds MAP_SensorFA	Once per cold start Cold start: max time is 1000 seconds	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						TPS_FA VehicleSpeedSensor_FA IAT_SensorCircuitFA ECT_Sensor_FA AmbientAirDefault EnginePowerLimited P0443 P0449 P0452 P0453 P0454		
Transmission Output Speed Sensor (TOSS) (Manual trans only)	P0502	No activity in the TOSS circuit	TOSS Raw Speed	<= 60 RPM			>= 4.5 sec	Type B 2 trips
					Maximum Engine Torque	<= 8192 N-m		
					Minimum Engine Torque	>= 68 N-m		
					Maximum Engine Torque in Park or Neutral	<= 8192 N-m		
					Minimum Engine Torque in Park or Neutral	>= 90 N-m		
					Minimum Throttle opening	>= 8 % TPS		
					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	>= -40 º 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	<= 18 volts		
					Minimum Ignition Voltage	>= 11 volts		
				Disable Conditions:	Disables on these Pcodes:	EngineTorqureInaccurate MAF_SensorTFTKO MAP_SensorTFTKO P0503		
Transmission Output Speed Sensor (TOSS) (Manual trans only)	P0503	TOSS Signal Intermittent	Loop-to-Loop change in TOSS	>= 350 RPM			>= 4.5 sec	Type B 2 trips
					Loop-to-Loop Input Speed Change	<= 500 RPM		
					Raw Output Speed	>= 300 RPM		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Output Speed change Time for Input Speed Change Time since Range Change Time for Positive Output Speed Change Time above raw Output Speed Time since 4WD Range change Maximum Ignition Voltage Minimum Ignition Voltage Minimum Engine Torque Minimum Engine Speed Maximum TCC slip Minimum TCC slip Minimum Throttle position Minimum Vehicle speed Minimum Throttle position Minimum Vehicle speed	<= 150 RPM >= 2 sec >= 6 sec >= 2 sec >= 2 sec >= 6 sec <= 18 volts >= 11 volts >= 75 N-m >= 1000 RPM <= 4096 RPM >= -4096 RPM >= 8% TPS >= 10 km/hr >= 8.0 % >= 10 km/hr		
Low Engine Speed Idle System	P0506	This DTC will determine if a low idle exists	Filtered Engine Speed Error filter coefficient	< 91.00 rpm 0.003	Baro Coolant Temp Engine run time Ignition voltage Time since gear change Time since a TCC mode change IAT Vehicle speed Commanded RPM delta Idle time No active DTCs	> 70 kPa > 60 °C ≥ 60 sec 18 ≥ volts ≥ 11 ≥ 3 sec > 3 sec > -20 °C ≤ 2 mph ≤ 25 rpm > 10 sec PTO not active Transfer Case not in 4WD LowState Output control state normal Output control state instrumentation AmbientAirDefault ECT_Sensor_FA EngCoolHot EGRValveCircuit_FA EGRValvePerformance_FA IAT_SensorCircuitFA	Diagnostic runs in every 12.5 ms loop Diagnostic reports pass or fail in 10 sec once all enable conds are met	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						EvapFlowDuringNonPurge_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA FuelInjectorCircuit_FA MAF_SensorFA EngineMisfireDetected_FA IgnitionOutputDriver_FA EnginePowerLimited TPS_FA TPS_Performance_FA VehicleSpeedSensor_FA FuelLevelDataFault LowFuelConditionDiagnostic ClchPstnEmisFA ClchToT_TypedABC		
High Engine Speed Idle System	P0507	This DTC will determine if a high idle exists	Filtered Engine Speed Error filter coefficient	> -182.00 rpm 0.003	Baro Coolant Temp Engine run time Ignition voltage Time since gear change Time since a TCC mode change IAT Vehicle speed Commanded RPM delta Idle time No active DTCs	> 70 kPa > 60 °C ≥ 60 sec 18 ≥ volts ≥ 11 ≥ 3 sec > 3 sec > -20 °C ≤ 2 mph ≤ 25 rpm > 10 sec PTO not active Transfer Case not in 4WD LowState Output control state normal Output control state instrumentation AmbientAirDefault ECT_Sensor_FA EngCoolHot EGRValveCircuit_FA	Diagnostic runs in every 12.5 ms loop Diagnostic reports pass or fail in 10 sec once all enable conds are met	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						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 ClchPstnEmisFA ClchToT_TypedABC		
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 difference between measured EOP and predicted EOP (a function of engine speed and engine oil temp.): **To pass a currently failing test:** The filtered difference between measured EOP and predicted EOP (a function of engine speed and engine oil temp.):	> 0 kPa and (< -50 kPa OR > 50 kPa) > 0 kPa and (> -47 kPa AND < 47 kPa)	Diagnostic enabled/disabled Oil Pressure Sensor In Use 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) No active DTC's	Enabled Present >= 0 ratio Fault bundles: CrankSensorFA ECT_Sensor_FA MAF_SensorFA IAT_SensorFA	Performed every 100 msec	2 trip(s) Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						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 <= 18.0 V and >= 11.0 No Enabled	50 failures out of 63 samples Performed every 100 msec	2 trip(s) Type B
Engine Oil Pressure (EOP) Sensor Circuit High Voltage	P0523	Determines if the Engine Oil Pressure (EOP) Sensor circuit voltage is too high	(Engine Oil Pressure Sensor Circuit Voltage) / 5	> 85 percent	Engine Running Ignition Voltage Sensor Present Diagnostic enabled/disabled	= True <= 18.0 V and >= 11.0 No Enabled	204 failures out of 255 samples Performed every 100 msec	2 trip(s) Type B
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 seconds <= 18.0 V and >= 11.0 > 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	2 trip(s) Type B
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	2 trip(s) Type B
Brake Booster Pressure Sensor Circuit High Voltage	P0558	Determines if the Brake Booster Pressure Sensor circuit voltage is	(Brake Booster Pressure Sensor Voltage) / 5 Volts		Brake booster diagnostic enabled/disabled		2000 failures out of 2400 samples	2 trip(s)

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
(AFM applications only)		too high		> 87.0 percent	Brake booster pressure sensor present	Enabled Yes	Performed every 12.5 msec	Type B
Cruise Control Mutil-Functon Switch Circuit	P0564	Detect when cruise control multi-function switch circuit (analog) voltage is in an illegal range	Cruise Control analog circuit voltage must be in an "illegal range" for greater than a calibratable period of time for cruise switch states 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	Type: C MIL: NO Trips: 1 "Special Type C"
		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 continously for greater than 0.750 seconds	
Cruise Control Resume Circuit	P0567	Detects a failure of the cruise resume switch in a continously applied state	Cruise Control Resume switch remains applied for greater than a calibratable period of time for architecture where cruise switch states are received over serial data			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	Type: C "Special Type C" MIL: NO
			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	Trips: 1

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Cruise Control Set Circuit	P0568	Detects a failure of the cruise set switch in a continously applied state	Cruise Control Set switch remains applied for greater than a calibratable period of time for architecture where cruise switch states are received over serial data			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	Type: C "Special Type C" MIL: NO Trips: 1
			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	
Cruise Control Input Circuit	P0575	Detects rolling count or protection value errors in Cruise Control Switch Status serial data signal	If x of y rolling count / protection value faults occur, disable cruise for duration of fault			Switch architecture CeCRZG_e_CAN is CAN, DTC enable cal 1 is TRUE	10/16 counts	Type: C "Special Type C" MIL: NO Trips: 1
Control Module Read Only Memory (ROM)	P0601	This DTC will be stored if the calibration check sum is incorrect	Output state invalid		PCM State	= crank or run	Diagnostic runs continuously in the background Diagnostic reports a fault if 1 failure occurs on the first pass. Diagnostic reports a fault if 5 failures occur after the first pass is complete.	Type A 1 trips
Control Module Not Programmed	P0602	This DTC will be stored if the PCM is a service PCM that has not been programmed.	Output state invalid		PCM State	= crank or run PCM is identified	Diagnostic runs at powerup	Type A 1 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						through calibration as a Service PCM		
Control Module Long Term Memory Reset	P0603	Non-volatile memory checksum error at controller power-up	Checksum at power-up does not match checksum at power-down				Diagnostic runs at powerup 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:
			2. Secondary processor battery backed RAM failed checksum twice for original values at power up and the defaulted values				2. Completion at intilization, <500 ms	A
			3. Secondary processor copy of calibration area to RAM failed for a count >	2counts			3. Completion at intilization, <500 ms	MIL:
			4. Secondary Processor data pattern written doesn't match the pattern read consecutive times				4. Will finish within 30 seconds at all engine conditions.	YES
			5. Secondary Processor TPS or APPS minimum learned values fail compliment check continuouslv				5. 0.0625sec continuous	Trips: 1
ECM Processor 1. Processor Performance Check - Throttle limiting Fault	P0606	Indicates that the ECM has detected an internal processor integrity fault	When drag is active Secondary processor detects Primary's calculated throttle position is greater > than Secondary Processor calculated Throttle Position by	0.00%		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	1. 0.1875sec in the Secondary Processor	Type: A MIL: YES Trips: 1

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			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	8.41%				
			Secondary processor detects Primary's calculated throttle position is greater > than Secondary's calculated Throttle Position when reduce engine power is active by	38.25%				
2. Processor Performance Check - ETC software is not executed or it is not executed in in proper order			Software tasks on the Primary Processor in the 12.5 ms loop were not executed or were not executed in the correct order.	0.0625sec continuous		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	2. 0.0625sec continuous	
			Software tasks on the Primary Processor in the 25 ms loop were not executed or were not executed in the correct order.	0.1250sec continuous			0.1250sec continuous	
			Software tasks on the Primary Processor in the 50 ms loop were not executed or were not executed in the correct order.	0.2500sec continuous			0.2500sec continuous	
			Software tasks on the Primary Processor in the 100 ms loop were not executed or were not executed in the correct order.	0.5000sec continuous			0.5000sec continuous	
			Software tasks on the Primary Processor in the 250 ms loop were not executed or were not executed in the correct order.	1.2500sec continuous			1.2500sec continuous	
			The first completion of the RAM diagnostic on the Primary Processor was completed > the amount of time	360.0000sec continuous			360.0000sec continuous	
			The first completion of the ROM diagnostic on the Primary Processor was completed > the amount of time	360.0000sec continuous			360.0000sec continuous	
			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 recieved by the Primary Processor			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	In the primary processor, 159/400 counts intermittent or 15 counts continuous; 39 counts continuous @ initialization In the secondary processor 0.4750sec at initialization, 0.1750sec continuous or 20/200 intermittent.	
			Loss or invalid message of SPI communication from the Primary Processor at initialization detected by the Secondary Processor or loss or invalid message of SPI communication from the Primary Processor after a valid message was recieved by the Secondary Processor					
4. Processor Performance Check - Secondary Processor state of health (Main)			Primary processor check of the secondary processor by verifing the hardware line toggle between the two processors toggles within the threshold values	9.3750sec and 15.6250sec		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	9counts continuous at initialization or 9 counts continuous; 12.5 msec /count in the Primary processor	
5. Processor Performance Check - Primary Processor Learn Corruption Fault			Primary Processor TPS or APPS minimum learned values fail compliment check			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	0.1000sec continuous	
6. Processor Performance Check - Primary Processor Clock Fault			The ocillator failed for the Primary processor where the clock is outside the threshold	27.85 kHz and 37.68 kHz		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	100ms continuous	
9. Processor Performance Check - Secondary Processor ALU Fault			The secondary check of the ALU failed to compute the expected result			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	12.5ms continuous	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
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 hasen't set a select combination of internal processor faults			Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	12.5ms continuous	
13. Processor Performance Check - Primary Processor ALU Fault			The primary processor check of the ALU failed to compute the expected result	Two Consecutive Times			12.5ms continuous	
14. Processor Performance Check - Primary Processor Register Configuration Fault			Primary processor failed configuration check of the registers.				12.5ms continuous	
Vehicle Speed Output Circuit 2 (ODM)	P0609	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 ≤ 18 volts	100 failures out of 120 samples 250 ms /sample Continuous with solenoid operation	2 trips Type B
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.	Consecutive checks within 200ms or 2/2 counts; 175msec/count	Type: A MIL: YES

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)		Trips:
			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 MAIN Pedal Sync Error is FALSE Engine Running TPS minimum learn is not active Diagnostic is enabled (Only applicable for Legacy accelerator pedals)	44/40 counts or 39 counts continuous; 12.5 msec/count in the Secondary processor	1
Control Module EEPROM Error	P062F	Indicates that the NVM Error flag has not been cleared	Last EEPROM write did not complete		Ignition State	= unlock/accesory, run, or crank	1 test failure Diagnostic runs once at powerup	Type A 1 trips
5 Volt Reference #1 Circuit	P0641	Detects a continuous or intermittent short on th 5 volt reference circuit #1	Primary Processor Vref1 <	4.432		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
			Primary Processor Vref1 >	4.659				
			Secondary Processor Vref1 < Secondary Processor Vref1 >	4.432 4.659			19/39 counts or 15 counts continuous; 12.5 msec/count in Secondary processor	MIL: YES Trips: 1
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 ≤ 18 volts	20 failures out of 25 samples 250 ms / sample Continuous	2 trip Type B NO MIL

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
5 Volt Reference #2 Circuit	P0651	Detects a continuous or intermittent short on th 5 volt reference circuit #2	Primary Processor Vref2 < or Primary Processor Vref2 > Secondary Processor Vref1 < Secondary Processor Vref1 >	4.432 4.659 4.432 4.659		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	19/39 counts or 0.1875sec continuous; 12.5 msec/count in main /Secondary processor 19/39 counts or 15 counts continuous; 12.5 msec/count in Secondary processor	Type: A MIL: YES Trips: 1
Powertrain Relay Control (ODM)	P0685	This DTC checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Run/Crank Voltage	11 volts ≤ Voltage ≤ 18 volts	8 failures out of 10 samples 250 ms / sample Continuous	2 trips Type B
Powertrain Relay Feedback Circuit High	P0690	This DTC is a check to determine if the Powertrain relay is functioning properly.	PT Relay feedback voltage is Stuck Test: PT Relay feedback voltage is when commanded 'OFF'	≥ 18 volts > 2 volts	Powertrain relay commanded "ON" No active DTCs:	PowertrainRelayStateOn Error	5 failures out of 6 samples 1second / sample Stuck Test: 100 ms/ sample Continous failures ≥ 2 seconds	2 trips Type B
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 trips MIL: NO
Transmission Control Module (TCM) Requested MIL Illumination	P0700	Monitors the TCM MIL request line to determine when the TCM has detected a MIL illuminating fault.	Transmission Emissions-Related DTC set			Time since power-up > 3 seconds	Continuous	Type A 1 trips MIL: NO

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Skip Shift Solenoid Control Circuit (Manual Transmission Only)	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	2 trips Type B
Clutch Pedal Position Sensor Circuit Range / Performance (Manual Transmission Only)	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	1 trip(s) Type A
Clutch Pedal Position Sensor Circuit Low (Manual Transmission Only)	P0807	Detects Continuous Circuit Short to Low or Open	Clutch Position Sensor Circuit	< 4 % of Vref disable conditions:	Engine Not Cranking System Voltage No active DTCs:	< 10.0 Volts 5VoltReferenceB_FA	200 failures out of 250 samples 25 ms loop Continuous	1 trip(s) Type A
Clutch Pedal Position Sensor Circuit High (Manual Transmission Only)	P0808	Detects Continuous Circuit Short toHigh	Clutch Position Sensor Circuit	> 96 % of Vref disable conditions:	Engine Not Cranking System Voltage No active DTCs:	< 10.0 Volts 5VoltReferenceB_FA	200 failures out of 250 samples 25 ms loop Continuous	1 trip(s) Type A
Clutch Pedal Position Not Learned (Manual Transmission Only)	P080A	Monitor for Valid Clutch Pedal Fully Applied Learn Position values	Fully Applied Learn Position OBD Manufacturer Enable Counter	= 0 = 0	Clutch Pedal Position Not Learned		250 ms loop Continuous	1 trip(s) Type A
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 $1C9 or $1C7 for PPEI3)	Message <> 2's complement of	**All except Class2 with PWM:** Serial communication to EBTCM (U0108) Power Mode	No loss of communication = Run	**All except Class2 PWM:** Count of 2's complement values not equal	1 trip(s) Type C "Special Type C"

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			OR Serial Communication message ($140 for PPEI2 or $1C9 or $1C7 for PPEI3) rolling count value	message Message rolling count value <> previous message rolling count value plus one	Engine Running Status of traction in GMLAN message ($380 for PPEI2 or $4E9 for PPEI3)	= True = Traction Present	>= 10 **OR** 10 rolling count failures out of 10 samples Performed every 25 msec	
			with PWM: PWM Duty cycle **OR** PWM Duty cycle	< 5 Pct > 95 Pct	**Only Class2 with PWM:** Traction Status for PWM ($2B3C Class2 message) Engine Run Time	= Traction Present > 2 Seconds	**Only Class2 with PWM:** 12 failures out of 30 samples Performed every 50 msec	
Inlet Airflow System Performance (naturally aspirated applications)	P1101	Determines if there are multiple air induction problems affecting airflow and/or manifold pressure.	Filtered Throttle Model 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	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:	on RPM MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM See table "IFRD Residual Weighting Factors". MAP_SensorCircuitFA EGRValve_FP EGRValvePerformance_FA MAF_SensorCircuitFA CrankSensorFA ECT_sensor_FA ECT_Sensor_FP IAT_SensorFA IAT_SensorCircuitFP CylDeacSystemTFTKO		
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. Filtered Throttle Model AND ABS(Measured Flow – Modeled Air Flow) Filtered AND ABS(Measured MAP – MAP Model 1) Filtered AND	> 300 kPa/(g/s) > 10 grams/sec > 15.0 kPa	Engine Speed Engine Speed Coolant Temp Coolant Temp Intake Air Temp Intake Air Temp Minimum total weight factor (all factors multiplied together)	>= 450 RPM <= 8000 RPM > -7 Deg C < 125 Deg C > -7 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	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.
			ABS(Measured MAP – MAP Model 2) Filtered AND ABS(Measured SCIAP – SCIAP Model 1) Filtered AND ABS(Measured SCIAP – SCIAP Model 2) Filtered	> 15.0 kPa > 15.0 kPa > 15.0 kPa		Factor Based on MAF Estimate 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 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 Supercharged		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						Factors Supercharged Applications". 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 If Slope Time L/R or R/L Switches are below the threshold.	H/C L/R switches < Threshold, or H/C R/L switches < Threshold, (refer to table named "P1133 - O2S HC L to R Switches Limit Bank 1 Sensor 1" Pass/Fail Threshold table & "P1133 - O2S HC R to L Switches Limit Bank 1 Sensor 1" Pass/Fail Threshold table in Supporting tables tab) OR S/T L/R switches < 3, or S/T R/L switches < 3	No Active DTC's	TPS_ThrottleAuthority Defaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA EthanolCompositionSensor_FA	Sample time is 70 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	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						EngineMisfireDetected_FA	(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< 18.0 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		
					Fuel	< 92 % 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		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
O2S Insufficient Switching Bank 2 Sensor 1	P1153	This DTC determines if the O2 sensor is no longer sufficiently switching.	Fault condition present if Half Cycle L/R or R/L Switches are below the threshold. OR If Slope Time L/R or R/L Switches are below the threshold.	H/C L/R switches < Threshold, or H/C R/L switches < Threshold, (refer to table named "P1153 - O2S HC L to R Switches Limit Bank 2 Sensor 1" Pass/Fail Threshold table & "P1153 - O2S HC R to L Switches Limit Bank 2 Sensor 1" Pass/Fail Threshold table in Supporting tables tab) OR S/T L/R switches < 3, or S/T R/L switches < 3	No Active DTC's Bank 2 Sensor 1 DTC's not active System Voltage EGR Device Control Idle Device Control Fuel Device Control AIR Device Control Low Fuel Condition Diag Green O2S Condition O2 Heater on for Learned Htr resistance Engine Coolant IAT Engine Run Time Time since any AFM status change Time since Purge On to Off change Time since Purge Off to On change	TPS_ThrottleAuthority Defaulted MAP_SensorFA IAT_SensorFA ECT_Sensor_FA AmbientAirDefault MAF_SensorFA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSnsrCkt_FA FuelInjectorCircuit_FA AIR System FA EthanolCompositionSensor_FA EngineMisfireDetected_FA = P0151, P0152 or P0154 10.0 volts < system voltage< 18.0 volts = Not active = Not active = Not active = Not active = False = Not Valid >= 40 seconds = Valid > 60 ºC > -40 ºC > 160 seconds > 0.0 seconds > 0.0 seconds > 0.0 seconds	Sample time is 70 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	2 trips Type B

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	< 92 % 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 not = Power		
					Fuel Control State	Enrichment		
					Fuel State	DFCO not active		
					Commanded Proportional Gain	>= 0.0 %		
					All of the above met for Time	> 3.5 seconds		
Air Fuel Imbalance Bank 1	P1174	Determines if the air-fuel delivery system is imbalanced by monitoring the pre-catalyst O2 sensor voltage characteristics	The Bank 1 AFIM Filtered Length Ratio variable exceeds a value of	> 0.500	System Voltage	*10 < V < 18 for > 4 seconds*	Frequency: Continuous Monitoring of O2 voltage signal in 12.5ms loop	Type B 2 Trip(s)
					Engine Run Time	> 5 seconds	AFIM Filtered Length Ratio variable is updated after every 3 seconds of valid data	
					ECT	> -20 oC		
					Engine speed	*425 < rpm < 6000*		
					Mass Airflow	*25 < g/s < 510*		
					PerCent Ethanol	< 85 %		
					Delta O2 voltage during previous 12.5ms	> 5 and -5		
					O2 sensor switches	> 0 times during current 3 second sample period		
					Quality Factor	> 0 in the current operating region		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					For DoD equipped vehicles only	No DoD state change during current 3 second sample period.		
					The AFIM Filtered Length Ratio is determined by The first report is delayed for 10 seconds to allow time for **Closed Loop fueling enabled** Fuel System Status	***LONG FT Enabled***		
					Disable Conditions: EngineMisfireDetected_FA MAP_SensorFA MAF_SensorFA ECT_Sensor_FA Ethanol Composition Sensor FA TPS_ThrottleAuthorityDefaulted FuelInjectorCircuit_FA AIR System FA O2S_Bank_1_Sensor_1_FA O2S_Bank_2_Sensor_1_FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSensorCircuit_FA			
					Device Control Intrusive Diagnostics Engine OverSpeed Protection Reduced Power Mode (ETC DTC)	**Not Active** **Not Active** **Not Active** **Not Active**		
					PTO Traction Control	**Not Active** **Not Active**		
Air Fuel Imbalance Bank 2	P1175	Determines if the air-fuel delivery system is imbalanced by monitoring the pre-catalyst O2 sensor voltage characteristics	The Bank 2 AFIM Filtered Length Ratio variable exceeds a value of	> 0.500	System Voltage	*10 < V < 18 for > 4 seconds*	Frequency: Continuous Monitoring of O2 voltage signal in 12.5ms loop	Type B 2 Trip(s)
					Engine Run Time	> 5 seconds	AFIM Filtered Length Ratio variable is updated after every 3 seconds of valid data	
					ECT Engine speed Mass Airflow PerCent Ethanol	> -20 oC *425 < rpm < 6000* *25 < g/s < 510* < 85 %		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Delta O2 voltage during previous 12.5ms	> 5 and -5		
					O2 sensor switches	> 0 times during current 3 second sample period		
					Quality Factor	> 0 in the current operating region		
					For DoD equipped vehicles only	No DoD state change during current 3 second sample period.		
					The AFIM Filtered Length Ratio is determined by			
					The first report is delayed for 10 seconds to allow time for			
					Closed Loop fueling enabled			
					Fuel System Status	***LONG FT Enabled***		
					Disable Conditions: EngineMisfireDetected_FA MAP_SensorFA MAF_SensorFA ECT_Sensor_FA Ethanol Composition Sensor FA TPS_ThrottleAuthorityDefaulted FuelInjectorCircuit_FA AIR System FA O2S_Bank_1_Sensor_1_FA O2S_Bank_2_Sensor_1_FA EvapPurgeSolenoidCircuit_FA EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSensorCircuit_FA			
					Device Control	**Not Active**		
					Intrusive Diagnostics	**Not Active**		
					Engine OverSpeed Protection	**Not Active**		
					Reduced Power Mode (ETC DTC)	**Not Active**		
					PTO	**Not Active**		
					Traction Control	**Not Active**		
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 trips
ABS Rough Road malfunction	P1380	This diagnostic detects if the ABS controller is indicating a fault, and	GMLan Message: "Wheel Sensor Rough Road Magnitude Validity"	= FALSE	Vehicle Speed Engine Speed	VSS ≥ 8 kph rpm < 8192	40 failures out of 80 samples	1 Trips Type C

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		misfire is present. When this occurs, misfire will continue to run.			Engine Load RunCrankActive Active DTC	load < 60 = TRUE P0300, MIL Request	250 ms /sample Continuous	"Special Type C" 1 trips
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 ≥ 8 kph rpm < 8192 load < 60 = TRUE P0300, MIL Request	40 failures out of 80 samples 250 ms /sample Continuous	1 Trips Type C "Special Type C"
Cold Start Emissions Reduction System Fault	P1400	Model based test computes power from exhaust flow and thermal energy resulting from elevated idle speed and retarded spark advance. Detects if the cold start emission reduction system has failed resulting in the delivered power being out of range.	Average desired accumulated exhaust power - Average estimated accumulated exhaust power OR Average desired accumulated exhaust power - Average estimated accumulated exhaust power (EWMA filtered)	< -2.15 KJ/s (high RPM failure mode) > 1.30 KJ/s (low RPM failure mode)	**Cold Start Emission Reduction Strategy Is Active. The strategy is considered active if either the Spark cat light off or Idle cat light off strategies are considered active.** **Spark CLO is considered active when the CatLightOffDesiredSparkRetard (function of idle RPM and air per cylinder and scaled based on coolant and engine run time) <= 11.00 degrees of Spark** **Idle CLO is considered active if the desired RPM exceeds a base RPM value (function of coolant) plus**		Runs once per trip when the cold start emission reduction strategy is active Frequency: 100ms Loop Test completes after 12 seconds of accumulated qualified data.	Type A 1 Trip(s)
					Vehicle Speed Throttle Position A change in throttle position (tip-in/tip-out) will initiate a For Manual Transmission vehicles, the clutch must be fully ***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	< 2 kph < 0.50 percent		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					FuelInjectorCircuit_FA Clutch Sensor FA			
Cooling Fan Speed Output (Circuit Not used on systems with Mechanical Fan) LS7 only	P1482	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 ≤ 18 volts ≥ 400 RPM	20 failures out of 25 samples 250 ms / sample Continuous with fan operation	2 trips Type B
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 Disable Conditions:	Transmission output Speed Angular Velocity Engine Speed Hi Engine Speed Lo Time at Engine Speed Ignition Voltage Hi Ignition Voltage Lo Disabled for these DTC's:	>= 1200 RPM <= 7500 RPM >= 200 RPM >= 5 sec <= 18 Volts >= 11 Volts VehicleSpeedSensor_FA P150B	>= 4.5 Fail Time (Sec)	Type B 2 trips
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 Disable Conditions:	Raw Output Speed Output Speed change Transmission output Speed Angular Velocity 4WD Range Change Delay Timer Time for Positive Output Speed Change Time above raw Output Speed Engine Speed Hi Engine Speed Lo Time at Engine Speed Ignition Voltage Hi Ignition Voltage Lo Disabled for these DTC's:	>= 300 RPM <= 150 RPM >= 1200 Sec >= 6 Sec >= 2 sec >= 2 sec <= 7500 RPM >= 200 RPM >= 5 sec <= 18 Volts >= 11 Volts VehicleSpeedSensor_FA	>= 3.25 Fail Time (Sec)	Type B 2 trips
Transmission Engine Speed Request Circuit	P150C	Determines if engine speed request from the TCM is valid	Serial Communication rolling count value	+ 1 from previous $19D message (PTEI3)	Diagnostic enable bit	1	Diagnostic runs in 25 ms loop	2 trips Type B
			Transmission engine speed protection	not equal to 2's complement of transmission engine speed request + Transmission alive rolling count	Engine run time # of Protect Errors # of Alive Rolling Errors No idle diagnostic 506/507 code No Serial communication loss to TCM	0.5 10 6 IAC_SystemRPM_FA (U0101)		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Engine Running Power mode	= TRUE Run Crank Active		
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 <	8.41% 8.41%	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 MIL: YES Trips: 1
		2) Detect throttle control is driving the throttle in the incorrect direction	Thottle Position >	38.25%	(Throttle is being Controlled and TPS minimum learn is active) or Reduce Engine Power is Active	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	0.1375sec continuous	
		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 is greater than 2.00%		Engine Running or Ignition Voltage > and Ignition Voltage > and Throttle is being Controlled and Communication Fault (SPI is not set) and TPS minimum learn is not active	11 5.4	0.4875sec continuous on secondary processor	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Ignition voltage failure is false (P1682)			
Remote Vehicle Speed Limiting Signal Circuit	P162B	Determines if the speed request from OnStar is valid	**Password Protect error** - Serial Communication message - ($3ED) **OR** **Rolling count error** - Serial Communication message ($3ED) rolling count value	Message <> two's complement of message Message <> previous message rolling count value + one	Vehicle Requested Speed Limit	< 158 Kph	>= 10 Password Protect errors out of 10 samples >= 10 Rolling count errors out of 10 samples Performed every 25 msec	1 trip(s) Type C "Special Type C"
Ignition Voltage Correlation	P1682	Detect a continuous or intermittent out of correlation between the Run/Crank Ignition Voltage & the Powertrain Relay Ignition Voltage	|Run/Crank – ETC Run/Crank| >	3.00Volts	Powertrain commanded on and Run/crank voltage > or ETC Run/crank voltage > and Run/crank voltage >	 Table, f(IAT). See supporting tables 5.5 5.5	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 MIL: YES Trips: 1
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	2 trips Type B
			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	>= 99.0 liters < 0.0 liters 200 miles				

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			During fuel tranfer					
			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 transfered 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 kph		
			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 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	2 trips Type B
			Fuel Level in Secondary Tank Remains in an Unreadable Range too Long					
			If fuel volume in primary tank is	>= 28.5 liters				

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			AND Fuel volume in secondary tank and remains in this condition for OR	< 6.0 liters 124 miles				
			Fuel Level is in a Readable Range for both Primary and Secondary Tanks too Long					
			Volume in Primary Tank AND Volume in Secondary Tank and remains in this condition for OR	< 28 liters > 6 liters 1800 seconds				
			Distance Traveled without a Secondary Fuel Level Change					
			If the vehicle is driven a distance of 62 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	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 ≤ 18 volts	180 failures out of 225 samples 100 ms / sample Continuous	2 trips Type B
Fuel Level Sensor 2 Circuit High Voltage (For use on vehicles with	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 ≤ 18 volts	180 failures out of 225 samples 100 ms / sample Continuous	2 trips Type B
Control Module Throttle Actuator Position Performance	P2101	1) Detect a throttle positioning error	Difference between measured throttle position and modeled throttle position >	8.41%	TPS minimum learn is not active and Throttle is being Controlled and	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	1. 15/15 counts; 12.5 msec/count in the primary processor	Type: A
			Difference between measured throttle position and modeled throttle position <	8.41%	(Engine Running or Ignition Voltage > or Ignition Voltage >) Ignition voltage failure is false (P1682)	11 5.5		MIL: YES Trips: 1
		2) Detect throttle control is driving the throttle in the incorrect direction or exceed the reduced power limit	Thottle Position >	39.26%	TPS minimum learn is active		2. 11counts; 12.5 msec/count in the primary processor	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Thottle Position >	39.06%	Reduced Power is True			
Accelerator Pedal Position (APP) Sensor #1	P2120	Detects a continuous or intermittent short or open in APP1 circuit on the secondary processor but sensor is in range on the primary processor	Secondary APP1 Voltage < or Secondary APP1 Voltage >	0.325 4.75	No 5 V reference error No 5 V reference DTCs	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	19/39counts or 14counts continuous; 12.5 msec/count in the secondary processor	Type: A MIL: YES Trips: 1
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 0.325	No 5 V reference error No 5 V reference DTCs	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	1. 19/39counts 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 MIL: YES Trips: 1
Accelerator Pedal Position (APP) Sensor 1 Hi	P2123	Detect a continuous or intermittent short in the APP1 sensor on on both processors or just the primary processor	1. Primary APP1 Voltage > 2. Secondary APP1 Voltage >	4.75 4.75	 No 5 V reference error No 5 V reference DTCs	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	1. 19/39counts 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 MIL: YES Trips: 1

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Accelerator Pedal Position (APP) Sensor 2	P2125	Detects a continuous or intermittent short or open in APP2 circuit on the secondary processor but sensor is in range on the primary processor	Seondary APP2 Voltage < or Secondary APP2 Voltage >	0.325 4.75	No 5 V reference error No 5 V reference DTCs	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	19/39counts or 14counts continuous; 12.5 msec/count in the secondary processor	Type: A MIL: YES Trips: 1
Accelerator Pedal Position (APP) Sensor 2 Lo	P2127	Detects a continuous or intermittent short or open in APP2 circuit on both processors or just the primary processor	1. Primary APP2 Voltage <	0.325		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	1. 19/39counts or 14counts continuous; 12.5 msec/count in the primary processor	Type: A MIL: YES Trips: 1
			2. Secondary APP2 Voltage <	0.325	No 5 V reference error No 5 V reference DTCs		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	No 5 V reference error	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 MIL: YES Trips: 1
			2. Secondary APP2 Voltage >	4.75	No 5 V reference DTCs		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	No TPS Sensor Faults No 5 V reference DTCs	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	79/159 counts or 58 counts continuous; 3.125 msec/count in the primary processor	Type: A MIL: YES Trips: 1
			On the Secondary processor, the difference between TPS1 displaced and TPS2 displaced >	7.11% 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%	No TPS Sensor Faults No 5 V reference DTCs	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	19/39 counts or 15 counts continuous; 12.5 msec/count in the secondary processor	
			On the secodary processor, the difference between (raw min TPS1) and (raw_min TPS2) >	5.00%				
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 >	8.073% offset at min. throttle position with it linearly increasing to 10% at max pedal position	No APP Sensor Faults No 5 V reference DTCs	Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	1. 19/39 counts intermittent or 15 counts continuous, 12.5 msec/count in the primary processor	Type: A MIL: YES Trips:
			On the secondary processor, the difference between APP 1 displaced and APP 2 displaced is >	8.07% offset at min. throttle position with it linearly increasing to 10% at max pedal position				

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			2. On the primary processor, the difference between the learned PPS1 min and PPS2 min >	5.000%		Run/crank voltage or Powertrain relay voltage > 6.00 and reduced power is false, else the failure will be reported for all conditions	2. 19/39 counts intermittent or 15 counts continuous, 12.5 msec/count in the secondary processor	1
			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	Engine Torque high Engine Torque low Transmission Input Speed High Transmission Input Speed Low Throttle opening high Throttle opening low	<= 8192 N-m >= 60 N-m <= 1000 RPM >= 7500 RPM <= 99 % >= 8.0 %	>= 5 Fail Time (Sec)	Type B 2 trips
				Disable Conditions:	Disables on these DTCs:	TPS_FA EngineMisfireDetected_FA		
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	Engine Speed Lo	>= 1000 RPM CrankSensorFA P2160	>= 4 Enable Time (Sec)	Type B 2 trips
				Disable Conditions:	Disables on these DTCs:			
Minimum Throttle Position Not Learned	P2176	TP sensors were not in the minmum learn window after multiple attempts to learn the minimum.	During TPS min learn on the Primary processor, TPS Voltage >	18.70%		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 MIL: YES Trips: 1
			or During TPS min learn on the Secondary processor, TPS Voltage >	19.60%	No TPS circuit errors No TPS circuit faults Ignition voltage failure is false (P1682) Minimum TPS learn active			
			and					

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			Number of learn attempts >	10counts				
Barometric Pressure (BARO) Sensor Performace	P2227	Detects stability of 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 < 100 KPH AmbientAirPressCktFA ECT_Sensor_FA IAT_SensorFA MAF_SensorFA AfterThrottlePressure_NA or AfterThrottlePressure_SC TPS_FA TPS_Performance_FA VehicleSpeedSensorError	20 failures out of 25 samples 1 sample every 250 msec	Type B 2 trips
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	< 1.0 % of 5 Volt Range (0.1 Volts = 1.0 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 % of 5 Volt Range (4.5 Volts = 115.3 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 < 775 mvolts AND 2) Accumulated air flow during stuck lean test > 82 grams.	No Active DTC's B1S2 Failed this key cycle	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,	Frequency: Once per trip Note: if NaPOPD_b_ResetFastRespFunc= FALSE for the given Fuel Bank OR NaPOPD_b_RapidResponseActive = TRUE, multiple tests per trip are allowed.	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					System Voltage Learned heater resistance ICAT MAT Burnoff delay Green O2S Condition Low Fuel Condition Diag Engine Speed to enable test Engine Speed to disable test Engine Airflow Vehicle Speed to enable test Vehicle Speed to disable test Closed loop integral Closed Loop Active Evap Ethanol Post fuel cell Power Take Off EGR Intrusive diagnostic All post sensor heater delays O2S Heater on Time Predicted Catalyst temp Fuel State All of the above met for at least 2.0 seconds, and then the Force Cat Rich intrusive stage is requested.	P013F, P2270 or 10.0 volts < system voltage< 18.0 volts = Valid = Not Valid = Not Valid = False 1150 <= RPM <= 2500 1075 <= RPM <= 2650 3 gps <= Airflow <= 20 gps 43.5 mph <= Veh Speed <= 74.6 mph 41.0 mph <= Veh Speed <= 79.5 mph 0.74 <= C/L Int <= 1.08 = TRUE not in control of purge not in estimate mode = enabled = not active = not active = not active >= 100.0 sec 600 ºC <= Cat Temp <= 900 ºC = DFCO possible	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	
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	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	1) Post O2S signal > 100 mvolts AND 2) Accumulated air flow during stuck rich test > 50 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	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
		achieve the required lean threshold.	threshold before the above voltage threshold is met.				RapCPD_D_RapidResponseActive = TRUE, multiple tests per trip are allowed.	
						FuelTrimSystemB1_FA		
						FuelTrimSystemB2_FA		
						EngineMisfireDetected_FA		
						EthanolCompositionSensor_FA		
					B1S2 Failed this key cycle	P013A, P013B, P013E, P013F or P2270		
					System Voltage	10.0 volts < system voltage< 18.0 volts		
					Learned heater resistance	= Valid	Green Sensor Delay Criteria The diagnostic will not be enabled until the next ignition cycle after the following has been met: Airflow greater than 22 gps for 120000 grams of accumulated flow non-continuously. (Note that all other enable criteria must be met on the next ignition cycle for the test to run on that ignition cycle). Note: This feature is only enabled when the vehicle is new and cannot be enabled in service	
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid		
					Low Fuel Condition Diag	= False		
					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))		
					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 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 < 775 mvolts AND 2) Accumulated air flow during stuck lean test > 82 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 Engine Speed Engine Speed to disable test Engine Airflow Vehicle Speed Vehicle Speed to disable test Closed loop integral Closed Loop Active Evap Ethanol Post fuel cell Power Take Off EGR Intrusive diagnostic All post sensor heater delays	TPS_ThrottleAuthority Defaulted ECT_Sensor_FA IAT_SensorFA MAF_SensorFA MAP_SensorFA AIR System FA FuelInjectorCircuit_FA FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA P013C, P013D, P014A, P014B, P2272 or 10.0 volts < system voltage< 18.0 volts = Valid = Not Valid = Not Valid = False 1150 <= RPM <= 2500 1075 <= RPM <= 2650 3 gps <= Airflow <= 20 gps 43.5 mph <= Veh Speed <= 74.6 mph 41.0 mph <= Veh Speed <= 79.5 mph 0.74 <= C/L Int <= 1.08 = TRUE not in control of purge not in estimate mode = enabled = not active = not active = not active	Frequency: Once per trip Note: if NaPOPD_b_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 is only enabled when the vehicle is new and cannot be enabled in service	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					O2S Heater on Time Predicted Catalyst temp Fuel State	>= 100.0 sec 600 ºC <= Cat Temp <= 900 ºC = 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 > 50 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 Engine Speed Engine Airflow Vehicle Speed Closed loop integral Closed Loop Active Evap Ethanol Post fuel cell Power Take Off	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, P014A, P014B or P2272 10.0 volts < system voltage< 18.0 volts = Valid = Not Valid = Not Valid = False 1150 <= RPM <= 2500 3 gps <= Airflow <= 20 gps 43.5 mph <= Veh Speed <= 74.6 mph 0.74 <= C/L Int <= 1.08 = TRUE not in control of purge not in estimate mode = enabled = not active	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).	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					EGR Intrusive diagnostic All post sensor heater delays O2S Heater on Time Predicted Catalyst temp Fuel State DTC's Passed DTC's Passed DTC's Passed After above conditions are met: DFCO mode is continued (wo driver initiated pedal input).	= not active = not active >= 100.0 sec 600 ºC <= Cat Temp <= 900 ºC = DFCO possible = P2270 (and P2272 (if applicable)) = P013E (and P014A (if applicable)) = P013A (and P013C (if applicable))	Note: This feature is only enabled when the vehicle is new and cannot be enabled in service	
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	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	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	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						FuelTrimSystemB1_FA FuelTrimSystemB2_FA EngineMisfireDetected_FA EthanolCompositionSensor_FA	is only enabled when the vehicle is new and cannot be enabled in service	
					DTC passed	= P2271		
					System Voltage	10.0 volts < system voltage< 18.0 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 <= ven 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		
					During Stuck Lean test the following can cause the test to abort			
					Fuel State	= DFCO		
					Fuel State	= PE		
					Purge duty cycle	> 0 %		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
O2 Sensor Signal Stuck Rich Bank 1 Sensor 2 (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 EthanolCompositionSensor_FA 10.0 volts < system voltage< 18.0 volts = Valid = Not Valid = Not Valid = False 500 <= RPM <= 5000	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	2 trips Type B
					System Voltage			
					Learned heater resistance			
					ICAT MAT Burnoff delay			
					Green O2S Condition			
					Low Fuel Condition Diag			
					Engine Speed			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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		
					During Stuck Lean test the following can cause the test to abort			
					Piston Protection	= Active		
					Converter Mode	= Over Temperature		
					Hot Coolant Enrichment	= Active		
					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	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	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						EvapFlowDuringNonPurge_FA EvapVentSolenoidCircuit_FA EvapSmallLeak_FA EvapEmissionSystem_FA FuelTankPressureSensorCircuit_FA MAF_SensorFA MAP_SensorFA AIR System FA	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		
						FuelTrimSystemB1_FA		
						FuelTrimSystemB2_FA		
						EngineMisfireDetected_FA		
						EthanolCompositionSensor_FA		
					DTC passed	P2273		
					System Voltage	10.0 volts < system voltage< 18.0 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			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Fuel State	= Refer to **"P2270/P2272 - O2 Sensor Signal Stuck Lean Bank 1/2 Sensor 2"** Rich Equiv Ratio		
					During Stuck Lean test the following can cause the test to abort			
					Fuel State Fuel State Purge duty cycle	= DFCO = PE > 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	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	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						EthanolCompositionSensor_FA		
					System Voltage	10.0 volts < system voltage< 18.0 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 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		
					During Stuck Lean test the following can cause the test to abort			
					Piston Protection	= Active		
					Converter Mode	= Over Temperature		
					Hot Coolant Enrichment	= Active		
					Fuel State	= PE		
					Purge duty cycle	> 0 %		
Secondary AIR System Pressure Sensor Circuit Bank 1 (For applications with AIR)	P2430	This DTC detects a stuck in range pressure sensor signal when the AIR pump is commanded on.	Average Error and Signal Variation	< 0.50 kPa < 1.00 kPa	BARO Inlet Air Temp Coolant Temp	> 60 kPa > 5.0 deg C. > 5.0 deg C. < 60.0 deg C.	Stuck in range cumulative time > 5.0 seconds	2 trip(s) Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Engine off time System Voltage	> 3600.0 seconds > 10.0 OR < 18.0 Volts		
				disable conditions:	MAP Engine Speed MAF No active DTCs:	< 20 kPa for 2 seconds > 5000 RPM > 50 gm/s for 3 seconds AIRValveControlCircuitFA AIRPumpControlCircuitFA AIRSysPressSnsrB1CktLoFA AIRSysPressSnsrB1CktHiFA ControllerProcessorPerf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA	Frequency: Once per trip when SAI pump commanded On	
Secondary AIR System Pressure Sensor Performance Bank 1 (For applications with AIR)	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)	> 14.0 kPa < -10.0 kPa	BARO Inlet Air Temp Coolant Temp Engine off time System Voltage	> 60 kPa > 5.0 deg C. > 5.0 deg C. < 60.0 deg C. > 3600.0 seconds > 10.0 OR < 18.0 Volts	Skewed sensor cumulative test weight > 5.0 seconds Continuous 6.25ms loop	2 trip(s) Type B
				> 50.0 kPa	**Skewed sensor cumulatative test weight is based on distance from the last Baro update Baro Skewed Sensor Weight Factor**			
				disable conditions:	MAP Engine Speed MAF No active DTCs:	< 20 kPa for 2 seconds > 5000 RPM > 50 gm/s for 3 seconds Transfer Case not in 4WD Low AIRValveControlCircuitFA AIRPumpControlCircuitFA AIRSysPressSnsrB1CktLoFA AIRSysPressSnsrB1CktHiFA		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						MAF_SensorFA ControllerProcessorPerf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA		
Secondary AIR System Pressure Sensor Circuit Low Voltage Bank 1 (For applications with AIR)	P2432	This DTC detects an out of range low AIR pressure sensor signal	AIR Pressure Sensor signal	< 5 % of 5Vref disable conditions:	No active DTCs:	ControllerProcessorPerf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA	800 failures out of 1000 samples 6.25 ms loop Continuous	2 trip(s) Type B
Secondary AIR System Pressure Sensor Circuit Hi Voltage Bank 1 (For applications with AIR)	P2433	This DTC detects an out of range high AIR pressure sensor signal	AIR Pressure Sensor signal	> 94 % of 5Vref **disable** **conditions:**	No active DTCs:	ControllerProcessorPerf_FA 5VoltReferenceA_FA 5VoltReferenceB_FA	800 failures out of 1000 samples 6.25 ms loop Continuous	2 trip(s) Type B
Secondary AIR System Shut-off Valve Stuck Open Single Bank System (For applications with AIR)	P2440	This DTC detects if one or both of the AIR system control valves is stuck open This test is run during Phase 2 (Pump commanded On, valve commanded closed)	AIR pressure error	< **Bank 1 Valve Pressure Error** table or > 32.0 kPa **disable** **conditions:**	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 < 18.0 Volts Stability Time > 0.5 seconds AIR diagnostic Phase 1 passed **Conditional test weight is calculated by multiplying the following Factors** **Phase 2 Baro Test Weight Factor** **Phase 2 MAF Test Weight Factor** **Phase 2 System Volt Test Weight Factor** **Phase 2 Ambient Temp Test Weight Factor** MAP < 20 kPa for 2 seconds Engine Speed > 5000 RPM MAF > 50 gm/s for 3 seconds		Phase 2 Conditional test weight > 2.0 seconds Frequency: Once per trip when AIR pump commanded On	2 trip(s) Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					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 (For applications with AIR)	P2444	This DTC detects if the SAI pump is stuck On This test is run during Phase 3 (Pump commanded Off, valve commanded closed)	AIR pressure error	> **Bank 1 Pump Pressure Error** table or < -32 kPa	BARO Inlet Air Temp Coolant Temp Engine off time System Voltage Stability Time	> 60 kPa > 5.0 deg C. > 5.0 deg C. < 60.0 deg C. > 3600.0 seconds > 10.0 OR < 18.0 Volts > 10.0 seconds AIR diagnostic Phase 1 passed AIR diagnostic Phase 2 passed	Phase 3 Cumlatative test weight > 3.0 seconds Frequency: Once per trip when AIR pump commanded On	1 trip(s) Type A
					Phase 3 cumulatative test weight is based on distance from the last Baro update Baro Skewed Sensor Weight Factor			
				disable **conditions:**	MAP Engine Speed MAF No active DTCs:	< 20 kPa for 2 seconds > 5000 RPM > 50 gm/s for 3 seconds AIRSystemPressureSensor FA		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						AIRValveControlCircuitFA AIRPumpControlCircuitFA 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 - ($150 - PTEI2, $199 - PTEI3)	Message <> two's complement of message			>= 16 Protect errors during key cycle	2 trip(s) Type B
			OR					
			Rolling count error - Serial Communication message ($150 - PPEI2, $199 - PPEI3) rolling count value	Message <> previous message rolling count value + one	Diagnostic enabled/disabled	Enabled	>= 6 Rolling count errors out of ten samples	
			OR		Power Mode	= Run		
			RAM Error - Serial Communication message ($150 - PPEI2, $199 - PPEI3)	Trans torque reduction or type request portion of message 2's complement values <>	Engine Running Run/Crank Active	= True > 0.50 Sec	>= 3 RAM errors during key cycle	
			OR					
			TCM Requested Torque Increase message $199	> 400 Nm			>= 3 range out of 10 samples	
			OR					
			Multi-transition - Trans torque intervention type request change	Request change from not min limit to min limit			>= 3 multi-transitions out of 5 samples	
			OR					
			Serial communication from TCM	Loss of communication			> 0.20 seconds	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
							Performed every 12.5 msec	
Torque Management Request Input Signal B (LSA only)	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	1 trip(s) Type C "Special Type C"
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 < 1 seconds > 1 seconds ≥ 1 seconds ≠ 1	ECM is powered down IAT Temperature	-40 °C ≤ Temperature ≤ 125 °C	Initial value test: 3 failures 1.375 sec / sample Clock rate test: 8 failures out of 10 samples 1second / sample test runs once each key-off	2 trips Type B DTC sets on next key cycle if failure detected
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 <= 8 ratio >= 2.4 ratio <= 1.85 ratio >= 0.65 ratio	Engine Torque High	<= 8192 N-m	>= 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.
					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	>= 30 N-m <= 5500 RPM >= 1000 RPM <= 18 V >= 11 V <= 99 % >= 5.0 % <= 130 º C. >= -20 º C. >= 10 Sec >= 5 KPH		
			Disable Conditions:		Disabled on these pcodes:	CrankSensorFaultActive P2160 P2161 TPS_FA VehicleSpeedSensorError EngineMisfireDetected_FA MAF_SensorTFTKO MAP_SensorTFTKO TransmissionGearDefaulted		
O2Sensor Circuit Range/ Performance Bank 1 Sensor 1 (LLR, LLV, LL8 only)	P2A00	This DTC determines if the O2 sensor voltage is not meeting the voltage criteria to enable closed loop fueling.	Closed Loop O2S ready flag A) O2S signal must be 1) O2S signal OR 2) O2S signal To set Closed Loop ready flag Closed Loop O2S ready flag B) Once set to ready O2S cannot be 1) O2S signal AND 2) O2S signal for time Then set Closed Loop ready flag	= False > 550 mvolts < 350 mvolts = True = True > 350 mvolts < 550 mvolts > 5.0 seconds = False	No Active DTC's System Voltage Engine Speed Engine Airflow Engine Coolant Engine Metal Overtemp Active Converter Overtemp Active Fuel State AFM Status	TPS_ThrottleAuthority Defaulted MAP_SensorFA ECT_Sensor_FA FuelInjectorCircuit_FA P0131, P0151 P0132, P0152 10.0 volts < system voltage< 18.0 volts 1000 RPM <= Engine speed <= 3400 RPM 10.0 gps <= Engine Airflow<= 50.0 gps >= 70.0 ºC = False = False DFCO not active = All Cylinders active	200 failures out of 250 samples. Frequency: Continuous 100msec loop	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Predicted Exhaust Temp (B1S1) Engine run time Fuel Enrichment **All of the above met for** Time	>= 0.0 ºC > 100 seconds = Not Active > 5 seconds		
O2 Sensor Circuit Range/Performance Bank 1 Sensor 2 (LS7 only)	P2A01	This DTC determines if the post catalyst O2 sensor is stuck in a normal 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 increases or reduces delivered fuel to achieve the required rich or lean 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. OR 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 >= 805 mvolts AND Accumulated air flow > 550 grams for the stuck lean test. OR 2) Post O2S signal <= 150 mvolts AND Accumulated air flow during > 550 grams for the stuck rich test.	No Active DTC's System Voltage Learned heater resistance	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< 18.0 volts = Valid	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	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					ICAT MAT Burnoff delay	= Not Valid		
					Green O2S Condition	= Not Valid		
					Low Fuel Condition Diag	= False		
					Engine Speed	500 <= RPM <= 5000		
					Engine Airflow	3 gps <= Airflow <= 20 gps		
					Vehicle Speed	24 mph <= Veh Speed <= 132 mph		
					Closed loop integral	0.95999 <= 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 **"P2A01 - O2 Sensor Signal Stuck Lean Bank 1 Sensor 2"** Rich Equiv Ratio table in the Supporting		
					During Stuck Lean test the following can cause the test to abort			
					Fuel State	= DFCO		
					Fuel State	= PE		
					Purge duty cycle	> 0 %		
					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 **"P2A01 - O2 Sensor Signal Stuck Rich Bank 1 Sensor 2"** Lean Equiv Ratio table in the Supporting		
					During Stuck Lean test the following can cause the test to abort			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Piston Protection Converter Mode Hot Coolant Enrichment Fuel State Purge duty cycle	= Active = Over Temperature = Active = PE > 0 %		
O2 Sensor Circuit Range/Performance Bank 2 Sensor 2 (LS7 only)	P2A04	This DTC determines if the post catalyst O2 sensor is stuck in a normal 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 increases or reduces delivered fuel to achieve the required rich or lean 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. OR 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 >= 805 mvolts AND Accumulated air flow > 550 grams for the stuck lean test. OR 2) Post O2S signal <= 150 mvolts AND Accumulated air flow during > 550 grams for the stuck rich test.	No Active DTC's System Voltage Learned heater resistance ICAT MAT Burnoff delay	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< 18.0 volts = Valid = Not Valid	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	2 trips Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					Green O2S Condition	= Not Valid		
					Low Fuel Condition Diag	= False		
					Engine Speed	500 <= RPM <= 5000		
					Engine Airflow	3 gps <= Airflow <= 20 gps		
					Vehicle Speed	24 mph <= Veh Speed <= 132 mph		
					Closed loop integral	0.95999 <= 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 **"P2A04 - O2 Sensor Signal Stuck Lean Bank 2 Sensor 2"** Rich Equiv Ratio table in the Supporting		
					During Stuck Lean test the following can cause the test to abort			
					Fuel State	= DFCO		
					Fuel State	= PE		
					Purge duty cycle	> 0 %		
					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 **"P2A04 - O2 Sensor Signal Stuck Rich Bank 2 Sensor 2"** Lean Equiv Ratio table in the Supporting		
					During Stuck Lean 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 Fuel State Purge duty cycle	= Active = PE > 0 %		
Deactivation System Performance (AFM applications only)	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** Total filtered residual weight factors ECT IAT Engine RPM	>= 0 factor > -20 and < 125 Deg C > -20 and < 125 Deg C > 450 and < 5750 RPM MAP Model 2 multiplied by MAP2 Residual Weight Factor based on RPM. See table IFRD Residual		
					CYLINDER DEACTIVATION ENABLE CONDITIONS (Conditions below must be met for >= 0 seconds before cylinder deactivation will begin) Engine running Engine RPM Engine coolant Ignition voltage Pct throttle pedal Brake booster vacuum Engine oil temp PRNDL State Trans Gear Vehicle speed FCO not active for Time since last cylinder deac mode event Gear Shift	 > 30.0 seconds > **EngSpeedLwrLimitEnableTable** AND < **EngSpeedUprLimitEnableTable** - Details on Supporting Tables Tab >= 36 and <= 129 Deg C >= 11.0 and <= 18.0 Volts < 5 Percent >= 42.0 kPa >= 16 and <= 128 Deg C **HalfCylDisabledPRNDL** - See details on Supporting Tables Tab **HalfCylDisabledTransGr** - See details on Supporting Tables Tab >= 24 KPH >= 3.0 Seconds >= 3.0 Seconds Not currently in progress Not currently in	100 cylinder deactivation lag residual failures out of 200 samples Performed once every 100 msec	2 trip(s) Type B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					AC Clutch transition	progress
					Tip In Bump	Not active
					Accelerator pedel delta	<= 50.0 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
					PRNDL state	HalfCylDisabledPRNDL and HalfCylDisabledPRNDL DeviceControl tables (when in device control) - See details on Supporting Tables Tab (P3400 Section)
					Oil aeration present	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	>= 60 seconds
					DFCO mode	Not currently in DFCO
					Fuel shut off mode other than DFCO	Not currently in fuel shut-off
					ETC Power management mode	Not active
					Heater 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
					Vehicle speed	>= 22 Kph
					AFM is disabled at high percent	Ethanol concentration >

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					ethanol	95 % disables AFM. Once disabled, ethanol concentration must be < 90 % to re-enable		
					If feature is enabled, AFM is allowed only when percent ethanol learn is not in progress	Feature is Disabled		
					IF DEACTIVATED, ANY OF THE CONDITIONS BELOW WILL FORCE CYLINDER REACTIVATION			
					If deactivation mode is active for	>= 480 seconds		
					then reactivation will occur if:			
					Deac mode active	>= 600 seconds		
					OR			
					Delta vacuum	> 5 kPa or < -5 kPa		
					Engine RPM	> **EngSpeedDisableLwr LimitTable** AND < **EngSpeedDisableUpr LimitTable** - 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	Aeration enabled by engine RPM > 5000 for 15 seconds, disabled by engine RPM < 4000 for 90 seconds		
					Engine Metal Overtemp Protection			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
						Active		
					Accelerator pedel delta	<= 50.0 percent		
					in device control only, when in Park or Neutral, engine RPM	<= 0.0 Kph		
					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	< 22.0 KPH		
					Brake booster vacuum	< 40.0 kPa		
					Pct Throttle Pedal	< 6 Percent		
					Filtered engine vacuum	> HalfCylToAllCylVacuum or EcoHalfCylToAllCylVacuum (in Eco mode) - See details on Supporting Tables Tab (P3400 Section) for 0		
					ETC Power management mode	Active		
					Converter overtemp protect	Active		
					Hot Coolant Mode	Active		
					Engine running	= False		
					Engine overspeed protection	Active		
					Gear Shift	In progress		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
					AC Clutch transition Tip In Bump Engine Metal Overtemp Protect Cat. Temp Low POSD Intrusive FWD Engine Misfire Heater Performance POPD Intrusive	In progress Active Active Active Active In low range Detected Active Active		
					No active DTC's	Fault bundles: Map_SensorFA VehicleSpeedSensorError ECT_Sensor_FA EOP_Sensor_FA PowertrainRelayFault BrakeBoosterSensorFA CrankSensorFA CamSensorFA IAT_SensorFA CylnderDeacDriverTFTKO FourWheelDriveLowStateValid EngineTorqueEstInaccurate TransmissionGearDefaulted EnginePowerLimited		
Cylinder 1 Deactivation Solenoid Control Circuit (AFM applications only)	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 <= 18.0 and >= 11.0 Volts Enabled	20 failures out of 25 samples Performed every 250 msec	2 trip(s) Type B
Cylinder 4 Deactivation Solenoid Control Circuit	P3425	Checks the Solenoid Control Circuit electrical integrity for	The ECM detects that commanded state of driver and		Engine RPM	>= 400.0 RPM	20 failures out of 25 samples	2 trip(s)

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
(AFM applications only)		cylinder #4	actual state of the control circuit do not match. (Short to ground, short to voltage, open circuit)		Ignition Voltage Diagnostic enabled/disabled	<= 18.0 and >= 11.0 Volts Enabled	Performed every 250 msec	Type B
Cylinder 6 Deactivation Solenoid Control Circuit (AFM applications only)	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 <= 18.0 and >= 11.0 Volts Enabled	20 failures out of 25 samples Performed every 250 msec	2 trip(s) Type B
Cylinder 7 Deactivation Solenoid Control Circuit (AFM applications only)	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 <= 18.0 and >= 11.0 Volts Enabled	20 failures out of 25 samples Performed every 250 msec	2 trip(s) Type B
Control Module Communication Bus A Off	U0073	This DTC monitors for a BUS A off condition	Bus off failures 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 ≤ 18 volts > 3.0000 seconds	The diagnostic runs in the 1000 ms loop	Type B 2 trips
Lost Communication with Transfer Case Control Module (For applications with an electronic transfer case)	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	11 volts ≤ Voltage ≤ 18 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.
					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		
Lost Communication With Fuel Pump Control Module (For applications with a 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 ≤ 18 volts > 3.0000 seconds	The diagnostic runs in the 1000 ms loop	Type B 2 trips
Lost Communication With Vehicle Dynamics Control Module (LSA only)	U0122	This DTC monitors for a loss of communication with the Vehicle Dynamics 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 ≤ 18 volts > 3.0000 seconds	The diagnostic runs in the 1000 ms loop	Type B 2 trips
Lost Communication With Body Control Module	U0140	This DTC monitors for a loss of communication with the Vehicle Dynamics Control Module.	Message is not received from controller for this many counts	12 counts	Run/Crank Voltage	11 volts ≤ Voltage ≤ 18 volts	The diagnostic runs in the 1000 ms loop	Type C 1 trips

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
			out of these samples	12 counts	Power mode is RUN 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		"Special Type C"

LOOK-UP 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	-809.5442	-764.7857	-718.0813	-673.3228	-628.5644	-583.8059	-537.1014	-492.3430	-447.5845	-402.8261	-356.1216	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632
-4.3750	-809.5442	-764.7857	-718.0813	-673.3228	-628.5644	-583.8059	-537.1014	-492.3430	-447.5845	-402.8261	-356.1216	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632
1.2500	-809.5442	-764.7857	-718.0813	-673.3228	-628.5644	-583.8059	-537.1014	-492.3430	-447.5845	-402.8261	-356.1216	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632
6.8750	-809.5442	-764.7857	-718.0813	-673.3228	-628.5644	-583.8059	-537.1014	-492.3430	-447.5845	-402.8261	-356.1216	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632
12.5000	-809.5442	-764.7857	-718.0813	-673.3228	-628.5644	-583.8059	-537.1014	-492.3430	-447.5845	-402.8261	-356.1216	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632
18.1250	-809.5442	-764.7857	-718.0813	-673.3228	-628.5644	-583.8059	-537.1014	-492.3430	-447.5845	-402.8261	-356.1216	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632
23.7500	-809.5442	-764.7857	-718.0813	-673.3228	-628.5644	-583.8059	-537.1014	-492.3430	-447.5845	-402.8261	-356.1216	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632
29.3750	-809.5442	-764.7857	-718.0813	-673.3228	-628.5644	-583.8059	-537.1014	-492.3430	-447.5845	-402.8261	-356.1216	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632
35.0000	-809.5442	-764.7857	-718.0813	-673.3228	-628.5644	-583.8059	-537.1014	-492.3430	-447.5845	-402.8261	-356.1216	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632
40.6250	-809.5442	-764.7857	-718.0813	-673.3228	-628.5644	-583.8059	-537.1014	-492.3430	-447.5845	-402.8261	-356.1216	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632
46.2500	-809.5442	-764.7857	-718.0813	-673.3228	-628.5644	-583.8059	-537.1014	-492.3430	-447.5845	-402.8261	-356.1216	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632
51.8750	-809.5442	-764.7857	-718.0813	-673.3228	-628.5644	-583.8059	-537.1014	-492.3430	-447.5845	-402.8261	-356.1216	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632
57.5000	-809.5442	-764.7857	-718.0813	-673.3228	-628.5644	-583.8059	-537.1014	-492.3430	-447.5845	-402.8261	-356.1216	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632
63.1250	-809.5442	-764.7857	-718.0813	-673.3228	-628.5644	-583.8059	-537.1014	-492.3430	-447.5845	-402.8261	-356.1216	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632
68.7500	-809.5442	-764.7857	-718.0813	-673.3228	-628.5644	-583.8059	-537.1014	-492.3430	-447.5845	-402.8261	-356.1216	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632
74.3750	-809.5442	-764.7857	-718.0813	-673.3228	-628.5644	-583.8059	-537.1014	-492.3430	-447.5845	-402.8261	-356.1216	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632
80.0000	-809.5442	-764.7857	-718.0813	-673.3228	-628.5644	-583.8059	-537.1014	-492.3430	-447.5845	-402.8261	-356.1216	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632	-311.3632

P0442: Estimate of Ambient Temperature Valid Conditioning Time

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

Axis	Curve
0	300
600	450
1200	500
1800	600
2400	650
3000	650
3600	650
4200	650
4800	650
5400	650
6000	625
6600	600
7200	575
7800	550
8400	525
9000	500
9600	480
10200	460
10800	440
11700	420
12600	400
13500	380
14400	360
15300	340
16200	320
17100	300
18000	280
19200	260
20400	240
21600	220
22800	200
24000	200
25200	200

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

Purge Valve Leak Test Engine Vacuum Test Time (in seconds)
Axis is Fuel Level in %

Axis	Curve
0	47
6	45
12	44
19	43
25	41
31	40
37	39
44	37
50	36
56	35
62	33
69	32
75	31
81	29
87	28
94	27
100	25
53	4
56	4
59	4
63	4
66	4
69	4
72	4
75	4
78	4
81	4
84	4
88	4
91	4
94	4
97	4
100	4

LOOK-UP TABLES

P0461, P2066, P2636: Transfer Pump Enable

TransferPumpOnTimeLimit (in seconds)
Axis is Fuel Level in %

Axis	Curve
0	0
3	0
6	0
9	0
13	0
16	0
19	0
22	0
25	0
28	0
31	0
34	0
38	0
41	0
44	0
47	0
50	0
53	0
56	0
59	0
63	0
66	0
69	0
72	0
75	0
78	0
81	0
84	0
88	0
91	0
94	0
97	0
100	0

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	420	0
CATD_ExhaustWarmMin_Loc_1	420	1
CATD_ExhaustWarmMin_Loc_2	420	2
CATD_ExhaustWarmMin_Loc_3	420	3
CATD_ExhaustWarmMin_Loc_4	420	4
CATD_ExhaustWarmMin_Loc_5	420	5
CATD_ExhaustWarmMin_Loc_6	420	6
CATD_ExhaustWarmMin_Loc_7	420	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	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
90	0.0	1.5	3.0	6.0	6.0	6.0	8.0	9.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
100	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	10.0	10.0	10.0	10.0
110	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	10.0	10.0	10.0	10.0
120	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	10.0	10.0	10.0	10.0
130	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	10.0	10.0	10.0	10.0
140	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	10.0	10.0	10.0	10.0
150	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	10.0	10.0	10.0	10.0
160	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	10.0	10.0	10.0	10.0
170	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	10.0	10.0	10.0	10.0
180	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	10.0	10.0	10.0	10.0

LOOK-UP TABLES

Knock Detection Enabled Factors:

Knock Detection Enablec = 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

P0327/P0332 ShortLowThresh

Hitachi controller; E37 ECM

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

Hitachi controller; E37 ECM

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	15008	15008	15008	15008	15008	12496	12496	12496	12496	12496	12496	15008	15008	20000	20000	20000	20000
80	15008	15008	15008	15008	15008	12496	12496	12496	12496	12496	12496	15008	15008	20000	20000	20000	20000
120	15008	15008	15008	15008	15008	12496	12496	12496	12496	12496	12496	15008	15008	20000	20000	20000	20000
160	15008	15008	15008	15008	15008	12496	12496	12496	12496	12496	12496	15008	15008	20000	20000	20000	20000
200	15008	15008	15008	15008	15008	12496	12496	12496	12496	12496	12496	15008	15008	20000	20000	20000	20000
240	15008	15008	15008	15008	15008	12352	11008	10368	11008	11504	11008	15008	15008	20000	20000	20000	20000
280	15008	15008	15008	15008	15008	10000	10336	11504	10224	10496	10672	15008	15008	20000	20000	20000	20000
320	15008	15008	15008	15008	15008	12080	10928	11504	10144	10016	11008	15008	15008	20000	20000	20000	20000
360	15008	15008	15008	15008	15008	10192	12208	11728	10816	10000	11104	15008	15008	20000	20000	20000	20000
400	15008	15008	15008	15008	15008	13488	11200	11504	10656	10880	11024	15008	15008	20000	20000	20000	20000
440	15008	15008	15008	15008	15008	12640	13664	12432	10496	10432	10064	15008	15008	20000	20000	20000	20000
480	15008	15008	15008	15008	15008	10704	12000	10336	10864	10704	11904	15008	15008	20000	20000	20000	20000
520	15008	15008	15008	15008	15008	15008	15008	10144	11392	11248	11600	15008	15008	20000	20000	20000	20000
560	15008	15008	15008	15008	15008	15008	15008	10000	11008	11008	11776	15008	15008	20000	20000	20000	20000
640	15008	15008	15008	15008	15008	15008	15008	15008	15008	11264	10624	10608	27600	20000	20000	20000	20000
720	15008	15008	15008	15008	15008	15008	15008	15008	15008	15008	15008	15008	15008	20000	20000	20000	20000
800	15008	15008	15008	15008	15008	15008	15008	15008	15008	15008	15008	15008	15008	20000	20000	20000	20000

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	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008
80	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008
120	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008
160	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008
200	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008
240	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008
280	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008
320	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008
360	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008
400	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008
440	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008
480	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008
520	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008
560	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008
640	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008
720	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008
800	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008

KtOXYD_cmp_AFIM_LngthThrsh2

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	15008	15008	15008	15008	15008	12496	12496	12496	12496	12496	12496	15008	15008	20000	20000	20000	20000
80	15008	15008	15008	15008	15008	12496	12496	12496	12496	12496	12496	15008	15008	20000	20000	20000	20000
120	15008	15008	15008	15008	15008	12496	12496	12496	12496	12496	12496	15008	15008	20000	20000	20000	20000
160	15008	15008	15008	15008	15008	12496	12496	12496	12496	12496	12496	15008	15008	20000	20000	20000	20000
200	15008	15008	15008	15008	15008	12496	12496	12496	12496	12496	12496	15008	15008	20000	20000	20000	20000
240	15008	15008	15008	15008	15008	13488	11008	10000	10000	10000	10000	15008	15008	20000	20000	20000	20000
280	15008	15008	15008	15008	15008	10432	10752	10000	10336	10000	10000	15008	15008	20000	20000	20000	20000
320	15008	15008	15008	15008	15008	11088	11824	10000	10000	10000	10000	15008	15008	20000	20000	20000	20000
360	15008	15008	15008	15008	15008	11504	12752	10128	10000	10416	10000	15008	15008	20000	20000	20000	20000
400	15008	15008	15008	15008	15008	11808	11456	11472	10000	10048	11648	15008	15008	20000	20000	20000	20000
440	15008	15008	15008	15008	15008	11008	10192	13632	10000	10368	10912	15008	15008	20000	20000	20000	20000
480	15008	15008	15008	15008	15008	21344	15008	11872	10720	10384	13088	15008	15008	20000	20000	20000	20000
520	15008	15008	15008	15008	15008	15008	15008	12944	11856	11872	14880	15008	15008	20000	20000	20000	20000
560	15008	15008	15008	15008	15008	15008	15008	11344	11664	13136	14592	15008	15008	20000	20000	20000	20000
640	15008	15008	15008	15008	15008	15008	15008	15008	15008	14768	11952	19152	13664	20000	20000	20000	20000
720	15008	15008	15008	15008	15008	15008	15008	15008	15008	15008	15008	15008	15008	20000	20000	20000	20000
800	15008	15008	15008	15008	15008	15008	15008	15008	15008	15008	15008	15008	15008	20000	20000	20000	20000

LOOK-UP TABLES

KtOXYD_cmp_AFIM_LngthThrsh2_DoD

AvgFlow / AvgRPM	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3500	4000	4500	5000	6000
40	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008
80	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008
120	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008
160	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008
200	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008
240	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008
280	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008
320	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008
360	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008
400	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008
440	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008
480	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008
520	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008
560	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008
640	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008
720	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008
800	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008	25008

KtOXYD_K_AFIM_QualFactor1

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

KtOXYD_K_AFIM_QualFactor1_DoD

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

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	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
80	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
120	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
160	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
200	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
240	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
280	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
320	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
360	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
400	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
440	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
480	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
520	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
560	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
640	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
720	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
800	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

KtOXYD_K_AFIM_QualFactor2_DoD

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

LOOK-UP TABLES

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 travel**

Axis	0	6.2485	12.497	18.7455	24.994	31.2425	37.491	43.7395	49.988	56.2365	62.485	68.7335	74.982	81.2305	87.479	93.7275	99.976
Curve	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	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0

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	0.0	0.0	0.0

P0411

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

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

P02431

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	0.0	0.0	0.0

P02440

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

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

P02444

Bank 1 Pump Pressure Error — **axis weighted time in seconds**

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

LOOK-UP TABLES

FASD Section

P0171 & P0174	Long Term Trim Lean																
% 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	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24

P0172 & P0175	Non Purge Rich Limit																
% 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 Thr	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76

P0172 & P0175	Purge Rich Limit																
% 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 Thresho	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76

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	90	65	45	25	10	10	10	10	10	10	10	10	10	10	10	10

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

TPS Residual Weight Factor based on RPM

RPM	0	250	750	1250	1750	2250	2750	3250	3750	4250	4750	5250	5750	6250	6750	7250	9000
	1.000	1.000	1.000	1.000	1.000	1.000	0.868	0.803	0.746	0.631	0.586	0.513	0.429	0.456	1.000	1.000	1.000

MAF Residual Weight Factor based on RPM

RPM	0	250	750	1250	1750	2250	2750	3250	3750	4250	4750	5250	5750	6250	6750	7250	9000
	1.000	1.000	0.890	0.916	0.728	0.646	0.600	0.556	0.531	0.522	0.507	0.534	0.527	0.455	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	0.714	0.762	0.761	0.845	0.787	0.704	0.749	0.688	0.780	0.709	0.787	0.661	0.579	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	0.904	0.893	0.708	0.688	0.676	0.657	0.701	0.676	0.628	0.564	0.481	0.434	0.370	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 (Supercharger application)

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

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

LOOK-UP TABLES

Supercharger Intake Flow Rationality Diagnostic Failure Matrix

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

P0108, P012D: MAP/SCIAP Cold Run Time Threshold

X axis is Engine Coolant Temperature in Deg C

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

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

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

-40	-28	-16	-4	8	20	32	44	56	68	80	92	104	116	128	140	152
65	55	45	35	25	25	25	25	25	25	15	15	15	15	15	15	15

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

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

	IAT Range Low	Hi	-40	-28	-16	-4	8	20	32	44	56	68	80
Primary	10.0 ° C	54.5 ° C	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

LOOK-UP TABLES

P0300-P0308: Idle SCD

(decel index (> Idle SCD AND > Idle SCD ddt Tables))

load
Load

	400	500	600	700	800	900	1000	1100	1200
8	450	450	370	260	170	150	115	100	90
9	450	450	360	250	170	150	115	100	90
11	450	450	360	240	170	150	115	100	90
12	450	450	360	230	150	130	100	95	70
13	450	450	360	220	150	120	100	85	70
14	435	435	360	220	150	110	100	80	65
15	425	425	360	230	150	100	100	80	65
16	425	425	340	230	150	100	90	75	65
17	450	450	360	275	150	130	80	75	60
18	500	500	375	270	180	130	90	70	55
19	500	500	400	280	190	140	90	65	50
21	525	525	425	300	210	150	100	65	50
22	550	550	425	300	220	160	120	75	50
24	675	675	450	375	250	180	140	80	60
25	725	725	475	425	275	200	150	100	55
27	32767	32767	32767	32767	32767	32767	32767	32767	32767
29	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: Idle SCD ddt

load

	400	500	600	700	800	900	1000	1100	1200
8	450	450	360	280	190	170	125	110	100
9	450	450	340	260	190	170	125	110	100
11	450	450	330	240	190	170	125	110	100
12	450	450	330	250	180	140	110	105	80
13	450	450	330	225	160	140	110	95	80
14	400	400	310	225	160	140	110	80	70
15	420	420	340	250	150	120	100	80	70
16	440	440	320	250	150	110	95	80	70
17	460	460	330	275	150	120	90	75	65
18	500	500	360	270	180	120	90	75	65
19	500	500	370	275	170	120	90	70	60
21	550	550	375	280	180	120	100	60	60
22	600	600	400	325	190	130	120	70	50
24	700	700	500	350	225	150	130	80	50
25	800	800	600	400	300	175	140	100	55
27	32767	32767	32767	32767	32767	32767	32767	32767	32767
29	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: SCD Delta

OR (decel index >SCD Delta**AND** > SCD Delta ddt Tables)'

load
Load

	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
8	400	400	320	200	145	120	75	65	55	32767	32767	32767	32767
9	400	400	320	200	145	110	75	65	55	32767	32767	32767	32767
11	375	375	260	200	145	110	75	65	55	32767	32767	32767	32767
12	400	400	275	210	150	110	75	65	53	32767	32767	32767	32767
13	425	425	300	220	160	110	80	60	53	32767	32767	32767	32767
15	500	500	350	240	170	120	100	70	55	32767	32767	32767	32767
17	500	500	350	260	180	120	100	80	60	32767	32767	32767	32767
19	550	550	375	275	200	130	110	90	70	32767	32767	32767	32767
22	650	650	500	325	225	140	120	100	75	32767	32767	32767	32767
25	800	800	700	350	300	160	140	120	80	32767	32767	32767	32767
29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
33	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
42	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
48	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767
61	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767

P0300-P0308: SCD Delta ddt

load

	400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
8	400	400	340	220	150	130	75	70	57	32767	32767	32767	32767
9	400	400	340	220	150	120	75	65	57	32767	32767	32767	32767
11	375	375	300	220	150	120	75	65	55	32767	32767	32767	32767
12	400	400	300	230	170	110	85	65	57	32767	32767	32767	32767
13	425	425	340	250	190	130	95	70	60	32767	32767	32767	32767
15	500	500	370	260	200	140	120	80	65	32767	32767	32767	32767
17	550	550	400	280	225	140	110	90	75	32767	32767	32767	32767
19	650	650	450	325	250	150	120	100	80	32767	32767	32767	32767
22	750	750	600	350	300	170	130	120	90	32767	32767	32767	32767
25	900	900	750	400	375	200	160	140	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

LOOK-UP TABLES

P0300-P0308: Idle Cyl Mode

OR (decel index (>Idle Cyl Mode**AND** > Idle Cyl Mode ddt Tables)

load
Load

	400	500	600	700	800	900	1000	1100	1200
8	1000	1000	800	500	400	300	200	180	120
9	1000	1000	800	500	400	300	200	180	130
11	1000	1000	800	500	400	300	200	180	130
12	1000	1000	800	500	400	275	200	180	130
13	1000	1000	800	500	400	275	200	150	130
14	1000	1000	800	550	400	275	225	150	130
15	1000	1000	800	550	400	275	225	150	130
16	1000	1000	800	550	400	250	200	150	130
17	1200	1200	850	575	400	260	200	150	130
18	1300	1300	850	600	400	300	180	150	130
19	1400	1400	800	600	440	280	180	140	120
21	1500	1500	800	650	460	300	180	140	120
22	1600	1600	800	650	500	310	200	160	120
24	1700	1700	1065	850	600	340	240	170	120
25	1800	1800	1100	900	650	400	270	180	120
27	1900	1900	1150	1000	700	450	300	200	130
29	2000	2000	1200	1100	750	550	400	240	150

P0300-P0308: Idle Cyl Mode ddt

load

	400	500	600	700	800	900	1000	1100	1200
8	1100	1100	750	500	400	300	200	180	120
9	1100	1100	700	500	400	300	200	180	120
11	1100	1100	700	500	400	300	200	180	120
12	1100	1100	700	500	350	250	200	180	120
13	1100	1100	700	500	350	225	200	150	120
14	1100	1100	700	550	350	225	200	150	120
15	1100	1100	750	550	350	225	200	150	120
16	1100	1100	750	500	350	220	200	150	125
17	1200	1200	800	525	350	220	200	150	130
18	1300	1300	800	575	350	250	170	150	130
19	1400	1400	800	500	380	230	160	130	120
21	1500	1500	800	500	340	250	180	130	110
22	1600	1600	800	625	400	250	190	160	110
24	1700	1700	1000	800	500	300	200	160	110
25	1800	1800	1100	900	600	350	250	180	110
27	1900	1900	1150	1000	700	400	300	200	130
29	2000	2000	1200	1100	750	500	400	220	150

LOOK-UP TABLES

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

load / Load		400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3500	4000	4500	5000	5500	6000	6500	7000
load	8	1000	1000	800	650	350	260	200	150	150	100	55	40	32	25	18	14	12	9	4	4	4	3	2	32767	32767	32767
Load	9	1000	1000	750	600	350	260	175	150	140	100	55	40	32	25	17	14	11	9	4	4	4	3	2	32767	32767	32767
	11	900	900	650	550	350	260	175	150	140	90	55	40	32	25	17	14	11	9	4	4	4	3	3	32767	32767	32767
	12	800	800	650	550	350	240	175	150	130	80	50	40	32	24	18	14	12	9	4	4	4	3	3	32767	32767	32767
	13	900	900	750	550	355	250	180	150	120	80	55	40	30	25	19	15	13	10	5	4	3	3	3	32767	32767	32767
	15	900	900	850	600	425	275	200	150	130	80	60	42	32	28	22	16	13	11	5	4	3	3	2	32767	32767	32767
	17	1000	1000	900	650	450	300	250	160	135	85	60	50	37	30	22	17	14	12	6	4	4	3	2	32767	32767	32767
	19	1100	1100	1000	700	500	325	275	175	150	120	70	55	40	35	24	18	15	12	6	5	4	3	2	32767	32767	32767
	22	1200	1200	1100	800	600	350	300	200	200	130	80	55	40	35	24	21	16	13	7	5	4	3	2	32767	32767	32767
	25	1300	1300	1200	900	700	450	350	250	210	140	90	60	50	40	30	22	17	13	8	5	4	3	2	32767	32767	32767
	29	1400	1400	1300	1000	800	550	425	300	200	150	90	70	50	45	32	23	20	15	9	6	5	3	3	32767	32767	32767
	33	1600	1600	1400	1200	900	650	500	400	225	150	100	80	60	48	34	28	22	16	10	7	5	3	3	32767	32767	32767
	38	1800	1800	1600	1400	1000	750	600	450	275	160	120	90	65	55	36	30	30	22	11	7	6	4	3	32767	32767	32767
	42	2000	2000	1800	1600	1100	850	700	500	325	200	130	110	80	65	40	35	35	26	13	9	6	5	4	32767	32767	32767
	48	2000	2000	1800	1600	1200	1000	800	550	375	225	150	125	95	70	50	40	40	28	16	10	8	5	4	32767	32767	32767
	54	2000	2000	1800	1600	1200	1000	800	600	400	250	200	150	120	80	60	50	45	30	18	12	10	6	5	32767	32767	32767
	61	2000	2000	1800	1600	1200	1000	800	700	500	325	250	175	140	100	80	70	55	35	24	16	12	8	7	32767	32767	32767

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	1000	1000	800	650	350	280	200	150	150	100	50	40	35	25	18	12	12	9	0	0	0	0	0	0	0	0
	9	1000	1000	750	600	350	280	175	150	140	100	50	40	30	25	17	12	10	9	0	0	0	0	0	0	0	0
	11	900	900	650	550	350	280	175	150	140	90	50	40	30	24	16	12	10	9	0	0	0	0	0	0	0	0
	12	900	900	700	550	375	250	175	150	130	80	55	40	30	24	17	12	10	9	0	0	0	0	0	0	0	0
	13	1000	1000	800	600	400	300	200	170	120	80	55	40	30	25	19	13	13	10	0	0	0	0	0	0	0	0
	15	1000	1000	900	650	500	325	225	180	130	90	60	42	34	28	22	15	12	11	0	0	0	0	0	0	0	0
	17	1100	1100	1000	700	500	350	275	200	150	100	70	45	40	30	24	16	13	12	0	0	0	0	0	0	0	0
	19	1200	1200	1100	800	600	375	325	225	160	140	70	55	40	35	26	20	15	12	0	0	0	0	0	0	0	0
	22	1300	1300	1200	900	700	450	350	250	200	150	80	60	45	38	28	22	18	17	0	0	0	0	0	0	0	0
	25	1400	1400	1300	1000	800	523	450	300	200	150	90	70	50	40	32	22	19	17	0	0	0	0	0	0	0	0
	29	1500	1500	1400	1100	900	650	500	375	225	160	100	80	55	48	36	25	24	18	0	0	0	0	0	0	0	0
	33	1600	1600	1500	1200	1000	750	500	425	250	180	120	90	65	50	38	32	26	22	0	0	0	0	0	0	0	0
	38	1800	1800	1600	1400	1100	850	600	450	350	200	140	100	70	60	42	40	35	26	0	0	0	0	0	0	0	0
	42	2000	2000	1800	1600	1200	1000	700	500	400	250	150	120	90	70	50	45	40	30	0	0	0	0	0	0	0	0
	48	2000	2000	1800	1600	1200	1000	800	550	450	275	200	150	110	80	60	50	45	32	0	0	0	0	0	0	0	0
	54	2000	2000	1800	1600	1200	1000	800	600	450	300	225	175	140	90	70	60	55	36	0	0	0	0	0	0	0	0
	61	2000	2000	1800	1600	1200	1000	800	700	525	425	275	200	160	120	100	80	65	45	0	0	0	0	0	0	0	0

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

load		400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2600	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	75	55	40	30	26	16	32767	32767	32767
	9	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	80	55	40	32	26	18	32767	32767	32767
	11	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	85	60	40	32	26	22	32767	32767	32767
	12	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	85	60	45	32	26	22	32767	32767	32767
	13	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	90	70	50	40	28	24	32767	32767	32767
	15	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	100	80	55	45	32	26	32767	32767	32767
	17	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	120	90	65	50	40	32	32767	32767	32767
	19	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	140	100	80	55	45	35	32767	32767	32767
	22	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	160	120	90	65	50	40	32767	32767	32767
	25	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	170	140	100	75	60	50	32767	32767	32767
	29	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	180	150	110	85	70	55	32767	32767	32767
	33	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	220	180	130	110	80	60	32767	32767	32767
	38	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	280	220	140	125	90	70	32767	32767	32767
	42	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	320	260	150	140	100	80	32767	32767	32767
	48	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	350	290	180	160	120	100	32767	32767	32767
	54	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	370	320	200	180	135	120	32767	32767	32767
	61	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	32767	400	350	220	200	150	140	32767	32767	32767

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

load / Load		400	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000	2200	2400	2600	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

LOOK-UP TABLES

P0300-P0308: Zero torque engine load

Note: Zero torque is adjusted for Baro since load for misfire thresholds is relative to (maximum air density PID $1188 SAE xxx), not (current density as defined PID $04 SAE1979)

RPM	Pct load
400	11.00
500	10.00
600	9.50
700	9.10
800	9.10
900	9.05
1000	9.00
1100	8.90
1200	8.90
1400	9.00
1600	9.10
1800	9.20
2000	9.30
2200	9.40
2400	9.45
2600	9.50
2800	9.60
3000	9.70
3500	12.54
4000	14.87
4500	17.21
5000	19.55
5500	21.88
6000	24.22
6500	26.56
7000	28.89

KcMISF_OneCylNoCatDamLvl

Catalyst Damaging Misfire Percentage

load
Load

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

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

Need to change

	0.000	0.018	0.036	0.054	0.078	0.096	0.114	0.126	0.144	0.162	0.180	0.195	0.210	0.215	0.250	0.275	2.000
0.000	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
0.018	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
0.036	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
0.054	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
0.072	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
0.090	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.108	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.126	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.144	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.162	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.168	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.172	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.179	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.215	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.250	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

LOOK-UP TABLES

	0.000	0.018	0.036	0.054	0.078	0.096	0.114	0.126	0.144	0.162	0.180	0.195	0.210	0.215	0.250	0.275	2.000
0.000	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
0.018	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
0.036	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
0.054	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
0.072	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
0.090	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.108	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.126	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.144	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.162	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.168	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.172	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.179	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
0.200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.215	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.250	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 minumum switches

	0.0	10.0	20.0	50.0	80.0
0.0	41	41	41	41	41
6.3	41	41	41	41	41
12.5	42	42	42	42	42
18.8	42	42	42	42	42
25.0	42	42	42	42	42
31.3	42	42	42	42	42
37.5	43	43	43	43	43
43.8	43	43	43	43	43
50.0	43	43	43	43	43
56.3	43	43	43	43	43
62.5	44	44	44	44	44
68.8	44	44	44	44	44
75.0	44	44	44	44	44
81.3	44	44	44	44	44
87.5	45	45	45	45	45
93.8	45	45	45	45	45
100.0	45	45	45	45	45

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

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

	0.0	10.0	20.0	50.0	80.0
0.0	41	41	41	41	41
6.3	41	41	41	41	41
12.5	42	42	42	42	42
18.8	42	42	42	42	42
25.0	42	42	42	42	42
31.3	42	42	42	42	42
37.5	43	43	43	43	43
43.8	43	43	43	43	43
50.0	43	43	43	43	43
56.3	43	43	43	43	43
62.5	44	44	44	44	44
68.8	44	44	44	44	44
75.0	44	44	44	44	44
81.3	44	44	44	44	44
87.5	45	45	45	45	45
93.8	45	45	45	45	45
100.0	45	45	45	45	45

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

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

	0.0	10.0	20.0	50.0	80.0
0.0	41	41	41	41	41
6.3	41	41	41	41	41
12.5	42	42	42	42	42
18.8	42	42	42	42	42
25.0	42	42	42	42	42
31.3	42	42	42	42	42
37.5	43	43	43	43	43
43.8	43	43	43	43	43
50.0	43	43	43	43	43
56.3	43	43	43	43	43
62.5	44	44	44	44	44
68.8	44	44	44	44	44
75.0	44	44	44	44	44
81.3	44	44	44	44	44
87.5	45	45	45	45	45
93.8	45	45	45	45	45
100.0	45	45	45	45	45

LOOK-UP TABLES

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

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

	0.0	10.0	20.0	50.0	80.0
0.0	41	41	41	41	41
6.3	41	41	41	41	41
12.5	42	42	42	42	42
18.8	42	42	42	42	42
25.0	42	42	42	42	42
31.3	42	42	42	42	42
37.5	43	43	43	43	43
43.8	43	43	43	43	43
50.0	43	43	43	43	43
56.3	43	43	43	43	43
62.5	44	44	44	44	44
68.8	44	44	44	44	44
75.0	44	44	44	44	44
81.3	44	44	44	44	44
87.5	45	45	45	45	45
93.8	45	45	45	45	45
100.0	45	45	45	45	45

P2270/P2272 - O2 Sensor Signal Stuck Lean Bank 1/2 Sensor 2 Rich Equiv Ratio

	0.0	500.0	1000.0	1500.0	2000.0
0.0	1.120117	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

	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

P2A01 - O2 Sensor Signal Stuck Lean Bank 1 Sensor 2 Rich Equiv Ratio

	0.0	500.0	1000.0	1500.0	2000.0
0.0	0.919922	0.919922	0.919922	0.919922	0.919922
25.0	0.919922	0.919922	0.919922	0.919922	0.919922
50.0	0.919922	0.919922	0.919922	0.919922	0.919922
75.0	0.919922	0.919922	0.919922	0.919922	0.919922
100.0	0.919922	0.919922	0.919922	0.919922	0.919922

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

P2A01- O2 Sensor Signal Stuck Rich Bank 1 Sensor 2 Lean Equiv Ratio

	0.0	500.0	1000.0	1500.0	2000.0
0.0	1.080078	1.080078	1.080078	1.080078	1.080078
25.0	1.080078	1.080078	1.080078	1.080078	1.080078
50.0	1.100098	1.100098	1.100098	1.100098	1.100098
75.0	1.120117	1.120117	1.120117	1.120117	1.120117
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

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

For P3400: 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
	0.000	0.000	0.500	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.000	0.000

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
	0.000	0.000	0.286	0.481	1.000	0.337	0.316	1.000	1.000	0.701	0.721	0.545	0.415	0.000	0.000	0.000	0.000

MAF Residual Weight Factor Based on MAF Estimate

LOOK-UP TABLES

gm/sec	0.0	50.0	70.0	73.0	76.0	79.0	82.0	85.0	89.0	95.0	100.0	110.0	120.0	150.0	200.0	280.0	350.0
	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

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
	0.000	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.000	0.000

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
	0.000	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.000	0.000

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	11	11	11	11	11	11	11	11	11
100.0	11	11	11	11	11	11	11	11	11
200.0	11	11	11	11	11	11	11	11	11
300.0	11	11	11	11	11	11	11	11	11
400.0	11	11	11	11	11	11	11	11	11
500.0	11	11	11	11	11	11	11	11	11
600.0	11	11	11	11	11	11	11	11	11
700.0	28	28	28	28	28	28	28	28	28
800.0	28	28	28	28	28	28	28	28	28
900.0	28	28	28	28	28	28	28	28	28
1000.0	28	28	28	28	28	28	28	28	28
1100.0	28	28	28	28	28	28	28	28	28
1200.0	28	28	28	28	28	28	28	28	28
1300.0	16	16	16	16	16	16	16	16	16
1400.0	5	5	5	5	5	5	5	5	5
1500.0	5	5	5	5	5	5	5	5	5
1600.0	5	5	5	5	5	5	5	5	5
1700.0	5	5	5	5	5	5	5	5	5
1800.0	5	5	5	5	5	5	5	5	5
1900.0	5	5	5	5	5	5	5	5	5
2000.0	5	5	5	5	5	5	5	5	5
2100.0	5	5	5	5	5	5	5	5	5
2200.0	5	5	5	5	5	5	5	5	5
2300.0	5	5	5	5	5	5	5	5	5
2400.0	5	5	5	5	5	5	5	5	5
2500.0	5	5	5	5	5	5	5	5	5
2600.0	5	5	5	5	5	5	5	5	5
2700.0	5	5	5	5	5	5	5	5	5
2800.0	5	5	5	5	5	5	5	5	5
2900.0	5	5	5	5	5	5	5	5	5
3000.0	5	5	5	5	5	5	5	5	5
3100.0	5	5	5	5	5	5	5	5	5
3200.0	5	5	5	5	5	5	5	5	5

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

LOOK-UP TABLES

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
PRNDL Transitional 8	1
PRNDL Transitional 11	1
PRNDL Transitional 13	1
PRNDL Transitional Illegal	1
PRNDL Transitional Between State	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 11	1
PRNDL Transitional 13	1
PRNDL Transitional Illegal	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	1	1	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	1	1	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	54	54	54	54	54	54	54	54	54
100.0	54	54	54	54	54	54	54	54	54
200.0	54	54	54	54	54	54	54	54	54
300.0	53	53	53	53	53	53	53	53	53
400.0	53	53	53	53	53	53	53	53	53
500.0	52	52	52	52	52	52	52	52	52
600.0	51	51	51	51	51	51	51	51	51
700.0	51	51	51	51	51	51	51	51	51
800.0	56	56	56	56	56	56	56	56	56
900.0	55	55	55	55	55	55	55	55	55
1000.0	55	55	55	55	55	55	55	55	55
1100.0	55	55	55	55	55	55	55	55	55
1200.0	55	55	55	55	55	55	55	55	55
1300.0	51	51	51	51	51	51	51	51	51
1400.0	48	48	48	48	48	48	48	48	48
1500.0	47	47	47	47	47	47	47	47	47
1600.0	47	47	47	47	47	47	47	47	47
1700.0	46	46	46	46	46	46	46	46	46
1800.0	46	46	46	46	46	46	46	46	46
1900.0	45	45	45	45	45	45	45	45	45
2000.0	44	44	44	44	44	44	44	44	44
2100.0	44	44	44	44	44	44	44	44	44
2200.0	43	43	43	43	43	43	43	43	43
2300.0	43	43	43	43	43	43	43	43	43
2400.0	43	43	43	43	43	43	43	43	43
2500.0	43	43	43	43	43	43	43	43	43
2600.0	43	43	43	43	43	43	43	43	43
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	54	54	54	54	54	54	54	54	54
100.0	54	54	54	54	54	54	54	54	54
200.0	53	53	53	53	53	53	53	53	53
300.0	53	53	53	53	53	53	53	53	53
400.0	50	50	50	50	50	50	50	50	50
500.0	50	50	50	50	50	50	50	50	50
600.0	49	49	49	49	49	49	49	49	49
700.0	49	49	49	49	49	49	49	49	49
800.0	48	48	48	48	48	48	48	48	48
900.0	48	48	48	48	48	48	48	48	48
1000.0	48	48	48	48	48	48	48	48	48
1100.0	47	47	47	47	47	47	47	47	47
1200.0	47	47	47	47	47	47	47	47	47
1300.0	47	47	47	47	47	47	47	47	47

LOOK-UP TABLES

1400.0	47	47	47	47	47	47	47	47	47
1500.0	47	47	47	47	47	47	47	47	47
1600.0	47	47	47	47	47	47	47	47	47
1700.0	45	45	45	45	45	45	45	45	45
1800.0	45	45	45	45	45	45	45	45	45
1900.0	44	44	44	44	44	44	44	44	44
2000.0	43	43	43	43	43	43	43	43	43
2100.0	43	43	43	43	43	43	43	43	43
2200.0	43	43	43	43	43	43	43	43	43
2300.0	43	43	43	43	43	43	43	43	43
2400.0	43	43	43	43	43	43	43	43	43
2500.0	43	43	43	43	43	43	43	43	43
2600.0	43	43	43	43	43	43	43	43	43
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 Factor**

Axis	0	500	900	1000	2000	3000	4000	5000	6000
Curve	0	0	0	0	0	0	0	0	0

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

Axis	-10	-5	60	80	90	100	120	130	140
Curve	0	1	1	1	1	1	1	1	0

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

Axis	0	5	10	20	30	50	100	200	399
Curve	1	1	1	0	0	0	0	0	0

EngOilPredictionWeightFacotrTable — **AXIS is Engine RPM, Curve is Engine Oil Prediction Weight Factor Ratio**

Axis	0	170	250	275	360	375	400	500	600
Curve	0	0	1	1	1	1	1	1	0

CSED Section

KtIDLC_n_CLO_ThrshOfst

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

KaIDLC_n_EngDsrdBase[CiIDLR_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	600	600	600	600	665	725	725	725

KaIDLC_n_EngDsrdBase[CiIDLR_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	560	500	500	500	665	725	725	725

Phaser Section

KtPHSD_phi_CamPosErrorLimlc1

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

LOOK-UP TABLES

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	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
800	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
1200	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
1600	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
2000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
2400	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
2800	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
3200	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
3600	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
4000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
4400	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
4800	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
5200	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
5600	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
6000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
6400	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
6800	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000

P0068: MAP / MAF / TPS Correleation

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

X-axis	5.0003	10.0006	14.9994	19.9997	25.0000	30.0003	35.0006	39.9994	99.9985
Data	21.4531	22.8125	22.5625	18.6875	19.5859	19.2266	100.0000	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	15.4297	19.7188	25.3203	26.8672	36.7891	45.0547	255.0000	255.0000	255.0000

P1682: Ignition Voltage Correleation

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

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

FAULT BUNDLE DEFINITIONS

Cert Doc Bundle Name	Pcodes											
CatalystSysEfficiencyLoB1_FA	P0420											
CatalystSysEfficiencyLoB2_FA	P0430											
EvapPurgeSolenoidCircuit_FA	P0443											
EvapFlowDuringNonPurge_FA	P0496											
EvapVentSolenoidCircuit_FA	P0449											
EvapSmallLeak_FA	P0442											
EvapEmissionSystem_FA	P0455	P0446										
FuelTankPressureSnsrCkt_FA	P0452	P0453										
CoolingFanSpeedTooHigh_FA	P0495											
FuelLevelDataFault	P0461	P0462	P0463	P2066	P2067	P2068						
PowertrainRelayFault	P1682											
PowertrainRelayStateOn_FA	P0685											
PowertrainRelayStateOn_Error	P0685											
IgnitionOffTimer_FA	P2610											
IgnitionOffTimeValid	P2610											
TimeSinceEngineRunningValid	P2610											
VehicleSpeedSensor_FA	P0502	P0503	P0722	P0723								
VehicleSpeedSensorError	P0502	P0503	P0722	P0723								
FuelTrimSystemB1_FA	P0171	P0172										
FuelTrimSystemB2_FA	P0174	P0175										
A/F Imbalance Bank1	P1174											
A/F Imbalance Bank2	P1175											
AIRSystemPressureSensor FA	P2430	P2431	P2432	P2433	P2435	P2436	P2437	P2438				
AIR System FA	P0411	P2440	P2444									
AIRValveControlCircuit FA	P0412											
AIRPumpControlCircuit FA	P0418											
Clutch Sensor FA	P0806	P0807	P0808									
ClutchPositionSensorCktLo FA	P0807											
ClutchPositionSensorCktHi FA	P0808											
EthanolCompositionSensor_FA	P0178	P0179										
EngineMisfireDetected_TFTKO	P0300	P0301	P0302	P0303	P0304	P0305	P0306	P0307	P0308			
EngineMisfireDetected_FA	P0300	P0301	P0302	P0303	P0304	P0305	P0306	P0307	P0308			
KS_Ckt_Perf_B1B2_FA	P0324	P0325	P0326	P0327	P0328	P0330	P0332	P0333				
IgnitionOutputDriver_FA	P0351	P0352	P0353	P0354	P0355	P0356	P0357	P0358				
O2S_Bank_ 1_TFTKO	P0131	P0132	P0134	P2A00								
O2S_Bank_ 2_TFTKO	P0151	P0152	P0154	P2A03								

FAULT BUNDLE DEFINITIONS

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										

FAULT BUNDLE DEFINITIONS												
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											

FAULT BUNDLE DEFINITIONS

	no codes?											
A/C_FailedOn	P0645											
EngOilTempSensorCircuitFA	P0197	P0198										
EngOilModeledTempValid	ECT_Sensor_FA or IAT_SensorCircuitFA											
EngOilPressureSensorCktFA	P0522	P0523										
EngOilPressureSensorFA	P0521	P0522	P0523									
see Trans Summary Tables												
CylnderDeacDriverTFTKO	P3401	P3409	P3417	P3425	P3433	P3441	P3449					
BrakeBoosterSensorFA	P0556	P0557	P0558									
BrakeBoosterVacuumValid	P0556	P0557	P0558									
BrakeBoosterVacuumValid	VehicleSpeedSensorError or MAP_SensorFA											
FuelInjectorCircuit_FA	P0201	P0202	P0203	P0204	P0205	P0206	P0207	P0208				
FuelInjectorCircuit_TFTKO	P0201	P0202	P0203	P0204	P0205	P0206	P0207	P0208				
ControllerProcessorPerf_FA	P0606											
ControllerRAM_Error_FA	P0604											
TPS_Performance_FA	P0068	P0121	P1516	P2101								
EnginePowerLimited	P0068	P0606	P0120	P0122	P0123	P0220	P0222	P0223	P0641	P0651		
	P1516	P2101	P2120	P2122	P2123	P2125	P2127	P2128	P2135	P2138	P2176	
TPS1_OutOfRange_Composite	P0120	P0122	P0123									
TPS2_OutOfRange_Composite	P0220	P0222	P0223									
TPS_FA	P2135	(TPS1_OutOfRange_Composite and TPS2_OutOfRange_Composite)										
TPS_FaultPending	Always set to FALSE, As ETC diagnostics are set within 200 msec there is no real need for a pending flag											
TPS_ThrottleAuthorityDefaulted	P0068	P0606	P1516	P2101	P2135	P2176	V5B_OutOfRange_Composite					
	(TPS1_OutOfRange_Composite and TPS2_OutOfRange_Composite)											
	(MAP_OutOfRange_Composite and MAF_OutOfRange_Composite)											
AcceleratorEffectivePstnValid	Always set to TRUE, no P codes will set to FALSE											
5VoltReferenceA_FA	P0641											
5VoltReferenceB_FA	P0651											
IAC_SystemRPM_FA	P0506	P0507										
TransmissionGearDefaulted	P182E	P1915										
TransmissionEngagedState_FA	P182E	P1915										
FourWheelDriveLowStateValid	P2771											
EngineTorqureInaccurate	EngineMisfireDetected_FA or											
	FuelInjectorCircuit_FA or											

FAULT BUNDLE DEFINITIONS

	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 < 0.0 liters		
	AND		
	Fuel Volume in Secondary Fuel Tank ≥ 100.0 liters		
	AND		
	Transfer Pump on Time < **TransferPumpOnTimeLimit** Table		
	AND		
	Transfer Pump had been Off for at least 0.0 seconds		
	AND		
	Evap Diagnostic (Purge Valve Leak Test, 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 System Control Module:								
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 Intrusive test requested if fuel system is clamped for >= 5 seconds or fuel pressure error variance <= 0.6 (calculated over a 2.5sec period); otherwise report pass	DTC Type A 1 trip
					1. FRP Circuit Low DTC (P0192)	not active		
					2. FRP Circuit High DTC (P0193)	not active		
					3. FuelPump Circuit Low DTC (P0231)	not active	Duration of intrusive test is fueling related (5 to 12 seconds).	
					4. FuelPump Circuit High DTC (P0232)	not active		
					5. FuelPump Circuit Open DTC (P023F)	not active	Intrusive test is run when fuel flow is < 29.7 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		
					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		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Fuel System Control Module:								
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	Ignition AND Reference Voltage DTC P0641	Run or Crank not active	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
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	Ignition AND Reference Voltage DTC P0641	Run or Crank not active	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
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	 Run or Crank enabled enabled	72 test failures in 80 test samples; 1 sample/12.5ms	DTC Type A

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Fuel System Control Module:								
					Ignition Run/Crank Voltage	9V < voltage < 18V		
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 HS Comm OR Fuel Pump Control	Run or Crank enabled enabled	1 failure Frequency: Once at power-up	DTC Type A 1 trip
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	Run or Crank	1 failure if it occurs during the first RAM test of the ignition cycle, otherwise 5 failures Frequency:	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 System Control Module:								
					HS Comm OR Fuel Pump Control	enabled enabled	Runs continuously in the background.	
Control Module Internal 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.)	1. For all I/O configuration register faults: •Register contents 2. For Processor Clock Fault: •EE latch flag in EEPROM. OR	Incorrect value.	Ignition OR HS Comm OR Fuel Pump Control 1. For all I/O configuration register faults: •KeMEMD_b_ProcFltCfgRegEnbl	Run or Crack enabled enabled TRUE	Tests 1 and 2 1 failure Frequency: Continuously (12.5ms) Test 3 3 failures out of 15 samples	DTC Type A 1 trip
2. Processor clock test			• RAM latch flag.	0x5A5A 0x5A	2. For Processor Clock Fault: •KeMEMD_b_ProcFltCLKDiagEnbl	TRUE	1 sample/12.5 ms	
3. External watchdog test			3. For External Watchdog Fault: • Software control of viper chip.	Control Lost	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 not active 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

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Fuel System Control Module:								
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	72 failures out of 80 samples 1 sample/12.5 ms	DTC Type A 1 trip
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 **AND** Viper Temp	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.) > 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
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	144 failures out of 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 electronic return-less fuel system	Filtered fuel rail pressure error	<= Low Threshold (function of desired fuel rail pressure and fuel flow rate. Typical values in the range of -28.4 to -193.5 kPa.) **OR**	1. FRP Circuit Low DTC (P0192)	not active	Filtered fuel rail 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.
Fuel System Control Module:								
				> High Threshold (function of desired fuel rail pressure and fuel flow rate. Typical values in the range of 19.5 to 166.5 kPa.)	2. FRP Circuit High DTC (P0193)	not active		
					3. Fuel Rail Pressure Sensor Performance DTC (P0191)	not active		
					4. FuelPump Circuit Low DTC (P0231)	not active		
					5. FuelPump Circuit High DTC (P0232)	not active		
					6. FuelPump Circuit Open DTC (P023F)	not active		
					7. Reference Voltage DTC (P0641)	not active		
					8. 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 30 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.		

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