

Diagnostic Trouble Code (DTC) Description

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
P0010 - Intake Camshaft Position Actuator Circuit Open (Bank 1)	The comprehensive component monitor (CCM) monitors the VCT circuit to the PCM for high and low voltage. If the voltage falls below a calibrated limit a calibrated amount of time during testing, the test fails.	<ul style="list-style-type: none"> • Open or short in the VCT circuit • Open VPWR circuit • Damaged PCM • Open or short in the VCT solenoid valve 	DTC P1380 is a VCT circuit check. Testing should include wires, solenoid coil, and the PCM.
P0011 - Intake Camshaft Position Timing - Over-Advanced (Bank 1)	The comprehensive component monitor (CCM) monitors the VCT position for an over-advanced camshaft timing. The test fails when the camshaft timing exceeds a maximum calibrated value or remains in an advanced position.	<ul style="list-style-type: none"> • Camshaft timing improperly set • Continuous oil flow to the VCT piston chamber • VCT solenoid valve stuck open • Camshaft advance mechanism binding (VCT unit) 	DTC P1383 is a check of the VCT unit. Testing should not include electrical checks. The engine will idle rough, start hard and may stall. Diagnostics and repair for the VCT unit are located in the Workshop Manual.
P0012 - Variable Camshaft Timing Over-retarded (Bank 1)	The comprehensive component monitor (CCM) monitors the VCT position for over-retarded camshaft timing. The test fails when the camshaft timing exceeds a maximum calibrated value or remains in a retarded position.	<ul style="list-style-type: none"> • Camshaft timing improperly set • Continuous oil flow to the VCT piston chamber • VCT solenoid valve stuck open • Camshaft advance mechanism binding (VCT unit) 	DTC P1383 is a check of the VCT unit. Testing should not include electrical checks. The engine will idle rough, start hard and may stall. Diagnostics and repair for the VCT unit are located in the Workshop Manual.
P0013 - Exhaust Camshaft Position Actuator Circuit / Open (Bank 1)	The comprehensive component monitor (CCM) monitors the VCT circuit to the PCM for high and low voltage. If the voltage falls below a calibrated limit a calibrated amount of time during testing, the test fails.	<ul style="list-style-type: none"> • Open or short in the VCT circuit • Open VPWR circuit • Damaged PCM • Open or short in the VCT solenoid valve 	DTC P1380 is a VCT circuit check. Testing should include wires, solenoid coil, and the PCM.
P0020 - Intake Camshaft Position Actuator Circuit Open (Bank 2)	Camshaft Position Actuator Circuit/Open (Bank 2).	solenoid open circuit. Open in the wiring from the circuit driver to the solenoid.	

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
		Defective circuit driver. No VPWR at the solenoid.	
P0021 - Intake Camshaft Position Timing - Over-Advanced (Bank 2)	The comprehensive component monitor (CCM) monitors the VCT position for an over-advanced camshaft timing. The test fails when the camshaft timing exceeds a maximum calibrated value or remains in an advanced position.		
P0022 - Intake Camshaft Position Timing - Over-Retarded (Bank 2)	The comprehensive component monitor (CCM) monitors the VCT position for over-retarded camshaft timing. The test fails when the camshaft timing exceeds a maximum calibrated value or remains in a retarded position.		
P0040 - Upstream Oxygen Sensors Swapped from Bank to Bank (HO2S-11-21)	The heated oxygen sensor (HO2S) monitor determines if the HO2S signal response for a fuel shift corresponds to the correct engine bank. The test fails when a response from the HO2S being tested is not indicated.	<ul style="list-style-type: none"> • Crossed HO2S harness connectors (upstream). • Crossed HO2S wiring at the harness connectors (upstream). • Crossed HO2S wiring at the 104-pin harness connectors (upstream). 	
P0041 - Downstream Oxygen Sensors Swapped from Bank to Bank (HO2S-12-22)	The heated oxygen sensor (HO2S) monitor determines if the HO2S signal response for a fuel shift corresponds to the correct engine bank. The test fails when a response from the HO2S being tested is not indicated.	<ul style="list-style-type: none"> • Crossed HO2S harness connectors (downstream). • Crossed HO2S wiring at the harness connectors (downstream). • Crossed HO2S wiring at the 104-pin harness connectors (downstream). 	
P0053 - HO2S Heater Resistance (Bank 1, Sensor 1)	Heater current requirements too low or high in HO2S Heater Control Circuit (Bank 1, Sensor 1).		
P0054 - HO2S Heater Resistance (Bank 1, Sensor 2)	Heater current requirements too low or high in HO2S Heater Control Circuit (Bank 1, Sensor 2).		
P0055 - HO2S Heater Resistance (Bank 1, Sensor 3)	Heater current requirements too low or high in HO2S Heater Control Circuit (Bank 1, Sensor 3).		
P0059 - HO2S Heater Resistance (Bank 2, Sensor 1)	Heater current requirements too low or high in HO2S Heater Control Circuit		

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
	(Bank 2, Sensor 1).		
P0060 - HO2S Heater Resistance (Bank 2, Sensor 2)	Heater current requirements too low or high in HO2S Heater Control Circuit (Bank 2 Sensor 2).		
P0061 - HO2S Heater Resistance (Bank 2, Sensor 3)	Heater current requirements too low or high in HO2S Heater Control Circuit (Bank 2 Sensor 3).		
P0068 - Throttle Position (TP) Sensor Inconsistent with the MAF Sensor	The PCM monitors a vehicle operation rationality check by comparing sensed throttle position to mass air flow readings. If, during a KOER self-test, the comparison of the TP sensor and MAF sensor readings are not consistent with the calibrated load values, the test fails and a diagnostic trouble code is stored in continuous memory.	<ul style="list-style-type: none"> • Air leak between the MAF sensor and throttle body • TP sensor not seated properly • Damaged TP sensor • Damaged MAF sensor 	Drive the vehicle and exercise the throttle and the TP sensor in all gears. A TP PID (TP V PID) less than 4.82% (0.24 volt) with a LOAD PID greater than 55%, or a TP PID (TP V PID) greater than 49.05% (2.44 volts) with a LOAD PID less than 30%, indicates a hard fault.
P0102 - Mass Air Flow (MAF) Circuit Low Input	The MAF sensor circuit is monitored by the PCM for low air flow (or voltage) input through the comprehensive component monitor (CCM). If during key ON, engine running the air flow (or voltage) changes below a minimum calibrated limit, the test fails.	<ul style="list-style-type: none"> • MAF sensor disconnected • MAF circuit open to PCM • VPWR open to MAF sensor • PWR GND open to the MAF sensor • MAF RTN circuit open to PCM • MAF circuit shorted to GND • Intake air leak (near the MAF sensor) • A closed throttle indication (throttle position [TP] sensor system) • Damaged MAF sensor • Damaged PCM 	A MAF V PID (MAF PID) reading less than 0.23 volt in continuous memory or key ON and engine running indicates a hard fault.
P0103 - Mass Air Flow (MAF) Circuit High Input	The MAF sensor circuit is monitored by the PCM for high air flow (or voltage) input through the comprehensive component monitor (CCM). If during key ON, engine OFF, or key ON, engine running, the air flow (or voltage) changes above a maximum calibrated limit, the test fails.	<ul style="list-style-type: none"> • MAF sensor screen is blocked • MAF circuit shorted to VPWR • Damaged MAF sensor • Damaged PCM 	A MAF V PID (MAF PID) reading less than 4.6 volts in continuous memory or key ON, engine running indicates a hard fault.
P0104 - Mass or Volume Air Flow A Circuit Intermittent/Erratic	A fault exists in the mass air flow (MAF) A circuit, or the air tube containing the sensor, causing an incorrect air flow reading.	Intermittent circuit A open or short. Air leaks in the tube from the MAF sensor to the throttle body.	VERIFY the integrity of the Mass Air Flow Sensor circuit A, for intermittent fault. CHECK the Mass Air Flow Sensor tube for air leaks.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
P0106 - Barometric (BARO) Pressure Sensor Circuit Performance	BARO sensor input to the PCM is monitored and is not within the calibrated value.	<ul style="list-style-type: none"> • Slow responding BARO sensor • Electrical circuit failure • Damaged BARO sensor • Damaged PCM 	<ul style="list-style-type: none"> • VREF voltage should be between 4.0 and 6.0 volts • The PID reading is in frequency
P0107 - BARO/MAP Sensor Low Voltage Detected	Sensor operating voltage is less than 0.25 volt (VREF). As a result it failed below the minimum allowable calibrated parameter.	<ul style="list-style-type: none"> • Open in the circuit, or short to ground • VREF circuit open, or short to ground • Damaged BARO/MAP sensor • Damaged PCM 	<ul style="list-style-type: none"> • VREF should be greater than 4.0 volts • The PID reading is in frequency/volts
P0108 - BARO/MAP Sensor High Voltage Detected	The sensor operating voltage is greater than 5 volts (VREF). As a result it failed above the maximum allowable calibrated parameter.	<ul style="list-style-type: none"> • VREF shorted to VPWR • BARO/MAP signal shorted to VPWR • VREF should be less than 6.0 volts. The PID reading is in frequency/volts • Damaged PCM 	<ul style="list-style-type: none"> • VREF should be greater than 4.0 volts • The PID reading is in frequency/volts
P0109 - BARO Sensor Circuit Intermittent	The sensor signal to the PCM is failing intermittently.	<ul style="list-style-type: none"> • Loose electrical connection • Damaged BARO sensor 	Check the harness and connection.
P0112 - Intake Air Temperature (IAT) Sensor 1 Circuit Low Input	Indicates the sensor signal is less than the self-test minimum. The IAT sensor minimum is 0.2 volt or 121°C (250°F).	<ul style="list-style-type: none"> • Grounded circuit in the harness • Damaged sensor • Improper harness connection • Damaged PCM 	An IAT V PID reading less than 0.2 volt with key ON and engine OFF or during any engine operating mode indicates a hard fault.
P0113 - Intake Air Temperature (IAT) Sensor 1 Circuit High Input	Indicates the sensor signal is greater than the self-test maximum. The IAT sensor maximum is 4.6 volts or -50°C (-58°F).	<ul style="list-style-type: none"> • Open circuit in the harness • Sensor signal short to voltage • Damaged sensor • Improper harness connection • Damaged PCM 	An IAT V PID reading greater than 4.6 volts with key ON and engine OFF or during any engine operating mode indicates a hard fault.
P0114 - Intake Air Temperature (IAT) Sensor 1 Intermittent/Erratic	Indicates the IAT sensor signal was intermittent during the comprehensive component monitor.	<ul style="list-style-type: none"> • Damaged harness • Damaged sensor • Damaged harness connector • Damaged PCM 	Monitor the IAT on the diagnostic tool, and look for sudden changes in the reading when the harness is wiggled or the sensor is tapped.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
P0116 - Engine Coolant Temperature Sensor 1 Circuit Range/Performance Failure	<p>Indicates the engine coolant temperature rationality test has failed. The PCM logic that sets this DTC indicates that engine coolant temperature sensor (ECT or CHT) drifted higher than the nominal sensor calibration curve and could prevent 1 or more OBD monitors from executing.</p> <p>The PCM runs this logic after an engine off/calibrated soak period (typically 6 hours). This soak period allows the intake air temperature (IAT) and engine coolant temperature (CHT or ECT) to stabilize and not differ by more than a calibrated value. DTC P0116 is set when all of the following conditions are met:</p> <ul style="list-style-type: none"> • Engine coolant temperature at engine start exceeds IAT at engine start by more than a calibrated value, typically -1°C (30°F). • Engine coolant temperature exceeds a calibrated value, typically 107°C (225°F). • The Fuel System, Heated Oxygen and Misfire Monitors have not completed. • Calibrated timer to set DTC P0116 has expired. 	<ul style="list-style-type: none"> • Engine Coolant Temperature (ECT) or Cylinder Head Temperature (CHT) Sensor • Coolant System Concern 	<p>Make sure the IAT and the engine coolant temperature are similar when the engine is cold. Also make sure the ECT or CHT sensor and the actual engine operating temperatures are the same.</p>
P0117 - Engine Coolant Temperature (ECT) Sensor 1 Circuit Low Input	<p>Indicates the sensor signal is less than the self-test minimum. The ECT sensor minimum is 0.2 volt or 121°C (250°F). Note: on some vehicles that are not equipped with an ECT sensor, a cylinder head temperature (CHT) sensor can be used and can set this DTC.</p>	<ul style="list-style-type: none"> • Grounded circuit in the harness • Damaged sensor • Improper harness connection • Damaged PCM 	<p>An ECT V PID reading less than 0.2 volt with key ON and engine OFF or during any engine operating mode indicates a hard fault.</p>
P0118 - Engine Coolant Temperature (ECT) Sensor 1 Circuit High Input	<p>Indicates the sensor signal is greater than the self-test maximum. The ECT sensor maximum is 4.6 volts or -50°C (-58°F). Note: on some vehicles that are not equipped with an ECT sensor, a cylinder head temperature (CHT) sensor can be used and can set this DTC.</p>	<ul style="list-style-type: none"> • Open circuit in the harness • Sensor signal short to voltage • Damaged PCM • Improper harness connection • Damaged sensor 	<p>An ECT V PID reading greater than 4.6 volts with key ON and engine OFF or during any engine operating mode indicates a hard fault.</p>
P0119 - Engine Coolant Temperature (ECT) Sensor 1 Circuit Intermittent/Erratic	<p>Indicates the ECT circuit became intermittently open or shorted while the engine was running. Note that on some vehicles which are not equipped with an</p>	<ul style="list-style-type: none"> • Damaged harness • Damaged sensor • Damaged PCM 	<p>Monitor the ECT or CHT on a diagnostic tool, and look for sudden changes in the reading when the harness is wiggled or the sensor is tapped.</p>

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
	ECT sensor, the CHT can be used and can set this DTC.	<ul style="list-style-type: none"> • Damaged harness connector • Low engine coolant 	
<p>P0121 - Throttle/Pedal Position Sensor A Circuit Range/Performance</p> <p>Vehicles with electronic throttle control (ETC)</p>	The ETC TP1 sensor was flagged as fault status by the PCM indicating an out of range in either the closed or wide open throttle modes.	<ul style="list-style-type: none"> • Obstruction in the throttle plate movement. • Damaged throttle body • TP circuit open to PCM • Damaged TP sensor • SIG RTN circuit open to the TP sensor • Operator placing 	The fault exhibits a symptom of limited power. A TP1 PID (TP V PID) reading less than 13% (0.65 volt), or greater than 93% (4.65 volts) in key ON engine OFF, continuous memory or key ON engine running indicates a hard fault.
<p>P0121 - Throttle/Pedal Position Sensor A Circuit Range/Performance</p> <p>All Others:</p>	The TP sensor circuit is monitored by the PCM for a non-closed throttle position at idle. If the KOER self-test terminates upon placing the transmission range selector in gear (DRIVE or REVERSE) or when closing the throttle (idle) after opening it (in PARK or NEUTRAL) the TP closed throttle position is not attained, and the test fails.	<ul style="list-style-type: none"> • Binding throttle linkage • Damaged throttle body • TP circuit open to PCM • Damaged TP sensor • SIG RTN circuit open to the TP sensor 	Drive the vehicle, bring it to a stop, and turn the key to the OFF position. Start the vehicle, and run the key ON engine running self-test at idle. Access KOER diagnostic trouble codes on the diagnostic tool.
<p>P0122 - Throttle/Pedal Position Sensor A Circuit Low Input</p> <p>Vehicles with electronic throttle control (ETC)</p>	The ETC TP1 sensor was flagged as fault status by the PCM indicating a low voltage or open circuit.	<ul style="list-style-type: none"> • Open ETC TP sensor harness • Short to ground in the ETC TP sensor harness • Damaged TP sensor • SIG RTN circuit open to the TP sensor 	The fault exhibits a symptom of limited power. A TP1 PID (TP V PID) reading less than 3.42% (0.17 volt) in key ON engine OFF, continuous memory or key ON engine running indicates a hard fault.
<p>P0122 - Throttle/Pedal Position Sensor A Circuit Low Input</p> <p>All Others:</p>	The TP sensor circuit is monitored by the PCM for a low TP rotation angle (or voltage) input through the comprehensive component monitor (CCM). If during key ON, engine OFF or key ON, engine running the TP rotation angle (or voltage) changes below a minimum calibrated limit, the test fails.	<ul style="list-style-type: none"> • TP sensor not seated properly • TP circuit open to PCM • VREF open to TP sensor • TP circuit short to GND • Damaged TP sensor • Damaged PCM 	The fault exhibits a symptom of limited power. A TP PID (TP V PID) reading less than 3.42% (0.17 volt) in key ON engine OFF, continuous memory or key ON engine running indicates a hard fault.
<p>P0123 - Throttle/Pedal Position Sensor A Circuit High Input</p> <p>Vehicles with electronic throttle control (ETC)</p>	The ETC TP1 sensor was flagged as fault status by the PCM indicating high voltage.	<ul style="list-style-type: none"> • ETC TP sensor harness shorted to VREF • ETC TP sensor harness shorted to PWR • Damaged TP sensor • VREF circuit shorted to TP sensor 	<p>Drive the vehicle, bring it to a stop, and turn the key to the OFF position. Start the vehicle, and run the key ON engine running self-test at idle. Access KOER diagnostic trouble codes on the diagnostic tool.</p> <p>The TP1 signal is normally at a high voltage at closed throttle, and a lower voltage at wide open throttle (opposite of TP2).</p>

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
P0123 - Throttle/Pedal Position Sensor A Circuit High Input All Others:	The TP sensor circuit is monitored by the PCM for a high TP rotation angle (or voltage) input through the comprehensive component monitor (CCM). If during key ON, engine OFF or key ON, engine running the TP rotation angle (or voltage) changes above the maximum calibrated limit, the test fails.	<ul style="list-style-type: none"> • TP sensor not seated properly • TP circuit short to PWR • TP circuit short to VREF • SIG RTN circuit open to the TP sensor • Damaged TP sensor • Damaged PCM 	A TP PID (TP V PID) reading greater than 93% (4.65 volts) in key ON engine OFF, continuous memory or key ON engine running indicates a hard fault.
P0125 - Insufficient Coolant Temperature For Closed Loop Fuel Control	Indicates the ECT or CHT sensor has not achieved the required temperature level to enter closed loop operating conditions within a specified amount of time after starting the engine.	<ul style="list-style-type: none"> • Insufficient warm up time • Low engine coolant level • Leaking or stuck open thermostat • Malfunctioning ECT sensor • Malfunctioning CHT sensor 	Compare the thermostat specification to the actual engine coolant temperature using the engine temperature PID (ECT or CHT). The temperature reading should be similar when the engine is at a normal operating temperature.
P0127 - Intake Air Temperature Too High	Indicates that the IAT2 sensor has detected a potential abnormality in the intercooler system. This condition will cause the boost from the supercharger to be bypassed to avoid potential engine damage.	<ul style="list-style-type: none"> • Blockage of heat exchangers • Low fluid level • Fluid leakage • Intercooler pump or relay failure • Crossed intercooler coolant lines 	Monitor IAT2 PID. Typical IAT2 temperature should be greater than IAT1. REFER to Section 6, Reference Values for ranges.
P0128 - Coolant Thermostat (Coolant Temperature Below Thermostat Regulating Temperature)	Indicates that the thermostat monitor has not achieved the required engine operating temperature within a specified amount of time after starting the engine.	<ul style="list-style-type: none"> • Insufficient warm up time • Low engine coolant level • Leaking or stuck open thermostat • Malfunctioning ECT sensor • Malfunctioning CHT sensor 	Refer to Thermostat Monitor in Section 1, Description and Operation, for system information.
P0131 - HO2S Sensor Circuit Out of Range Low Voltage (HO2S-11)	The HO2S is monitored for a negative voltage known as Characteristic Shift Downward (CSD). If the sensor is switching from 0 to -1 volt during testing, the PCM uses this input and remains in fuel control.	<ul style="list-style-type: none"> • Contaminated HO2S (water, fuel, oil) • Crossed HO2S signal/signal return wiring 	
P0132 - HO2S Sensor Circuit High Voltage (HO2S-11)	The HO2S signals are monitored for an over voltage fault. The code is set when the HO2S signal voltage is 1.5 volts or greater.	<ul style="list-style-type: none"> • HO2S Signal Circuit shorted to Heater Voltage inside of HO2S sensor. • HO2S Signal Circuit shorted to VPWR or VREF in harness. • PCM failure. 	An HO2S parameter identifier (PID) switching across 0.45 volt from 0.2 to 0.9 volt indicates a normal switching HO2S. An HO2S PID voltage of 1.5 volts or greater indicates a short to voltage.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
P0133 - HO2S Sensor Circuit Slow Response (HO2S-11)	The Heated Oxygen Sensor (HO2S) monitor checks the HO2S frequency and amplitude. If during testing the frequency and amplitude fall below a calibrated limit, the test fails.	<ul style="list-style-type: none"> • Contaminated HO2S sensor. • Exhaust leaks. • Shorted/open wiring. • Improper fueling. • MAF sensor. • Deteriorating HO2S sensor. • Inlet air leaks. 	Access the HO2S test results from the Generic OBD-II menu to verify the DTC.
P0135 - HO2S Sensor Circuit Malfunction (HO2S-11)	During testing the HO2S heaters are checked for opens/shorts and excessive current draw. The test fails when the current draw exceeds a calibrated limit and/or an open or short is detected.	<ul style="list-style-type: none"> • Vacuum hose disconnected on EGR System Module (ESM) applications • Short to VPWR in the harness or HO2S. • Water in the harness connector. • Open VPWR circuit. • Open GND circuit. • Low battery voltage. • Corrosion or poor mating terminals and wiring • Damaged HO2S heater. • Damaged PCM. 	<ul style="list-style-type: none"> • Wiring. • Damaged HO2S heater. • Damaged PCM.
P0136 - HO2S Sensor Circuit Malfunction (HO2S-12)	The downstream HO2Ss are continuously checked for maximum and minimum voltages. The test fails when the voltages fail to meet the calibrated limits.	<ul style="list-style-type: none"> • Pinched, shorted, and corroded wiring and pins • Crossed sensor wires • Exhaust leaks. • Contaminated or damaged sensor 	
P0138 - HO2S Sensor Circuit High Voltage (HO2S-12)	See the description for DTC P0132.	See the possible causes for DTC P0132.	See the diagnostic aids for DTC P0132.
P0141 - HO2S Sensor Circuit Malfunction (HO2S-12)	See the description for DTC P0135.	See the possible causes for DTC P0135.	See the diagnostic aids for DTC P0135.
P0144 - HO2S Sensor Circuit High Voltage (HO2S-13)	See the description for DTC P0132.	See the possible causes for DTC P0132.	See the diagnostic aids for DTC P0132.
P0147 - HO2S Sensor Circuit Malfunction (HO2S-13)	See the description for DTC P0135.	See the possible causes for DTC P0135.	See the diagnostic aids for DTC P0135.
P0148 - Fuel Delivery Error	At least 1 bank is lean at wide open throttle.	<ul style="list-style-type: none"> • Severely restricted fuel filter. • Severely restricted fuel supply line. • Damaged or contaminated mass air flow (MAF) sensor 	

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
P0151 - HO2S Sensor Circuit Out of Range Low Voltage (HO2S-21)	See the description for DTC P0131.	See the possible causes for DTC P0131.	
P0152 - HO2S Sensor Circuit High Voltage (HO2S-21)	See the description for DTC P0132.	See the possible causes for DTC P0132.	See the diagnostic aids for DTC P0132.
P0153 - HO2S Sensor Circuit Slow Response (HO2S-21)	See the description for DTC P0133.	See the possible causes for DTC P0133.	See the diagnostic aids for DTC P0133.
P0155 - HO2S Sensor Circuit Malfunction (HO2S-21)	See the description for DTC P0135.	See the possible causes for DTC P0135.	See the diagnostic aids for DTC P0135.
P0156 - HO2S Sensor Circuit High Voltage (HO2S-22)	The downstream HO2Ss are continuously checked for maximum and minimum voltages. The test fails when the voltages fail to meet the calibrated limits.	<ul style="list-style-type: none"> • Pinched, shorted, and corroded wiring and pins • Crossed sensor wires • Exhaust leaks. • Contaminated or damaged sensor 	
P0158 - HO2S Sensor Circuit High Voltage (HO2S-22)	See the description for DTC P0132.	See the possible causes for DTC P0132.	See the diagnostic aids for DTC P0132.
P0161 - HO2S Sensor Circuit Malfunction (HO2S-22)	See the description for DTC P0135.	See the possible causes for DTC P0135.	See the diagnostic aids for DTC P0135.
P0167 - HO2S Sensor Circuit Malfunction (HO2S-23)	See the description for DTC P0135.	See the possible causes for DTC P0135.	See the diagnostic aids for DTC P0135.
P0171 - System Too Lean (Bank 1)	The adaptive fuel strategy continuously monitors the fuel delivery hardware. The test fails when the adaptive fuel tables reach a rich calibrated limit. Refer to Section 1, Powertrain Control Software, Fuel Trim for more information.	<p>Fuel System.</p> <ul style="list-style-type: none"> • Fuel pressure regulator (leaking, faulty). • Fuel filter plugged, dirty. • Fuel pump (weak, check valve leaking). • Leaking/contaminated fuel injectors. • Low fuel pressure or running out of fuel. • EVAP canister purge valve leaking (when the canister is clean). • Fuel supply line restricted. • Fuel rail pressure sensor (incorrect reading). • Ethanol content in the fuel <p>Air Induction System.</p> <ul style="list-style-type: none"> • Air leaks after the MAF. • Vacuum leaks. 	View the Freeze Frame Data to determine the operating conditions when the DTC was set. Observe the LONGFT1 and LONGFT2 PIDs. Refer to Section 2, Adaptive Fuel DTC Diagnostic Techniques for more information and the appropriate pinpoint test for specific concern identification.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
		<ul style="list-style-type: none"> • PCV system (leak or valve stuck open) • Improperly seated engine oil dipstick. • Air induction turbulence due to incorrect air filter. <p>Exhaust System.</p> <ul style="list-style-type: none"> • Exhaust leaks before or near the HO2Ss (exhaust manifold gasket, mating gaskets) <p>EGR system.</p> <ul style="list-style-type: none"> • Vacuum hose disconnected on EGR System Module (ESM) applications • EGR valve tube/gasket leak • EVR solenoid vacuum leak <p>Secondary Air Injection.</p> <ul style="list-style-type: none"> • Damaged/malfunctioning secondary air injection system (mechanically stuck valve). <p>Air Measurement System.</p> <ul style="list-style-type: none"> • MAF sensor (contaminated, damaged, or faulty) 	
P0172 - System Too Rich (Bank 1)	The adaptive fuel strategy continuously monitors the fuel delivery hardware. The test fails when the adaptive fuel tables reach a lean calibrated limit. Refer to Section 1, Powertrain Control Software, Fuel Trim for more information.	<p>Fuel System.</p> <ul style="list-style-type: none"> • Fuel Pressure Regulator (vacuum hose off, diaphragm leak, malfunctioning). • Leaking fuel injectors. • Fuel return line restricted. • Fuel rail pressure sensor (incorrect reading). • EVAP canister purge valve leak (when canister is full). <p>Base engine.</p> <ul style="list-style-type: none"> • Engine oil contamination. <p>Air Measurement System.</p>	View the Freeze Frame Data to determine the operating conditions when the DTC was set. Observe the LONGFT1 and LONGFT2 PIDs. Refer to Section 2, Adaptive Fuel DTC Diagnostic Techniques for more information and the appropriate pinpoint test for specific concern identification.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
		<ul style="list-style-type: none"> MAF sensor (contaminated, damaged, or corroded connector). 	
P0174 - System Too Lean (Bank 2)	See the description for DTC P0171.	See the possible causes for DTC P0171.	See the diagnostic aids for DTC P0171.
P0175 - System Too Rich (Bank 2)	See the description for DTC P0172.	See the possible causes for DTC P0172.	See the diagnostic aids for DTC P0172.
P0180 - Engine Fuel Temperature Sensor A Circuit Low Input (EFT)	The comprehensive component monitor (CCM) monitors the EFT sensor circuit to the PCM for low and high voltage. If voltage falls below or exceeds a calibrated limit and amount of time during testing, the test fails.	<ul style="list-style-type: none"> Open or short in the harness. Low ambient temperature operation. Improper harness connection. Damaged EFT sensor. Damaged PCM. 	Verify the EFT-PID value to determine an open or short.
P0181 - Engine Fuel Temperature Sensor A Circuit Range/Performance (EFT)	The comprehensive component monitor (CCM) monitors the EFT temperature for acceptable operating temperature. If voltage falls below or exceeds a calibrated limit, for a calibrated amount of time during testing, the test fails.	<ul style="list-style-type: none"> Open or short in the harness. Low ambient temperature operation. Improper harness connection. Damaged EFT sensor. Damaged PCM. 	Verify the EFT-PID value to determine an open or short.
P0182 - Engine Fuel Temperature Sensor A Circuit Low Input (EFT)	The comprehensive component monitor (CCM) monitors the EFT sensor circuit to the PCM for low voltage. If voltage falls below a calibrated limit for a calibrated amount of time during testing, the test fails.	<ul style="list-style-type: none"> Short in the harness. VREF open or shorted. Low ambient temperature operation. Improper harness connection. Damaged EFT sensor. Damaged PCM. 	Verify EFT-PID and VREF values to determine an open or short.
P0183 - Engine Fuel Temperature Sensor A Circuit High Input (EFT)	The comprehensive component monitor (CCM) monitors the EFT sensor circuit to the PCM for high voltage. If voltage exceeds a calibrated limit for a calibrated amount of time during testing, the test fails.	<ul style="list-style-type: none"> Open or short to PWR in the harness. Damaged EFT sensor. Improper harness connection. Damaged PCM. 	Verify the EFT-PID value to determine an open or short.
P0186 - Engine Fuel Temperature Sensor B Circuit Range/Performance (EFT)	See the description for DTC P0181.	See the possible causes for DTC P0181.	See the diagnostic aids for DTC P0181.
P0187 - Engine Fuel Temperature Sensor B Circuit Low Input (EFT).	See the description for DTC P0182.	See the possible causes for DTC P0182.	See the diagnostic aids for DTC P0182.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
P0188 - Engine Fuel Temperature Sensor B Circuit High Input (EFT)	See the description for DTC P0183.	See the possible causes for DTC P0183.	See the diagnostic aids for DTC P0183.
P0190 - Fuel Rail Pressure (FRP) Sensor Circuit Malfunction	The comprehensive component monitor (CCM) monitors the FRP sensor to the PCM for VREF voltage. The test fails when the VREF voltage from the PCM drops to a voltage less than a minimum calibrated value.	<ul style="list-style-type: none"> • VREF open in harness. • VREF open in sensor. • VREF open in PCM. 	Verify a VREF voltage between 4 and 6 volts.
P0191 - Fuel Rail Pressure (FRP) Sensor Circuit Performance	The comprehensive component monitor (CCM) checks the FRP for acceptable fuel pressure. The test fails when the fuel pressure falls below or exceeds a minimum/maximum calibrated value for a calibrated period of time.	<ul style="list-style-type: none"> • High fuel pressure. • Low fuel pressure. • Damaged FRP sensor. • Excessive resistance in the circuit. • Low or no fuel. 	A FRP PID value during key on, engine running of 138 kPa (20 psi) and 413 kPa (60 psi) for gasoline, or 586 kPa (85 psi) and 725 kPa (105 psi) for natural gas (NG) vehicles is acceptable.
P0192 - Fuel Rail Pressure (FRP) Sensor Circuit Low Input	The comprehensive component monitor (CCM) monitors the FRP sensor circuit to the PCM for low voltage. If voltage falls below a calibrated limit and a calibrated amount of time during testing, the test fails.	<ul style="list-style-type: none"> • FRP signal shorted to SIG RTN or PWR GND. • FRP signal open (NG only) • Low fuel pressure (NG only) • Damaged FRP sensor. • Damaged PCM. 	An FRP PID value during KOER or KOEO less than 0.3 volt for gasoline or 0.5 volt for natural gas vehicles (NG) indicates a hard fault.
P0193 - Fuel Rail Pressure (FRP) Sensor Circuit High Input	The comprehensive component monitor (CCM) monitors the FRP sensor circuit to the PCM for high voltage. If voltage exceeds a calibrated limit for a calibrated amount of time during testing, the test fails.	<ul style="list-style-type: none"> • FRP signal shorted to VREF or VPWR. • FRP signal open (gasoline only) • Low fuel pressure (NG only) • Damaged FRP sensor. • Damaged PCM. • High fuel pressure (caused by a damaged fuel pressure regulator) (NG) 	The FRP signal high condition can be caused by any number of conditions, including a short on FRP signal to VREF, a more positive voltage level or an open FRP signal or signal return. Note the FRP signal line is pulled up by the PCM and VREF at the sensor and downward by the sensor through SIGRTN.
P0196 - Engine Oil Temperature (EOT) Sensor Circuit Range/Performance	Indicates the sensed EOT value from the EOT sensor is not within the PCM predicted engine oil temperature range, based on other PCM inputs.	<ul style="list-style-type: none"> • Engine not at operating temperature • Cooling system problem of stuck thermostat • EOT circuit failure • Damaged PCM 	The EOT rationality test looks for the engine oil temperature sensor to be within a calibrated delta of the PCM predicted engine oil temperature. Make sure EOT sensor reading is similar to the engine temperature. If the EOT reading greatly differs from engine temperature, check the EOT circuitry for correct operation.
P0197 - Engine Oil Temperature (EOT) Sensor Circuit Low Input	Indicates EOT signal voltage is low (high temperature).	<ul style="list-style-type: none"> • Damaged harness • Damaged sensor 	An EOT V PID reading less than 0.2 volt with key ON and engine OFF or during any engine operating mode indicates a hard fault short to ground.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
		<ul style="list-style-type: none"> • Damaged harness connector • Damaged PCM 	
P0198 - Engine Oil Temperature (EOT) Sensor Circuit High Input	Indicates EOT signal voltage is high (low temperature).	<ul style="list-style-type: none"> • Damaged harness • Damaged sensor • Damaged harness connector • Damaged PCM 	An EOT V PID reading greater than 4.5 volts with key ON and engine OFF or during any engine operating mode indicates an open circuit hard fault.
P0201 - Cylinder No. 1 Injector Circuits	The comprehensive component monitor (CCM) monitors the operation of the fuel injector drivers in the PCM. The test fails when the fuel injector does not operate electrically even though the harness assembly and fuel injectors test satisfactorily.	<ul style="list-style-type: none"> • Faulty fuel injector driver within the PCM. 	PID Data Monitor INJ1F fault flags = YES.
P0202 - Cylinder No. 2 Injector Circuits	See the description for DTC P0201.	<ul style="list-style-type: none"> • Faulty fuel injector driver within the PCM. 	PID Data Monitor INJ2F fault flags = YES.
P0203 - Cylinder No. 3 Injector Circuits	See the description for DTC P0201.	<ul style="list-style-type: none"> • Faulty fuel injector driver within the PCM. 	PID Data Monitor INJ3F fault flags = YES.
P0204 - Cylinder No. 4 Injector Circuits	See the description for DTC P0201.	<ul style="list-style-type: none"> • Faulty fuel injector driver within the PCM. 	PID Data Monitor INJ4F fault flags = YES.
P0205 - Cylinder No. 5 Injector Circuits	See the description for DTC P0201.	<ul style="list-style-type: none"> • Faulty fuel injector driver within the PCM. 	PID Data Monitor INJ5F fault flags = YES.
P0206 - Cylinder No. 6 Injector Circuits	See the description for DTC P0201.	<ul style="list-style-type: none"> • Faulty fuel injector driver within the PCM. 	PID Data Monitor INJ6F fault flags = YES.
P0207 - Cylinder No. 7 Injector Circuits	See the description for DTC P0201.	<ul style="list-style-type: none"> • Faulty fuel injector driver within the PCM. 	PID Data Monitor INJ7F fault flags = YES.
P0208 - Cylinder No. 8 Injector Circuits	See the description for DTC P0201.	<ul style="list-style-type: none"> • Faulty fuel injector driver within the PCM. 	PID Data Monitor INJ8F fault flags = YES.
P0209 - Cylinder No. 9 Injector Circuits	See the description for DTC P0201.	<ul style="list-style-type: none"> • Faulty fuel injector driver within the PCM. 	PID Data Monitor INJ9F fault flags = YES.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
P0210 - Cylinder No. 10 Injector Circuits	See the description for DTC P0201.	<ul style="list-style-type: none"> Faulty fuel injector driver within the PCM. 	PID Data Monitor INJ10F fault flags = YES.
P0211 - Cylinder No. 11 Injector Circuits	See the description for DTC P0201.	<ul style="list-style-type: none"> Faulty fuel injector driver within the PCM. 	PID Data Monitor INJ11F fault flags = YES.
P0212 - Cylinder No. 12 Injector Circuits	See the description for DTC P0201.	<ul style="list-style-type: none"> Faulty fuel injector driver within the PCM. 	PID Data Monitor INJ12F fault flags = YES.
P0217 - Engine Coolant Over-Temperature Condition	Indicates an engine overheat condition was detected by the engine temperature sensor (CHT or ECT depending how the vehicle is equipped). This condition causes the boost from the supercharger to be bypassed to avoid potential engine damage.	<ul style="list-style-type: none"> Engine cooling system concerns. Low engine coolant level. Base engine concerns. 	Monitor the engine temperature PID (CHT or ECT) for an overheat condition. Typical engine temperature should be close to cooling system thermostat specification.
P0218 - Transmission Fluid TFT Over-Temperature Condition	Indicates a transmission overheat condition was sensed by the Transmission Fluid Temperature (TFT) sensor.	Low transmission fluid level. Transmission cooling system concerns.	Monitor the transmission temperature PID TFT for an overheat condition.
P0219 - Engine Over Speed Condition	Indicates the vehicle has been operated in a manner which caused the engine speed to exceed a calibrated limit. The engine RPM is continuously monitored and evaluated by the PCM. The DTC is set when the RPM exceeds the calibrated limit set within the PCM. For additional information on the engine RPM limiter, refer to Section 1, Electronic Engine Control (EC) System Powertrain Control Software.	<ul style="list-style-type: none"> Wheel slippage (water, ice, mud, and snow) Excessive engine RPM in NEUTRAL or operated in the wrong transmission gear 	The DTC indicates the vehicle has been operated in a manner which caused the engine speed to exceed a calibrated limit.
P0221 - Throttle Position (TP2) Sensor Circuit Range/Performance	The ETC TP2 sensor was flagged as fault status by the PCM indicating an out of range in either the closed or wide open throttle modes.	<ul style="list-style-type: none"> Binding throttle linkage Damaged throttle body TP circuit open to PCM Damaged TP sensor SIG RTN circuit open to the TP sensor Self-test operator error (foot resting on the accelerator pedal during test) 	The fault exhibits a symptom of limited power. A TP2 PID (TP V PID) reading greater than 96.42% (4.65 volts) in key ON engine OFF, continuous memory or key ON engine running indicates a hard fault.
P0222 - Throttle Position (TP2) Sensor Circuit Low Input	The ETC TP2 sensor was flagged as fault status by the PCM indicating a low	<ul style="list-style-type: none"> Open ETC TP sensor harness 	The fault exhibits a symptom of limited power. A TP2 PID (TP V PID) reading less than 3.42% (0.17 volt) in

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
	voltage, or open circuit.	<ul style="list-style-type: none"> • Short to ground in the ETC TP sensor harness • Damaged TP sensor • SIG RTN circuit open to the TP sensor 	key ON engine OFF, continuous memory or key ON engine running indicates a hard fault.
P0223 - Throttle Position (TP2) Sensor Circuit High Input	The ETC TP2 sensor was flagged as fault status by the PCM indicating a high voltage.	<ul style="list-style-type: none"> • ETC TP sensor harness shorted to VREF • Damaged TP sensor • ETC TP2 circuit open • VREF circuit shorted to TP sensor 	The fault exhibits a symptom of limited power. A TP2 PID (TP V PID) reading greater than 93% (4.65 volts) in key ON engine OFF, continuous memory or key ON engine running indicates a hard fault.
P0230 - Fuel pump primary circuit malfunction	<p>NOTE: For natural gas applications, the following description applies to the fuel shutoff valve (FSV) circuit.</p> <p>The PCM monitors the fuel pump (FP) circuit output from the PCM. The test fails if: with the FP output commanded ON (grounded), excessive current draw is detected on the FP circuit; or with the FP output commanded OFF, voltage is not detected on the FP circuit (the PCM expects to detect VPWR voltage coming through the fuel pump relay coil to the FP circuit).</p>	<ul style="list-style-type: none"> • Open or shorted fuel pump (FP) circuit • Open VPWR circuit to the fuel pump relay • Damaged fuel pump relay • Damaged PCM 	<ul style="list-style-type: none"> • When the LFCF PID reads YES, a fault is currently present FPF • An open circuit or short to ground can only be detected with the fuel pump commanded OFF. • A short to voltage can only be detected with the fuel pump commanded ON. • During the KOEO and KOER self-test, the fuel pump output command is cycled on and off.
P0231 - Fuel pump secondary circuit Low	<p>NOTE: For natural gas applications, the following description applies to the fuel shutoff valve monitor (FSVM) and the fuel shutoff valve power (FSV PWR) circuits.</p> <p>The PCM monitors the fuel pump monitor (FPM) circuit. The test fails if the PCM commands the fuel pump ON and B+ voltage is not detected on the FPM circuit.</p>	<ul style="list-style-type: none"> • Open B+ circuit to the fuel pump relay • Open FP PWR circuit between the fuel pump relay and its connection to the FPM circuit • Damaged fuel pump relay • Damaged PCM (engine does start) • For 5.4L SC Lightning, damaged IFS switch, IFS switch relay, or concern with related circuits. 	During the KOEO self-test, the PCM commands the fuel pump on so this test can be performed.
P0232 - Fuel pump secondary circuit High	<p>NOTE: For natural gas applications, the following description applies to the fuel shutoff valve monitor (FSVM) and the fuel shutoff valve power (FSV PWR) circuits.</p> <p>The PCM monitors the fuel pump monitor (FPM) circuit. This test fails when the</p>	<ul style="list-style-type: none"> • Inertia fuel shutoff (IFS) switch not reset or electrically open • Open circuit between the fuel pump and the FPM 	Continuous memory P0232 can be set if the IFS switch is tripped then reset, or if the fuel pump circuit is activated when the PCM expected the circuit to be off (fuel system test or prime procedure).

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
	<p>PCM detects voltage on the FPM circuit while the fuel pump is commanded OFF. The FPM circuit is wired to a pull-up voltage inside the PCM. The FPM circuit will go high if, with the key ON and the fuel pump commanded OFF, the FPM/FP PWR circuit loses its path to ground through the fuel pump. The FPM circuit will also go high if the FPM/FP PWR circuit is shorted to voltage.</p>	<p>connection to the FP PWR circuit</p> <ul style="list-style-type: none"> • Poor fuel pump ground • Fuel pump electrically open • Fuel pump secondary circuits short to voltage • Fuel pump relay contacts always closed • Open FPM circuit between the PCM and the connection to the FP PWR circuit • Damaged low speed fuel pump relay or concern with related circuits (if equipped). • Damaged PCM 	
<p>P0234 - Supercharger Overboost Condition</p>	<p>The PCM disables (bypasses) the supercharger boost and sets a diagnostic trouble code (DTC) to keep from damaging the powertrain (engine or transmission) during potential harmful operating conditions.</p>	<ul style="list-style-type: none"> • Brake torque (brake on and throttle at wide open) • Transmission oil temperature (TOT) exceeds calibrated threshold • Engine over temperature • Ignition misfire exceeds the calibrated threshold • Knock sensor (KS) failure or knock detected • Low speed fuel pump relay not switching 	<p>Check for other diagnostic trouble codes accompanying P0234, or check appropriate and available PIDs related to the above possible causes.</p>
<p>P0243 - Supercharger (Boost) Bypass Solenoid Circuit Malfunction</p>	<p>The PCM monitors the supercharger (boost) bypass (SCB) solenoid circuit for an electrical failure. The test fails when the signal moves outside the minimum or maximum allowable calibrated parameters for a specified SCB solenoid duty cycle (100% or 0%) by PCM command.</p>	<ul style="list-style-type: none"> • VPWR circuit open to SCB solenoid • SCB solenoid circuit shorted to PWR GND or CHASSIS GND • Damaged SCB solenoid • SCB solenoid circuit open • SCB solenoid circuit shorted to VPWR • Damaged PCM 	<p>Disconnect SCB solenoid. Connect test lamp to SCB solenoid harness connector. Cycle SCB driver in PCM by Output Test Mode. Test lamp cycle on and off - SCB solenoid is suspect. Test lamp always on - SCB signal short in harness or PCM. Test always off - SCB signal or VPWR open in harness or PCM.</p>
<p>P0297 - Vehicle Over Speed Condition</p>	<p>Indicates the vehicle has been operated in a manner which caused the vehicle speed to exceed a calibration limit. The vehicle speed is continuously monitored and evaluated by the PCM. The DTC is set when the vehicle speed exceed the calibrated limit set within the PCM. For</p>	<ul style="list-style-type: none"> • Vehicle driven at a high rate of speed 	<p>The DTC indicates the vehicle has been operated in a manner which caused the engine speed to exceed a calibrated limit.</p>

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
	additional information on the vehicle speed limiter, refer to Section 1, Electronic Engine Control (EC) System , Powertrain Control Software.		
P0298 - Engine Oil Over Temperature Condition	Indicates the Engine Oil Temperature Protection strategy in the PCM has been activated. This temporarily prohibits high engine speed operation by disabling injectors, reducing the risk of engine damage from high engine oil temperature. Note: On engines which are equipped with an oil temperature sensor, the PCM reads oil temperature to determine if it is excessive. When an oil temperature sensor is not present, the PCM uses an oil algorithm to infer actual temperature. Engine shutdown strategy function is the same on vehicles with and without oil temperature sensors.	<ul style="list-style-type: none"> • Very high engine RPM for an extended period of time. • Overheating condition. • Malfunction EOT sensor or circuit (vehicles w/EOT sensor). • Base engine concerns. 	Engine operating in high RPM range, due to improper gear selection. May cause Lack/Loss of Power or Surge customer concern.
P0300 - Random Misfire	The random misfire DTC indicates multiple cylinders are misfiring or the PCM cannot identify which cylinder is misfiring.	<ul style="list-style-type: none"> • Camshaft position sensor (CMP) • Low fuel: less than 1/8 tank • Stuck open EGR valve • Blocked EGR passages 	One or more EGR passages may be blocked or partially blocked. If this is the case the misfire detection monitor indicates the EGR port to check for possible blockage.
P030x - Misfire Detection Monitor	The misfire detection monitor is designed to monitor engine misfire and identify the specific cylinder in which the misfire has occurred. Misfire is defined as lack of combustion in a cylinder due to absence of spark, poor fuel metering, poor compression, or any other cause.	<ul style="list-style-type: none"> • Ignition System • Fuel Injectors • Running out of fuel • EVAP canister purge valve • Fuel Pressure • Evaporative emission system • Base engine 	The MIL blinks once per second when a misfire severe enough to cause catalyst damage is detected. If the MIL is on steady state due to a misfire, this indicates the threshold for emissions was exceeded and caused the vehicle to fail an inspection and maintenance tailpipe test.
P0310 - Misfire Detection Monitor	The misfire detection monitor is designed to monitor engine misfire and identify the specific cylinder in which the misfire has occurred. Misfire is defined as lack of combustion in a cylinder due to absence of spark, poor fuel metering, poor compression, or any other cause.	<ul style="list-style-type: none"> • Ignition System • Fuel Injectors • Running out of fuel • EVAP canister purge valve • Fuel Pressure • Evaporative emission system • Base engine 	The MIL blinks once per second when a misfire severe enough to cause catalyst damage is detected. If the MIL is on steady state due to a misfire, this indicates the threshold for emissions was exceeded and caused the vehicle to fail an inspection and maintenance tailpipe test.
P0315 - The PCM is unable to learn Crankshaft Pulse Wheel tooth spacing (exceeded the allowable correction tolerances).	The PCM is unable to learn and correct for mechanical inaccuracies in crankshaft pulse wheel tooth spacing. This DTC disables the misfire monitor.	<ul style="list-style-type: none"> • Damaged crankshaft pulse wheel teeth. • Damaged CKP sensor 	Visual inspection of the CKP sensor and crankshaft pulse wheel teeth for damage.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
P0316 - Misfire Occurred in the First 1,000 Engine Revolutions	P0316 code is set in addition to any type B misfire DTC which occurs in the first 1,000 revolution test interval following engine start.	<ul style="list-style-type: none"> • Damaged CKP sensor • Ignition System • Fuel Injectors • Running out of fuel • Fuel Quality • Base engine • Damaged PCM 	Freeze Frame Data and the P03xx DTC are also stored, indicating in which cylinder the misfire occurred.
P0320 - Ignition Engine Speed Input Circuit Malfunction	The ignition engine speed sensor input signal to PCM is continuously monitored. The test fails when the signal indicates that 2 successive erratic profile ignition pickup (PIP) pulses occurred.	<ul style="list-style-type: none"> • Loose wires/connectors. • Arcing secondary ignition components (coil, wires and plugs) • On-board transmitter (2-way radio) 	The DTC indicates that 2 successive erratic PIP pulses occurred.
P0325 - Knock Sensor 1 Circuit Malfunction (Bank 1)	The knock sensor detects vibrations upon increase and decrease in engine RPM. The knock sensor generates a voltage based on this vibration. If the voltage goes outside a calibrated level, a DTC is set.	<ul style="list-style-type: none"> • Knock sensor circuit short to GND • Knock sensor circuit short to PWR • Knock sensor circuit open • Damaged knock sensor • Damaged PCM 	A knock sensor voltage greater than 0.5 volt with the key ON and engine OFF indicates a hard fault.
P0326 - Knock Sensor 1 Circuit Range/Performance (Bank 1)	The knock sensor detects vibrations upon increase and decrease in engine RPM. The knock sensor generates a voltage based on this vibration. If the voltage goes outside a calibrated level, a DTC is set.	<ul style="list-style-type: none"> • Knock sensor circuit short to GND • Knock sensor circuit short to PWR • Knock sensor circuit open • Damaged knock sensor • Damaged PCM 	A knock sensor voltage greater than 0.5 volt with the key ON and engine OFF indicates a hard fault.
P0330 - Knock Sensor 2 Circuit Malfunction (Bank 2)	The knock sensor detects vibrations upon increase and decrease in engine RPM. The knock sensor generates a voltage based on this vibration. If the voltage goes outside a calibrated level, a DTC is set.	<ul style="list-style-type: none"> • Knock sensor circuit short to GND • Knock sensor circuit short to PWR • Damaged knock sensor • Damaged PCM • Knock sensor circuit open 	A knock sensor voltage greater than 0.5 volt with the key ON and engine OFF indicates a hard fault.
P0331 - Knock Sensor 2 Circuit Range/Performance (Bank 2)	The knock sensor detects vibrations upon increase and decrease in engine RPM. The knock sensor generates a voltage based on this vibration. If the voltage	<ul style="list-style-type: none"> • Knock sensor circuit short to GND • Knock sensor circuit short to PWR 	A knock sensor voltage greater than 0.5 volt with the key ON and engine OFF indicates a hard fault.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
	goes outside a calibrated level, a DTC is set.	<ul style="list-style-type: none"> • Damaged knock sensor • Damaged PCM • Knock sensor circuit open 	
P0340 - Camshaft Position (CMP) Sensor Circuit Malfunction (Bank 1)	The test fails when the PCM can no longer detect the signal from the CMP sensor on Bank 1.	<ul style="list-style-type: none"> • CMP circuit open • CMP circuit short to GND • CMP circuit short to PWR • SIG RTN open (VR sensor) • CMP GND open (Hall-effect sensor) • CMP incorrectly installed (Hall-effect sensor) • Damaged CMP sensor shielding • Damaged CMP sensor • Damaged PCM 	Harness routing, harness alterations, improper shielding, or electrical interference from other improperly functioning systems may have an intermittent impact on the CMP signal.
P0344 - Camshaft Position Sensor A Circuit Intermittent (Bank 1 or single sensor)	The test fails when the powertrain control module (PCM) detects an intermittent signal from the camshaft position (CMP) sensor.	<ul style="list-style-type: none"> • Intermittent open circuit • Intermittent short circuit • Damaged sensor shielding • Damaged sensor 	Harness routing, harness alterations, improper shielding, or electrical interference from other improperly functioning systems may have an intermittent impact on the CMP signal.
P0345 - Camshaft Position (CMP) Sensor Circuit Malfunction (Bank 2)	The test fails when the PCM can no longer detect the signal from the CMP sensor on Bank 2.	See the possible causes for DTC P0340.	See the possible causes for DTC P0340.
P0349 - Camshaft Position Sensor A Circuit Intermittent (Bank 2)	See the description for DTC P0344.	See the possible causes for DTC P0344.	See the diagnostic aids for DTC P0344.
P0350 - Ignition Coil (Undetermined) Primary/Secondary Circuit Malfunction	Each ignition primary circuit is continuously monitored. The test fails when the PCM does not receive a valid IDM pulse signal from the ignition module (integrated in the PCM).	<ul style="list-style-type: none"> • Open or short in the Ignition START/RUN circuit • Open coil driver circuit • Coil driver circuit shorted to ground • Damaged coil • Damaged PCM • Coil driver circuit shorted to VPWR 	
P0351 - Ignition Coil A Primary/Secondary Circuit Malfunction	See the description for DTC P0350.	See the possible causes for DTC P0350.	
P0352 - Ignition Coil B Primary/Secondary Circuit Malfunction	See the description for DTC P0350.	See the possible causes for DTC P0350.	

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
P0353 - Ignition Coil C Primary/Secondary Circuit Malfunction	See the description for DTC P0350.	See the possible causes for DTC P0350.	
P0354 - Ignition Coil D Primary/Secondary Circuit Malfunction	See the description for DTC P0350.	See the possible causes for DTC P0350.	
P0355 - Ignition Coil E Primary/Secondary Circuit Malfunction	See the description for DTC P0350.	See the possible causes for DTC P0350.	
P0356 - Ignition Coil F Primary/Secondary Circuit Malfunction	See the description for DTC P0350.	See the possible causes for DTC P0350.	
P0357 - Ignition Coil G Primary/Secondary Circuit Malfunction	See the description for DTC P0350.	See the possible causes for DTC P0350.	
P0358 - Ignition Coil H Primary/Secondary Circuit Malfunction	See the description for DTC P0350.	See the possible causes for DTC P0350.	
P0359 - Ignition Coil I Primary/Secondary Circuit Malfunction	See the description for DTC P0350.	See the possible causes for DTC P0350.	
P0360 - Ignition Coil J Primary/Secondary Circuit Malfunction	See the description for DTC P0350.	See the possible causes for DTC P0350.	
P0400 - EGR Flow Failure (Outside the Minimum or Maximum Limits)	The EEGR system is monitored once per drive cycle during steady state conditions above 77 km/h (48 mph). The test fails when a malfunction is detected by PCM calculations indicating the EGR flow is less or greater than expected.	<ul style="list-style-type: none"> • EEGR valve stuck open or closed • Connector to EEGR not seated • EEGR motor windings shorted or open circuited • No voltage to the EEGR • Harness open or shorted to voltage or ground • Vacuum signal to MAP restricted or leaking • MAF sensor signal erroneous • Damaged PCM • Carbon build up in the EEGR valve seat area • One or more sensors is not responding or is out of range 	All of the following sensors input data to the PCM for proper operation of the EEGR system: ECT, CPS, IAT, MAF, TP, MAP. Any DTC relating to these sensors must be resolved prior to addressing code P0400.
P0401 - EGR Flow Insufficient Detected	The EGR system is monitored during steady state driving conditions while the	<ul style="list-style-type: none"> • Vacuum supply 	Perform the KOER self-test and look for DTC P1408 as an indication of a hard fault. If P1408 is not

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
	EGR is commanded on. The test fails when the signal from the Differential Pressure Feedback EGR sensor indicates that EGR flow is less than the desired minimum.	<ul style="list-style-type: none"> • EGR valve stuck closed • EGR valve leaks vacuum • EGR flow path restricted • EGRVR circuit shorted to PWR • VREF open to DPFEGR sensor • DPFEGR sensor downstream hose is off or plugged • EGRVR circuit open to the PCM • VPWR open to EGRVR solenoid • DPFEGR sensor hoses are both off • DPFEGR sensor hoses are reversed • Damaged EGR orifice tube • Damaged EGRVR solenoid • Damaged PCM 	present, look for contamination, restrictions, leaks, and intermittents.
P0402 - EGR Flow Excessive Detected	The EGR system is monitored for undesired EGR flow during idle. The EGR monitor looks at the Differential Pressure Feedback EGR signal at idle and compares it to the stored signal measured during key ON and engine OFF. The test fails when the signal at idle is greater than at key ON engine OFF by a calibrated amount.	<ul style="list-style-type: none"> • EGR valve stuck open • Plugged EGR vacuum regulator solenoid vent • Plugged EGR tube • Slow responding DPFEGR sensor • Damaged DPF EGR sensor • Improper vacuum hose connection • Plugged vacuum hoses • EGRVR circuit shorted to ground • Damaged EGR vacuum regulator solenoid • Damaged PCM 	A DPFEGR PID reading that is greater at idle than during key ON and engine OFF by 0.5 volt or a rough engine idle may indicate a hard fault.
P0403 - EGR Vacuum Regulator Solenoid Circuit Malfunction (Vehicles with out Electric EGR)	This test checks the electrical function of the EGRVR solenoid. The test fails when the EGRVR circuit voltage is either too high or too low when compared to the expected voltage range. The EGR system must be enabled for the test to be completed.	<ul style="list-style-type: none"> • EGRVR circuit open • VPWR open to EGRVR solenoid • EGRVR circuit short to VPWR or GND • Damaged EGRVR solenoid • Damaged PCM 	The EGR vacuum regulator solenoid resistance is between 26 and 40 ohms.
P0405 - DPF EGR Sensor Circuit Low Voltage Detected	The EGR monitor checks the DPF EGR sensor signal to the PCM for low voltage.	<ul style="list-style-type: none"> • DPFEGR circuit short to GND 	A DPF EGR PID reading less than 0.2 volt with the key ON and engine OFF or running indicates a hard

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
	The test fails when the average voltage to the PCM drops to a voltage less than the minimum calibrated value.	<ul style="list-style-type: none"> • Damaged DPF EGR sensor • VREF short to GND • Damaged PCM 	fault.
P0406 - DPF EGR Sensor Circuit High Voltage Detected	The EGR monitor checks the DPF EGR sensor signal to the PCM for high voltage. The test fails when the average voltage to the PCM goes to a voltage greater than the maximum calibrated value.	<ul style="list-style-type: none"> • DPF EGR circuit open • VREF short to PWR • Damaged DPF EGR sensor • DPFEGR circuit short to PWR • SIG RTN circuit open • Damaged PCM 	A DPF EGR PID reading greater than 4.5 volts with the key ON and engine OFF or running indicates a hard fault.
P0411 - Secondary Air Injection (AIR) system upstream flow	The secondary air injection system does not detect the presence of air in the exhaust when introduced by the secondary air injection system.	<ul style="list-style-type: none"> • AIR bypass solenoid circuit open • AIR bypass solenoid leaking/blocked or stuck open/closed • Electric AIR pump - no/low air flow • AIR diverter valve leaking/blocked or stuck open/closed • AIR air hoses restricted or leaking • AIR vacuum hoses restricted or leaking 	<p>In order to test the AIR pump, it must be capable of driving the HO2S lean.</p> <p>A single electrical circuit open, such as an AIR bypass solenoid, in this multi-component circuit will not be detected by a PCM output driver circuit, yet it will create DTC P0411.</p>
P0412 - Secondary Air Injection (AIR) system circuit malfunction	On the primary side of the AIR relay, open and short faults on the AIR command circuit are detected during normal operation by the PCM output driver.	<ul style="list-style-type: none"> • Short to voltage or ground in the AIR command circuit • Open in the AIR command circuit • AIR bypass solenoid fault • AIR relay fault • Damaged PCM 	<p>A single open AIR component, solenoid, or relay on this multi-component circuit is not detected by a PCM output driver circuit, yet it generates DTC P0411 for a solenoid open or P2257 for a relay open.</p> <p>For intermittent faults consider using the AIR PCM output driver fault PID AIRF with a harness wiggle test with the AIR PCM output driver in OFF and ON states. The AIR PCM output driver fault PID AIRF instantly detects open circuits and shorts to ground with the PCM output driver off. The AIR PCM output driver fault PID AIRF instantly detects a short to voltage or low resistance load with the PCM output driver on. Use the OTM or OSC to toggle the PCM output driver from OFF to ON. (REFER to Section 2, OTM).</p>
P0420 - Catalyst System Efficiency Below Threshold (Bank 1)	Indicates the bank 1 catalyst system efficiency is below the acceptable threshold.	<ul style="list-style-type: none"> • Use of leaded fuel • Damaged HO2S • Malfunctioning engine coolant temperature sensor 	Compare HO2S upstream HO2S11 and downstream HO2S12 switch rate and amplitude. Under normal closed loop fuel conditions, high efficiency catalysts have oxygen storage which makes the switching frequency of the downstream HO2S very slow and

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
		<ul style="list-style-type: none"> • High Fuel Pressure • Damaged exhaust manifold • Damaged catalytic converter • Oil contamination • Cylinder misfiring • Downstream HO2S wires improperly connected • Damaged exhaust system pipe • Damaged muffler/tailpipe assembly • Retarded spark timing • Leaking fuel injector 	<p>reduces the amplitude of those switches as compared to the upstream HO2S. As catalyst efficiency deteriorates, its ability to store oxygen declines and the downstream HO2S signal begins to switch more rapidly with increase amplitude, approaching the switching rate and amplitude of the upstream HO2S. Once beyond an acceptable limit the DTC is set.</p>
P0430 - Catalyst System Efficiency Below Threshold (Bank 2)	<p>Indicates the bank 2 catalyst system efficiency is below the acceptable threshold.</p>	<p>See the possible causes for DTC P0420.</p>	<p>Compare HO2S upstream (HO2S21) and downstream (HO2S22) switch rate and amplitude. Under normal closed loop fuel conditions, high efficiency catalysts have oxygen storage which makes the switching frequency of the downstream HO2S very slow and reduces the amplitude of those switches as compared to the upstream HO2S. As catalyst efficiency deteriorates, its ability to store oxygen declines and the downstream HO2S signal begins to switch more rapidly with increase amplitude, approaching the switching rate and amplitude of the upstream HO2S. Once beyond an acceptable limit the DTC is set.</p>
P0442 - EVAP Control System Leak Detected (Small Leak)	<p>The PCM monitors the complete EVAP control system for the presence of a small fuel vapor leak. System failure occurs when a fuel vapor leak from an opening as small as 1.016 mm (0.040 in) is detected by the EVAP running loss monitor test.</p>	<ul style="list-style-type: none"> • After-market EVAP hardware (such as fuel filler cap) non-conforming to required specifications • Small holes or cuts in the fuel vapor hoses/tubes • Canister vent solenoid stays partially open on closed command • Damaged, missing or loosely installed fuel filler cap • Loose fuel vapor hose/tube connections to the EVAP system components • EVAP system component seals leaking (EVAP canister purge valve, fuel tank pressure sensor, canister vent solenoid, fuel vapor control valve tube assembly or fuel vapor vent valve assembly) 	

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
P0443 - EVAP Control System Canister Purge Valve Circuit Malfunction	The PCM monitors the state of the EVAP canister purge valve circuit output driver. The test fails when the signal moves outside the minimum or maximum limit for the commanded state.	<ul style="list-style-type: none"> • VPWR circuit open • EVAP canister purge valve circuit shorted to GND • Damaged EVAP canister purge valve • EVAP canister purge valve circuit open • EVAP canister purge valve circuit shorted to VPWR • Damaged PCM 	To verify normal function, monitor the EVAP canister purge valve signal PID EVAPPDC (or EVMV for electronic valve) and the signal voltage (PCM control side). With the valve closed, the EVAPPDC indicates a 0% duty cycle (0 mA for EVMV) and voltage approximately equal to battery voltage. When the valve is commanded fully open, EVAPPDC indicates 100% duty cycle (1000mA for EVMV) and a voltage drop of 3 volts minimum is normal. Output test mode may be used to switch output on/off to verify function.
P0446 - EVAP Control System Canister Vent Solenoid Circuit Malfunction	Monitors the canister vent (CV) solenoid circuit for an electrical failure. The test fails when the signal moves outside the minimum or maximum allowable calibrated parameters for a specified canister vent duty cycle by PCM command.	<ul style="list-style-type: none"> • VPWR circuit open • CV solenoid circuit shorted to PWR GND or CHASSIS GND • Damaged CV solenoid • CV solenoid circuit open • CV solenoid circuit shorted to VPWR • Damaged PCM 	To verify normal functioning, monitor the EVAP canister vent solenoid signal PID EVAPCV and the signal voltage (PCM control side). With the valve open, EVAPCV indicates 0% duty cycle and a voltage approximately equal to battery voltage. When the valve is commanded fully closed, EVAPCV indicates 100% duty cycle, and a minimum voltage drop of 4 volts is normal. Output test mode may be used to switch output on/off to verify function.
P0451 - EVAP System FTP Sensor Range/Performance/Intermittent	<p>Note: Starting on some 2004 applications, DTC P0451 will be set for a Fuel Tank Pressure FTP sensor range (offset) fault. DTC P0454 will replace the original P0451 for intermittent (noisy) sensor faults. Until the phase in process is complete, noisy or offset FTP sensor faults may set a P0451.</p> <ul style="list-style-type: none"> • The fuel tank pressure changes greater than 14 inches of water in 0.10 seconds. • FTP sensor output is offset by + /- 1.7 inches H2O 	<ul style="list-style-type: none"> • Intermittent open or short in the FTP sensor or the FTP sensor signal. • Contaminated or damaged sensor. • PCM damaged 	<ul style="list-style-type: none"> • Monitor the FTP PID and note if it changes from above 15 inches of water to below minus (-) 15 inches of water often in 1 minute. • With the FTP sensor at atmospheric pressure, the FTP PID normally indicates 0 inches of H2O. Look for a minimum reading of +/- 1.7 inches of water as an indication of an offset condition.
P0452 - FTP Sensor Circuit Low Voltage Detected	The PCM monitors the EVAP control system FTP sensor input signal to the PCM. The test fails when the signal average drops below a minimum allowable calibrated parameter.	<ul style="list-style-type: none"> • Contamination internal to the FTP sensor connector • Damaged PCM • FTP circuit shorted to GND or SIG RTN • Damaged FTP sensor 	An FTP V PID reading less than 0.22 volt with key ON and engine OFF or during any engine operating mode indicates a hard fault.
P0453 - FTP Sensor Circuit High Voltage Detected	The PCM monitors the EVAP control system FTP sensor input signal to the PCM. The test fails when the signal	<ul style="list-style-type: none"> • FTP circuit open • VREF shorted to VPWR • Damaged PCM 	An FTP V PID reading greater than 4.50 volts with key ON and engine OFF or during any engine operating mode indicates a hard fault.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
	average jumps above a minimum allowable calibrated parameter.	<ul style="list-style-type: none"> • FTP circuit shorted to VREF or VPWR • SIG RTN circuit open • Damaged FTP sensor 	
P0454 - FTP Sensor Circuit Noisy	The fuel tank pressure changes greater than 14 inches of water in 0.10 seconds.	<ul style="list-style-type: none"> • Intermittent open or short in the FTP sensor or the FTP sensor signal. • Contaminated or damaged sensor. 	Monitor the FTP PID and note if it changes from above 15 inches of water to below minus (-) 15 inches of water often in 1 minute.
P0455 - EVAP Control System Leak Detected (No Purge Flow or Large Leak)	The PCM monitors the complete EVAP control system for no purge flow, the presence of a large fuel vapor leak, or multiple small fuel vapor leaks. System failure occurs when no purge flow (attributed to fuel vapor blockages or restrictions), a large fuel vapor leak, or multiple fuel vapor leaks are detected by the EVAP Running Loss monitor test with the engine running (but not at idle).	<ul style="list-style-type: none"> • After-market EVAP hardware (such as fuel filler cap) non-conforming to required specifications • Disconnected or cracked fuel EVAP canister tube, EVAP canister purge outlet tube, or EVAP return tube • EVAP canister purge valve stuck closed • Damaged EVAP canister • Damaged or missing fuel filler cap • Insufficient fuel filler cap installation • Loose fuel vapor hose/tube connections to the EVAP system components • Blockages or restrictions in the fuel vapor hoses/tubes (items also listed under disconnections or cracks) • Fuel vapor control valve tube assembly or fuel vapor vent valve assembly blocked • Canister vent (CV) solenoid stuck open • Mechanically inoperative fuel tank pressure (FTP) sensor 	Check for audible vacuum noise or significant fuel odor in the engine compartment or near the EVAP canister and fuel tank.
P0456 - EVAP Control System Leak Detected (Very Small Leak)	The PCM monitors the complete EVAP control system for the presence of a very small fuel vapor leak. The system failure occurs when a fuel vapor leak from an opening as small as 0.508 mm (0.020	<ul style="list-style-type: none"> • Very small holes or cuts in the fuel vapor hoses/tubes. • Loose fuel vapor hose/tube connections to the EVAP system components. 	

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
	inch) is detected by the EVAP running loss monitor test.	<ul style="list-style-type: none"> • EVAP system component seals leaking (refer to Possible Causes under DTC P0442). 	
P0457 - EVAP Control System Leak Detected (Fuel Filler Cap Loose/Off)	A fuel tank pressure change less than a minus (-) 7 inches of water in 30 seconds has occurred after refueling; or there is excessive purge (fuel vapor) flow greater than 0.06 pounds per minute.	<ul style="list-style-type: none"> • Fuel filler cap not installed on refueling (storing continuous memory DTC) and the fuel cap indicator lamp (FCIL) may also be illuminated. • Damaged, missing or loosely installed fuel filler cap 	Check for a missing fuel filler cap or the integrity of the cap. If OK, clear continuous memory DTCs and re-initiate the EVAP Emission Running Loss Monitor Drive Cycle.
P0460 - Fuel Level Sensor A Circuit Aviator, Escape, Expedition, F-150 Heritage 4.2L, Marauder, Navigator	The powertrain control module (PCM) monitors the fuel level input (FLI) circuit or communications network message for an electrical failure. The test fails when the signal moves outside the minimum or maximum allowable calibrated parameters for a specified fuel fill percentage in the fuel tank.	<ul style="list-style-type: none"> • Empty fuel tank • Fuel pump (FP) module concern • Incorrectly installed fuel gauge • Damaged instrument cluster • CASE GND circuit open • FLI shorted to VPWR • Overfilled fuel tank • Damaged fuel gauge • FLI circuit open • FLI circuit shorted to CASE GND or PWR GND • CSE GND shorted to VPWR • Damaged PCM 	Monitor FLI PID and FLI V PID in key ON, engine RUNNING. FLI PID at 25% fill (with non matching fuel gauge) and FLI V PID less than 0.90 volts [for FLI PID at 75% fill (with non matching fuel gauge) and FLI V PID greater than 2.45 volts] indicates a hard fault.
P0460 - Fuel Level Sensor A Circuit All others	The powertrain control module (PCM) monitors the fuel level input (FLI) circuit or communications network message for a concern. The test fails when the PCM determines that the value of the FLI signal is stuck. The PCM calculates the amount of fuel used during operation. If the FLI signal does not change or does not correspond with the calculated fuel usage, the DTC is set.	<ul style="list-style-type: none"> • Stuck float arm • Fuel level is always greater than 95% due to refueling patterns • Fuel level is always less than 5% due to refueling patterns • Fuel level is always at the same level between 3% and 97% full due to refueling patterns • Fuel pump (FP) module concern • Damaged instrument cluster 	Check with the customer for driving and fueling habits that would keep the fuel level at approximately the same value. Monitor the FLI and FLI V PIDs while attempting to move the fuel level float by adding or removing fuel as necessary.
P0461 - Fuel Level Sensor Circuit Range/Performance	Excessive electrical noise.	Fuel level sensor circuit intermittent. FLI signal line open circuit.	

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
P0462 - Fuel level sensor circuit low input	The PCM monitors the fuel level input (FLI) circuit for electrical failure. The test fails when the signal moves below the minimum allowable calibrated parameter for a specified fuel fill percentage in the fuel tank.	<ul style="list-style-type: none"> • Empty fuel tank • Fuel pump (FP) module concern • Incorrectly installed fuel gauge • Damaged instrument cluster • Damaged fuel gauge • FLI circuit shorted to CASE GND or PWR GND • Damaged PCM 	Monitor FLI PID and FLI V PID in key ON, engine RUNNING. FLI PID at 25% fill (with non matching fuel gauge) and FLI V PID less than 0.90 volts [for FLI PID at 75% fill (with non matching fuel gauge) and FLI V PID greater than 2.45 volts] indicates a hard fault.
P0463 - Fuel level sensor circuit high input	The PCM monitors the fuel level input (FLI) circuit for electrical failure. The test fails when the signal moves above the maximum allowable calibrated parameter for a specified fuel fill percentage in the fuel tank.	<ul style="list-style-type: none"> • Fuel pump (FP) module concern • Incorrectly installed fuel gauge • Damaged instrument cluster • FLI circuit open • FLI shorted to VPWR • CASE GND circuit open • Overfilled fuel tank • Damaged fuel gauge • Damaged PCM 	Monitor FLI PID and FLI V PID in key ON, engine RUNNING. FLI PID at 25% fill (with non matching fuel gauge) and FLI V PID less than 0.90 volts [for FLI PID at 75% fill (with non matching fuel gauge) and FLI V PID greater than 2.45 volts] indicates a hard fault.
P0480 - Low Fan Control (LFC)/Fan Control 1 (FC1) Primary Circuit Malfunction Relay controlled electric cooling fan	Monitors the low fan control (LFC) or fan control (FC) for one speed fan application, primary circuit output from the PCM. The test fails if: When the PCM grounds the LFC/FC circuit, excessive current draw is detected on the LFC/FC circuit; or with the LFC/FC circuit not grounded by the PCM, voltage is not detected on the LFC/FC circuit (the PCM expects to detect VPWR voltage coming through the low speed FC relay coil to the LFC/FC circuit).	<ul style="list-style-type: none"> • Open or shorted LFC/FC circuit • Open VPWR circuit to the low speed FC relay • Damaged low speed FC relay (or CCRM) • PCM damaged 	<ul style="list-style-type: none"> • When the LFCF PID reads YES, a fault is currently present • During the KOEO and KOER self-test, the LFC/FC circuit is cycled on and off • A short to voltage can only be detected when the PCM is grounding the LFC/FC circuit. • During the KOEO and KOER self-test, the LFC/FC circuit is cycled on and off
P0480 - Low Fan Control (LFC)/Fan Control 1 (FC1) Primary Circuit Malfunction Variable Speed Electric Cooling Fan	This test checks the Fan Control - Variable (FCV) output circuit. The DTC sets if the PCM detects the voltage on the FCV circuit is not within the expected range.	<ul style="list-style-type: none"> • FCV circuit open or shorted. • B+ or ground circuit fault to cooling fan. • VPWR open to cooling fan (if applicable). • Damaged cooling fan module. • PCM damaged 	During the KOEO self-test, the cooling fan is cycled on and off.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
P0481 - High Fan Control (HFC)/Fan Control 3 (FC3) Primary Circuit Malfunction	Monitors the high fan control (HFC) primary circuit output from the PCM. The test fails if: With the HFC output commanded on (grounded), excessive current draw is detected on the HFC circuit; or, with the HFC circuit commanded off, voltage is not detected on the HFC circuit (the PCM expects to detect VPWR voltage through the high speed FC relay coil to the HFC circuit).	<ul style="list-style-type: none"> • Open or shorted HFC circuit • Open VPWR circuit to the high speed FC relay • Damaged high speed FC relay (or CCRM) • Damaged PCM 	<ul style="list-style-type: none"> • When the HFCF PID reads YES, a fault is currently present • An open circuit or short to ground can only be detected when the PCM is not grounding the HFC circuit • A short to voltage can only be detected when the PCM is grounding the HFC circuit. • During the KOEO and KOER self-test, the HFC circuit is cycled on and off
P0482 - Medium Fan Control (MFC) Primary Circuit Failure	Monitors the medium fan control (MFC) primary circuit output from the PCM. The test fails if: With the MFC output commanded on (grounded), excessive current draw is detected on the MFC circuit; or, with the MFC circuit commanded off, voltage is not detected on the MFC circuit (the PCM expects to detect IGN START/RUN voltage through the medium speed FC relay coil to the MFC circuit).	<ul style="list-style-type: none"> • Open or shorted MFC circuit • Open IGN START/RUN circuit to the medium speed FC relay • Damaged medium speed FC relay • Damaged PCM 	<ul style="list-style-type: none"> • When the MFCF PID reads YES, a fault is currently present • An open circuit or short to ground can only be detected when the PCM is not grounding the MFC circuit • A short to voltage can only be detected when the PCM is grounding the MFC circuit. • During the KOEO and KOER self-test, the MFC circuit is cycled on and off • Using Output Test Mode on a diagnostic tool, when commanding the low speed fan on, the PCM also activates the medium speed fan output.
P0500 - Vehicle Speed Sensor (VSS) Malfunction	Indicates the powertrain control module (PCM) detected an error in the vehicle speed information. Vehicle speed data is received from either the vehicle speed sensor (VSS), the transfer case speed sensor (TCSS) or the anti-lock brake system (ABS) control module. If the engine RPM is above the torque converter stall speed (automatic transmission) and the engine load is high, it can be inferred that the vehicle must be moving. If there is insufficient vehicle speed data input, a malfunction is indicated and a DTC is set. On most vehicle applications the malfunction indicator lamp (MIL) is triggered when this DTC is set.	<ul style="list-style-type: none"> • Open in the VSS+/VSS- harness circuit. • Open in the TCSS signal or the TCSS signal return harness circuit. • Short to GND in the VSS harness circuit. • Short to GND in the TCSS harness circuit. • Short to PWR in the VSS harness circuit. • Short to PWR in the TCSS harness circuit. • Damaged drive mechanism for VSS or TCSS. • Damaged VSS or TCSS. • Damaged wheel speed sensors. • Damaged wheel speed sensor harness circuits. • Damage in the module(s) connected to the VSC/VSS 	Monitor the VSS PID while driving vehicle. This DTC is set when the PCM detects a sudden loss of vehicle speed signal over a period of time. If vehicle speed data is lost, check the source of where the vehicle speed input originates from: VSS, TCSS or ABS. Note: On some MSOF applications, VSS and TCSS PID can be monitor. However if no TCSS PID is available and VSS PID is zero, TCSS circuitry frequency must be checked for loss of sensor signal. If another vehicle electronic module has generated the P0500 and the vehicle does not receive its vehicle speed input from one of the above mention sources (VSS, TCSS or ABS). Check the PCM for Output Shaft Speed Sensor (OSS) DTCs. On OSS applications the PCM uses the OSS to calculated the vehicle speed. If no OSS DTCs are found check for correct PCM configuration. Check PCM configuration for correct tire size and axle ratio.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
		circuit. <ul style="list-style-type: none"> • Open or short in the vehicle speed circuit VSS signal between the ABS VSS signal output and the VSS signal inputs to the PCM and other modules (Excursion and F-Super Duty). 	
P0501 - Vehicle Speed Sensor (VSS) Range/Performance	Indicates the powertrain control module (PCM) detected an error in the vehicle speed information. This DTC is set the same way as P0500, however the malfunction indicator lamp (MIL) is not triggered.	<ul style="list-style-type: none"> • Refer to possible causes for P0500. 	Refer to Diagnostic Aids for P0500.
P0503 - Vehicle Speed Sensor (VSS) Intermittent	Indicates poor or noisy VSS performance. Vehicle speed data is received from either the vehicle speed sensor (VSS), the transfer case speed sensor (TCSS), or the anti-lock brake system (ABS) control module.	<ul style="list-style-type: none"> • Noisy VSS/TCSS input signal from the radio frequency interference / electromagnetic interference (RFI/EMI) external sources, such as ignition components or the charging circuit • Damaged VSS or driven gears. • Damaged TCSS. • Damaged wiring harness or connectors. • Malfunction in the module(s) or circuit connected to the VSS/TCSS circuit. • After market add-on. 	Monitor the VSS PID while driving the vehicle. Check for intermittent vehicle speed indication. Verify the ignition and charging system are functioning correctly.
P0505 - Idle Air Control (IAC) System Malfunction Vehicles with electronic throttle control (ETC)	The powertrain control module (PCM) attempts to control engine speed during the key on, engine running (KOER) self-test. The test fails when the desired RPM could not be reached or controlled during the self-test.	<ul style="list-style-type: none"> • Failure mode effects management (FMEM) condition is present • Air inlet is plugged • Vacuum leaks • Sludged throttle body • Damaged electronic throttle body (ETB) • Damaged PCM 	This DTC may be accompanied by other DTCs. Diagnose other DTCs first. If other DTCs are not present inspect the intake air system for air restrictions, vacuum leaks, and damage. If no concerns are present, clear the DTC and retest.
P0505 - Idle Air Control (IAC) System Malfunction All others	The PCM attempts to control engine speed during the KOER self-test. The test fails when the desired RPM could not be reached or controlled during the self-test.	<ul style="list-style-type: none"> • IAC circuit open • VPWR to IAC solenoid open • IAC circuit shorted to PWR 	The IAC solenoid resistance is 6 to 13 ohms. Monitor the IAC PID duty cycle and/or voltage.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
		<ul style="list-style-type: none"> • Air inlet is plugged • Damaged IAC valve • Damaged PCM 	
<p>P0506 - Idle Air Control System RPM Lower Than Expected Vehicles with electronic throttle control (ETC)</p>	<p>This DTC is set when the powertrain control module (PCM) detects an engine idle speed that is less than the desired RPM.</p>	<ul style="list-style-type: none"> • Air intake restriction • Exhaust restriction • Engine mechanical fault. • Sludged throttle body • Damaged electronic throttle body (ETB) • Damaged PCM 	<p>This DTC may be accompanied by other DTCs. Diagnose other DTCs first. If other DTCs are not present inspect the intake air system for air restrictions and damage. If no concerns are present, clear the DTC and retest.</p>
<p>P0506 - Idle Air Control System RPM Lower Than Expected All others</p>	<p>This DTC is set when the PCM detects an engine idle speed that is less than the desired RPM.</p>	<ul style="list-style-type: none"> • IAC circuit open • Air inlet is plugged • Damaged or incorrect IAC valve • IAC valve stuck closed • VPWR to IAC solenoid open • IAC circuit shorted to PWR • Damaged PCM 	<p>Disconnect the IAC valve and look for no change in engine RPM as an indication of a stuck or damaged valve.</p>
<p>P0507 - Idle Air Control System RPM Higher Than Expected Vehicles with electronic throttle control (ETC)</p>	<p>This DTC is set when the powertrain control module (PCM) detects an engine idle speed that is greater than the desired RPM.</p>	<ul style="list-style-type: none"> • Air intake leak after throttle body • Vacuum leaks • Failed EVAP system • EGR valve leaks vacuum • Damaged electronic throttle body (ETB) • Damaged PCM 	<p>This DTC is informational only and it may be accompanied by other DTCs. Diagnose other DTCs first. If other DTCs are not present inspect the intake air system for air or vacuum leaks and damage. If no concerns are present, clear the DTC and retest.</p>
<p>P0507 - Idle Air Control System RPM Higher Than Expected All others</p>	<p>This DTC is set when the PCM detects an engine idle speed that is greater than the desired RPM.</p>	<ul style="list-style-type: none"> • IAC circuit shorted to ground • Damaged or incorrect IAC valve • IAC valve stuck open • Air intake leak after throttle body • Vacuum leaks • Failed EVAP system • Damaged PCM 	<p>Disconnect the IAC valve and look for little or no change in engine RPM as an indication of a stuck or damaged valve.</p>
<p>P0511 - Idle Air Control Circuit Malfunction</p>	<p>This DTC is set when the PCM detects an electrical load failure on the IAC output circuit.</p>	<ul style="list-style-type: none"> • IAC circuit open • VPWR to IAC solenoid open • IAC circuit shorted to PWR 	<p>The IAC solenoid resistance is 6 to 13 ohms. Monitor the IAC PID duty cycle and/or voltage.</p>

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
		<ul style="list-style-type: none"> • Damaged IAC valve • PCM damaged • IAC circuit short to GND 	
P0532 - Air Conditioning Pressure Sensor (ACP) Sensor High Voltage Detected	The ACP inputs a voltage to the PCM. If the voltage is above a calibrated level the DTC sets.	<ul style="list-style-type: none"> • ACP sensor circuit short to PWR • ACP circuit open • Damaged PCM • ACP circuit short to VREF • ACP circuit short to SIGRTN • Damaged ACP sensor 	Verify a VREF voltage between 4 and 6 volts.
P0533 - Air Conditioning Pressure Sensor (ACP) Sensor Low Voltage Detected	The ACP inputs a voltage to the PCM. If the voltage is below the calibrated level the DTC sets.	<ul style="list-style-type: none"> • ACP circuit short to GND or SIGRTN • VREF circuit open • Damaged PCM • Open ACP circuit • Damaged ACP sensor 	Verify a VREF voltage between 4 and 6 volts.
P0534 - Low A/C cycling period	Indicates frequent A/C compressor clutch cycling.	<ul style="list-style-type: none"> • Mechanical A/C system concern (such as low refrigerant charge, damaged A/C cycling switch) • Intermittent open between the cycling pressure switch and the PCM • Intermittent open in the IGN RUN circuit to cycling pressure switch (if applicable) 	<ul style="list-style-type: none"> • An intermittent open circuit, although possible, is unlikely • This test is designed to protect the transmission. In some strategies, the PCM unlocks the torque converter during A/C clutch engagement. If a concern is present that results in frequent A/C clutch cycling, damage could occur if the torque converter is cycled at these intervals. This test detects this condition, sets the DTC and prevents the torque converter from excessive cycling.
P0537 - A/C Evaporator Temperature (ACET) Circuit Low Input	Indicates the ACET signal input was less than the self-test minimum. The self-test minimum is 0.13 volts.	<ul style="list-style-type: none"> • ACET circuit short to ground or SIG RTN • Damaged ACET sensor • Damaged PCM 	The PCM sources a low current 5 volts on the ACET circuit (this voltage can be measured with the sensor disconnected). As the A/C evaporator air temperature changes, the ACET circuit resistance to SIG RTN (ground) changes (which changes the voltage the PCM detects). When the ACET signal is detected below the self-test minimum, check for shorts to the SIG RTN or ground, which would pull the voltage low.
P0538 - A/C Evaporator Temperature (ACET) Circuit High Input	Indicates the ACET signal input was greater than the self-test maximum. The self-test maximum is 4.5 volts.	<ul style="list-style-type: none"> • ACET circuit open • SIG RTN circuit open to the ACET sensor • ACET circuit short to voltage (VREF) 	The PCM sources a low current 5 volts on the ACET circuit (this voltage can be measured with the sensor disconnected). As the A/C evaporator air temperature changes, the ACET circuit resistance to SIG RTN (ground) changes (which changes the voltage the PCM detects). When the ACET signal is detected

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
		<ul style="list-style-type: none"> • Damaged ACET sensor • Damaged PCM 	above the self-test maximum, check for open circuits (ACET or SIG RTN), which would cause the voltage to remain high. Although not as probable, also check for a short to voltage (VREF).
P0552 - Power Steering Pressure (PSP) Sensor Circuit Low Input	Indicates the PSP sensor input signal was less than the self-test minimum.	<ul style="list-style-type: none"> • PSP sensor damaged • SIG RTN circuit open or shorted • VREF circuit open or shorted • PSP sensor signal circuit open or shorted • Damaged PCM 	View the PSP PID to monitor the PSP input.
P0553 - Power Steering Pressure (PSP) Sensor Circuit High Input	Indicates the PSP sensor input signal was greater than the self-test maximum.	<ul style="list-style-type: none"> • PSP sensor damaged • SIG RTN circuit shorted to voltage • VREF circuit shorted to voltage • PSP sensor signal circuit shorted to voltage • Damaged PCM 	View the PSP PID to monitor the PSP input.
P0602 - Control Module Programming Error	This diagnostic trouble code (DTC) indicates a programming error within the Vehicle ID (VID) block.	<ul style="list-style-type: none"> • VID data corrupted by the diagnostic tool during VID reprogramming 	Using the diagnostic tool, reprogram the VID block. If the PCM does not allow reprogramming of the VID block, reflashing the PCM is required.
P0603 - Powertrain Control Module Keep Alive Memory (KAM) Error	Indicates the PCM has experienced an internal memory fault. However, there are external items that can cause this DTC.	<ul style="list-style-type: none"> • Reprogramming • Battery terminal corrosion • KAPWR to PCM interrupt/open • Loose battery connection • Damaged PCM 	If KAPWR is interrupted to the PCM because of a battery or PCM disconnect, a DTC can be generated on the first power-up.
P0605 - PCM read only memory (ROM) error	The PCM ROM has been corrupted.	<ul style="list-style-type: none"> • An attempt was made to change the calibration • Module programming error • Physically damaged PCM 	<ul style="list-style-type: none"> • Reprogram or update the calibration. • Reprogram the VID block (use as built data) • Check for other DTCs or drive symptoms for further action
P0606 - Powertrain Control Module Internal Communication Error	P0606 indicates a register readback (PCM internal communications) error.	<ul style="list-style-type: none"> • Damaged PCM 	For Electronic Throttle Control applications, an internal PCM failure, or an ETC system FMEM condition exists. Repairing the other DTCs can fix the P0606. For all others, an internal PCM concern may be present. For both applications if only DTC P0606 is present, clear the DTCs. Repeat the self-test.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
P0620 - Generator Control Circuit Failure	The PCM reads the I-Line (or the ALF) and sends a DTC through the network when the I-Line (or ALF) indicates a fault.	<ul style="list-style-type: none"> • ILC circuit short to GND • ILC circuit short to B+ • ILC circuit open • ALF circuit short to GND • ALF circuit short to B+ • B+ circuit open • Generator drive mechanism • Damaged generator/regulator assembly • Damaged PCM 	Repair as necessary. If DTC P0606 is retrieved again, install a new PCM. Verify the battery voltage is 14.5 volts. Verify the generator/regulator has the correct part number.
P0622 - Generator Field Terminal Circuit Failure	The PCM monitors generator load from the generator/regulator in the form of frequency. The frequency range is determined by the temperature of the voltage regulator, where 97% indicates full load, and below 6% indicates no load.	<ul style="list-style-type: none"> • GEN-MON circuit short to GND • GEN-MON circuit short to B+ • GEN-MON circuit open • GEN-COM circuit short to GND • GEN-COM circuit short to B+ • GEN-COM circuit open • ILC circuit short to GND • ILC circuit short to B+ • ILC circuit open • ALI circuit short to GND • ALI circuit short to B+ • ALI circuit open • Battery-sense circuit open • Generator drive mechanism • Damaged generator/regulator assembly • Damaged PCM 	Verify the battery voltage is 14.5 volts. Verify the generator/regulator has the correct part number.
P0645	Monitors the wide open throttle A/C cutoff (WAC) circuit output from the PCM. The test fails if: When the PCM grounds the WAC circuit, excessive current draw is detected on the WAC circuit; or, with the WAC circuit not grounded by the PCM, voltage is not detected on the WAC circuit (the PCM expects to detect VPWR voltage coming through the WAC relay coil to the WAC circuit).	<ul style="list-style-type: none"> • Open or shorted WAC circuit • Damaged WAC relay (or CCRM) • Open VPWR circuit to the WAC relay • Damaged PCM 	<ul style="list-style-type: none"> • The A/CCR control circuit can be monitored using the WACF & WAC PID • When the WACF PID reads YES, a fault is currently present • An open circuit or short to ground can only be detected when the PCM is not grounding the circuit • A short to voltage can only be detected when the PCM is grounding the circuit • During the KOEO and KOER self-test, the WAC circuit is cycled on and off • Verify the A/C and defrost were off during the KOEO and KOER self-tests. Check the ACCS

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
			PID to verify. <ul style="list-style-type: none"> If the vehicle is not equipped with A/C, DTC P1460 can be ignored
P0657 - Actuator Supply Voltage A Circuit/Open	Voltage to all transmission solenoids has been interrupted.		Refer to the Workshop Manual Section 307-01, Automatic Transmission.
P0660 - Intake Manifold Tuning Valve (IMTV) Control Circuit Open - Bank 1	The IMTV system is monitored for failure during continuous, KOEO, or KOER self-tests. The test fails when the signal on the monitor pin is more or less than an expected calibrated range.	<ul style="list-style-type: none"> IMTV signal circuit open, shorted to PWR GND or SIG RTN Damaged IMTV actuator Damaged PCM 	An IMTVM PID reading may indicate a fault if available.
P0663 - Intake Manifold Tuning Valve (IMTV) Control Circuit Open - Bank 2	The IMTV system is monitored for failure during continuous, KOEO, or KOER self-tests. The test fails when the signal on the monitor pin is more or less than an expected calibrated range.	<ul style="list-style-type: none"> IMTV signal circuit open, shorted to PWR GND or SIG RTN Damaged IMTV actuator Damaged PCM 	An IMTVM PID reading may indicate a fault if available.
P0703 - Brake Switch Circuit Input Malfunction	Indicates the PCM did not receive a brake pedal position (BPP) input.	<ul style="list-style-type: none"> Open or short in the BPP circuit Open or short in the stoplamp circuits Damaged PCM Malfunction in module(s) connected to the BPP circuit (rear electronic module [REM] for Freestar/Monterey, LS, and Thunderbird or lighting control module [LCM] for Town Car). Damaged brake switch Misadjusted brake switch 	Check for proper function of the stoplamps. Using the diagnostic tool, check the BPP PID. The stoplamps and PID should toggle on and off with brake pedal activation.
P0704 - Clutch Pedal Position Switch Malfunction	When the clutch pedal is applied the voltage goes to low. If the PCM does not see this change from high to low the DTC is set.	<ul style="list-style-type: none"> CPP circuit short to PWR Damaged CPP switch CPP circuit open in the SIGRTN Damaged PCM 	When pressing the CPP switch the voltage should cycle from 5 volts down.
P0720 - Insufficient input from the Output Shaft Speed sensor	The output shaft speed sensor inputs a signal to the PCM, based on the speed of the output shaft of the transmission. The PCM compares this signal with the signal	<ul style="list-style-type: none"> OSS sensor circuit short to GND OSS sensor circuit short to PWR 	Verify the sensor signal output varies with the vehicle speed.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
	of the VSS or TCSS and determines correct tire size and axle gear ratio.	<ul style="list-style-type: none"> • OSS sensor circuit open • Damaged OSS sensor • Damaged PCM 	
P0721 - Noise interference on the Output Shaft Speed sensor signal	The output shaft speed sensor signal is very sensitive to noise. This noise distorts the input to the PCM.	<ul style="list-style-type: none"> • Wiring misrouted • After market add-on • Wiring damaged • Wiring insulation wear 	<ul style="list-style-type: none"> • Check the routing of the harness. • Check the wiring and connector for damage.
P0722 - No signal from the Output Shaft Speed sensor	The output shaft speed sensor failed to provide a signal to the PCM upon initial movement of vehicle.	<ul style="list-style-type: none"> • Damaged OSS connector • Damaged OSS sensor, or not installed properly • Harness intermittently shorted or open 	
P0723 - Output Shaft Speed sensor circuit intermittent failure	The output shaft speed sensor signal to the PCM is irregular or interrupted.	<ul style="list-style-type: none"> • Harness connector not properly seated • Harness intermittently shorted or open • Harness connector damaged • OSS sensor damaged, or not installed properly 	<ul style="list-style-type: none"> • Verify harness and connector integrity • Verify OSS sensor proper installation
P1000 - On Board Diagnostic (OBD) System Readiness Test Not Complete	The OBD monitors are performed during the OBD Drive Cycle. P1000 is stored in continuous memory if any of the OBD monitors do not carry out their full diagnostic check.	<ul style="list-style-type: none"> • The vehicle is new from the factory • Battery or PCM had recently been disconnected • An OBD monitor failure occurred before completion of an OBD drive cycle • PCM DTCs have recently been cleared with a diagnostic tool • PTO circuit is shorted to VPWR or B+ or PTO is on during testing 	<p>The Ford P1000 inspection/maintenance (I/M) readiness function is part of the PCM strategy. A battery disconnection or clearing codes using a diagnostic tool results in the various I/M readiness bits being set to a "not ready" condition. As each non-continuous OBD monitor completes a full diagnostic check, the I/M readiness bit associated with that monitor is set to a "ready" condition. This may take 1 or 2 drive cycles based on whether malfunctions are detected or not. The readiness bits for comprehensive component monitoring, misfire and fuel system monitoring are considered complete once all the non-continuous monitors are evaluated. Because the EVAP system monitor requires certain ambient conditions to run, special logic can bypass the monitor for purpose of clearing the EVAP system I/M readiness bit due to the continued presence of these extreme conditions.</p> <p>Note: P1000 does not need to be cleared from the PCM except to pass an I/M test.</p>

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
P1001 - KOER Not Able To Complete, KOER Aborted	This non-MIL (Malfunction Indicator Lamp) code is set when the Key On/Engine Running (KOER) self-test does not complete in the time intended.	<ul style="list-style-type: none"> • Incorrect Self-Test Procedure. • Unexpected response from the self-test monitors • RPM out of specification. 	Rerun the self-test following QT1 in Section 3, Symptom Charts, STEP 1: PCM Quick Test.
P1100 - Mass Air Flow (MAF) Sensor Intermittent	The MAF sensor circuit is monitored by the PCM for sudden voltage (or air flow) input change through the comprehensive component monitor (CCM). If during the last 40 warm-up cycles in key ON, engine running the PCM detects a voltage (or air flow) change beyond the minimum or maximum calibrated limit, a continuous memory diagnostic trouble code (DTC) is stored.	<ul style="list-style-type: none"> • Poor continuity through the MAF sensor connectors • Poor continuity through the MAF sensor harness • Intermittent open or short inside the MAF sensor. 	While accessing the MAF V PID on the diagnostic tool, lightly tap on the MAF sensor or wiggle the MAF sensor connector and harness. If the MAF V PID suddenly changes below 0.23 volt or above 4.60 volts, an intermittent fault is indicated.
P1101 - Mass Air Flow (MAF) Sensor Out of Self-Test Range	The MAF sensor circuit is monitored by the PCM for an out of range air flow (or voltage) input. If during key ON engine OFF the air flow voltage signal is greater than 0.27 volt the test fails. Likewise, if during key ON engine running, an air flow voltage signal is not within 0.46 volt to 2.44 volts, the test fails.	<ul style="list-style-type: none"> • Low battery charge • MAF sensor partially connected • MAF sensor contamination • PWR GND open to the MAF sensor • MAF RTN circuit open to PCM • Damaged MAF sensor • Damaged PCM 	A MAF V PID reading greater than 0.27 volt (KOEO) or a MAF V PID reading outside the 0.46 volt to 2.44 volts range (KOER) indicates a hard fault.
P1112 - Intake Air Temperature Circuit Intermittent	Indicates the IAT sensor signal was intermittent during the comprehensive component monitor.	<ul style="list-style-type: none"> • Damaged harness • Damaged sensor • Damaged harness connector • Damaged PCM 	Monitor the IAT on the diagnostic tool, and look for sudden changes in the reading when the harness is wiggled or the sensor is tapped.
P1114 - Intake Air Temperature 2 (IAT2) Circuit Low Input	Indicates the sensor signal is less than the self-test minimum. The IAT2 sensor minimum is 0.2 volt.	<ul style="list-style-type: none"> • Grounded circuit in the harness • Improper harness connection • Damaged sensor • Damaged PCM 	Monitor IAT2 PID. Typical IAT2 temperature should be greater than IAT1. REFER to Section 6, Reference Values for ranges.
P1115 - Intake Air Temperature 2 (IAT2) Circuit High Input	Indicates the sensor signal is greater than the self-test maximum. The IAT2 sensor maximum is 4.6 volts.	<ul style="list-style-type: none"> • Open circuit in the harness • Sensor signal short to voltage • Improper harness connection • Damaged sensor • Damaged PCM 	Monitor IAT2 PID. Typical IAT2 temperature should be greater than IAT1. REFER to Section 6, Reference Values for ranges.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
P1116 - Engine Coolant Temperature (ECT) Sensor Out of Self-Test Range	Indicates the ECT sensor is out of self-test range. The correct range is 0.3 to 3.7 volts.	<ul style="list-style-type: none"> • Overheating condition • Malfunctioning thermostat • Damaged ECT sensor • Low engine coolant • Damaged harness connector • Damaged PCM 	Engine coolant temperature must be greater than 10°C (50°F) to pass the KOEO self-test and greater than 82°C (180°F) to pass the KOER self-test.
P1117 - Engine Coolant Temperature (ECT) Sensor Intermittent	Indicates the ECT circuit became intermittently open or shorted while the engine was running. Note that on some vehicles which are not equipped with an ECT sensor, the CHT can be used and can set this DTC.	<ul style="list-style-type: none"> • Damaged harness • Damaged sensor • Damaged PCM • Damaged harness connector • Low engine coolant 	Monitor the ECT or CHT on a diagnostic tool, and look for sudden changes in the reading when the harness is wiggled or the sensor is tapped.
P1120 - Throttle Position (TP) Sensor Out of Range Low (RATCH Too Low)	The TP sensor circuit is monitored by the PCM for a low TP rotation angle (or voltage) input below the closed throttle position through the comprehensive component monitor (CCM). If during key ON, engine OFF or key ON, engine running, the TP rotation angle (or voltage) remains within the calibrated self-test range but falls between 3.42 and 9.85% (0.17 and 0.49 volt), the test fails.	<ul style="list-style-type: none"> • TP circuit with frayed wires • Corrosion on the TP circuit connectors • VREF open to TP sensor • VREF short to SIG RTN • TP sensor loose pins 	A TP PID (TP V PID) between 3.42 and 9.85% (0.17 and 0.49 volt) in key ON engine OFF, continuous memory or key ON engine running indicates a hard fault.
P1121 - Throttle Position (TP) Sensor Inconsistent with the MAF Sensor	The PCM monitors a vehicle operation rationality check by comparing sensed throttle position to mass air flow readings. If, during a KOER self-test, the comparison of the TP sensor and MAF sensor readings are not consistent with the calibrated load values, the test fails and a diagnostic trouble code is stored in continuous memory.	<ul style="list-style-type: none"> • Air leak between the MAF sensor and throttle body • TP sensor not seated properly • Damaged TP sensor • Damaged MAF sensor 	Drive the vehicle and exercise the throttle and the TP sensor in all gears. A TP PID (TP V PID) less than 4.82% (0.24 volt) with a LOAD PID greater than 55%, or a TP PID (TP V PID) greater than 49.05% (2.44 volts) with a LOAD PID less than 30%, indicates a hard fault.
P1124 - Throttle Position (TP) Sensor Out of Self-Test Range	The TP sensor circuit is monitored by the PCM for an out of range TP rotation angle (or voltage) input. If during key ON, engine OFF or key ON, engine running the TP rotation angle (or voltage) reading is less than 13.27% (0.66 volt) or greater than 23.52% (1.17 volts), the test fails.	<ul style="list-style-type: none"> • Binding or bent throttle linkage • TP sensor not seated properly • Throttle plate below closed throttle position • Throttle plate/screw misadjusted • Damaged TP sensor • Damaged PCM 	The TP PID (TP V PID) reading not between 13.27 and 23.52% (0.66 and 1.17 volts) in key ON, engine OFF or key ON, engine running indicates a hard fault.
P1125 - Throttle Position (TP) Sensor Intermittent	The TP sensor circuit is monitored by the PCM for sudden TP rotation angle (or voltage) input change through the	<ul style="list-style-type: none"> • Poor continuity through the TP sensor connectors 	While accessing the TP V PID on the diagnostic tool, lightly tap on the TP sensor or wiggle the TP sensor connector and harness. If the TP V PID suddenly

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
	comprehensive component monitor (CCM). If during the last 80 warm-up cycles in key ON, engine running the PCM detects TP rotation angle (or voltage) changes beyond the minimum or maximum calibrated limit, a continuous diagnostic trouble code (DTC) is stored.	<ul style="list-style-type: none"> • Poor continuity through the TP harness • Intermittent open or short inside the TP sensor 	changes below 0.49 volt or above 4.65 volts, an intermittent fault is indicated.
P1127 - Exhaust Not Warm Enough, Downstream Sensor Not Tested	The heated oxygen sensor (HO2S) monitor uses an exhaust temperature model to determine when the HO2S heaters are cycled ON. The test fails when the inferred exhaust temperature is below a minimum calibrated value.	<ul style="list-style-type: none"> • Engine not operating long enough prior to performing KOER self-test. • Exhaust system too cool. 	Monitor the HO2S Heater PIDs to determine their ON/OFF state. DTC P1127 is present if the exhaust is not hot.
P1128 - Upstream Oxygen Sensors Swapped from Bank to Bank (HO2S-11-21)	The heated oxygen sensor (HO2S) monitor determines if the HO2S signal response for a fuel shift corresponds to the correct engine bank. The test fails when a response from the HO2S being tested is not indicated.	<ul style="list-style-type: none"> • Crossed HO2S harness connectors (upstream). • Crossed HO2S wiring at the harness connectors (upstream). • Crossed HO2S wiring at the 104-pin harness connectors (upstream). 	
P1129 - Downstream Oxygen Sensors Swapped from Bank to Bank (HO2S-12-22)	The heated oxygen sensor (HO2S) monitor determines if the HO2S signal response for a fuel shift corresponds to the correct engine bank. The test fails when a response from the HO2S being tested is not indicated.	<ul style="list-style-type: none"> • Crossed HO2S harness connectors (downstream). • Crossed HO2S wiring at the harness connectors (downstream). • Crossed HO2S wiring at the 104-pin harness connectors (downstream). 	
P1130 - Lack of HO2S-11 Switch, Fuel Trim at Limit	The Heated Oxygen Sensor (HO2S) is monitored for switching. The test fails when the HO2S does not switch due to circuit or fuel at or exceeding a calibrated limit.	<ul style="list-style-type: none"> • Electrical: • Short to VPWR in the harness or HO2S • Water in the harness connector • Open/shorted HO2S circuit • Corrosion or poor mating terminals and wiring • Damaged HO2S • Damaged PCM • Fuel System: • Excessive fuel pressure • Leaking/contaminated fuel injectors 	A fuel control HO2S PID switching across 0.45 volt from 0.2 to 0.9 volt indicates a normal switching HO2S.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
		<ul style="list-style-type: none"> • Leaking fuel pressure regulator • Low fuel pressure or running out of fuel • Vapor recovery system • Induction System: • Air leaks after the MAF • Vacuum Leaks • PCV system • Improperly seated engine oil dipstick • EGR System: • Leaking gasket • Stuck EGR valve • Leaking diaphragm or EVR • Base Engine: • Oil overfill • Cam Timing • Cylinder compression • Exhaust leaks before or near the HO2S(s) 	
P1131 - Lack of HO2S-11 Switch, Sensor Indicates Lean	A Heated Oxygen (HO2S) sensor indicating lean at the end of a test is trying to correct for an over-rich condition. The test fails when the fuel control system no longer detects switching for a calibrated amount of time.	See the possible causes for DTC P1130.	
P1132 - Lack of HO2S-11 Switch, Sensor Indicates Rich	A Heated Oxygen (HO2S) sensor indicating rich at the end of a test is trying to correct for an over-lean condition. The test fails when the fuel control system no longer detects switching for a calibrated amount of time.	See the possible causes for DTC P1130.	
P1137 - Lack of HO2S-12 Switch, Sensor Indicates Lean	The downstream HO2Ss are forced rich and lean and monitored by the PCM. The test fails if the PCM does not detect the output of the HO2S in a calibrated amount of time.	<ul style="list-style-type: none"> • Pinched, shorted, and corroded wiring and pins • Crossed sensor wires • Exhaust leaks • Contaminated or damaged sensor 	
P1138 - Lack of HO2S-12 Switch, Sensor Indicates Rich	The downstream HO2Ss are forced rich and lean and monitored by the PCM. The test fails if the PCM does not detect the output of the HO2S in a calibrated amount of time.	<ul style="list-style-type: none"> • Pinched, shorted, and corroded wiring and pins • Crossed sensor wires • Exhaust leaks 	

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
		<ul style="list-style-type: none"> Contaminated or damaged sensor 	
P1150 - Lack of HO2S-21 Switch, Fuel Trim at Limit	See the description for DTC P1130.	See the possible causes for DTC P1130.	See the diagnostic aids for DTC P1130.
P1151 - Lack of HO2S-21 Switch, Sensor Indicates Lean	A Heated Oxygen (HO2S) sensor indicating lean at the end of a test is trying to correct for an over-rich condition. The test fails when the fuel control system no longer detects switching for a calibrated amount of time.	See the possible causes for DTC P1130.	
P1152 - Lack of HO2S-21 Switch, Sensor Indicates Rich	A Heated Oxygen (HO2S) sensor indicating rich at the end of a test is trying to correct for an over-lean condition. The test fails when the fuel control system no longer detects switching for a calibrated amount of time.	See the possible causes for DTC P1130.	
P1157 - Lack of HO2S-22 Switch, Sensor Indicates Lean	The downstream HO2Ss are forced rich and lean and monitored by the PCM. The test fails if the PCM does not detect the output of the HO2S in a calibrated amount of time.	<ul style="list-style-type: none"> Pinched, shorted, and corroded wiring and pins Crossed sensor wires Exhaust leaks Contaminated or damaged sensor 	
P1158 - Lack of HO2S-22 Switch, Sensor Indicates Rich	The downstream HO2Ss are forced rich and lean and monitored by the PCM. The test fails if the PCM does not detect the output of the HO2S in a calibrated amount of time.	<ul style="list-style-type: none"> Pinched, shorted, and corroded wiring and pins Crossed sensor wires Exhaust leaks Contaminated or damaged sensor 	
P1168 - Fuel Rail Pressure Sensor in Range But Low	The comprehensive component monitor (CCM) checks the FRP for acceptable fuel pressure. The test fails when the fuel pressure falls below a calibrated value.	<ul style="list-style-type: none"> Low fuel pressure Damaged FRP sensor Excessive resistance in the circuit Low or no fuel 	<ul style="list-style-type: none"> An FRP PID value below 551 kPa (80 psi) indicates a failure Low or no fuel An FRP PID value greater than 896 kPa (130 psi) indicates a failure
P1169 - Fuel Rail Pressure (FRP) Sensor in Range But High	The comprehensive component monitor (CCM) checks the FRP for acceptable fuel pressure. The test fails when the fuel pressure falls below or exceeds a minimum/maximum calibrated value for a calibrated period of time.	<ul style="list-style-type: none"> High Fuel Pressure Low fuel pressure Damaged FRP sensor Excessive resistance in the circuit 	

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
P1180 - Fuel Delivery System - Low	The PCM receives fuel tank pressure (FTP) information from the natural gas (NG) module, which uses the information to infer the fuel rail pressure (FRP). The test fails when the inferred pressure is less than a minimum calibrated value.	<ul style="list-style-type: none"> • Restriction in the fuel line • Plugged fuel filter 	
P1181 - Fuel Delivery System - High	The PCM receives fuel tank pressure (FTP) information from the natural gas (NG) module, which uses the information to infer the fuel rail pressure (FRP). The test fails when the inferred pressure is higher than a maximum calibrated value.	<ul style="list-style-type: none"> • Fuel pressure regulator 	
P1184 - Engine Oil Temperature (EOT) Sensor Out of Self-Test Range	Indicates the EOT signal was out of self-test range.	<ul style="list-style-type: none"> • Damaged harness • Damaged sensor • Damaged harness connector • Damaged PCM 	The engine should be at operating temperature before running the self-test.
P1229 - Supercharger Intercooler Pump (ICP) Not Operating	The ICP DTC sets when the PCM calls for the pump to operate but no current is detected.	<ul style="list-style-type: none"> • Pump motor open circuited • Pump relay coil open • Open circuit between the relay and pump • Damaged PCM • Pump motor shorted • Open circuit between the PCM and the relay • Poor pump ground connection 	Check for voltage at the relay. Check the fuse in the voltage feed. Check the ground connection of the pump motor. The PID reading is on/off.
P1232 - Low Speed Fuel Pump Primary Circuit Malfunction	The PCM monitors the low speed fuel pump (LFP) primary circuit output from the PCM. The test fails if: the LFP circuit is commanded ON (grounded), and excessive current draw is detected on the LFP circuit; or, the LFP circuit is commanded OFF, and voltage is not detected on the LFP circuit. The PCM expects to detect VPWR voltage through the low speed fuel pump relay coil to the LFP circuit.	<ul style="list-style-type: none"> • Open or shorted low fuel pump (LFP) circuit • Open VPWR to the low speed fuel pump relay • Damaged low speed fuel pump relay • Damaged PCM 	<ul style="list-style-type: none"> • An open circuit or short to ground can only be detected with the low speed fuel pump. • A short to voltage can only be detected with the low speed fuel pump commanded ON. • During the KOEO and KOER self-test, the low speed fuel pump output command is cycled on and off.
P1233 - Fuel System Disabled or Offline	<p>LS6/LS8 and Thunderbird:</p> <ul style="list-style-type: none"> • For LS and Thunderbird, this DTC indicates the PCM is not receiving the fuel level information on the communication link from the rear electronics module (REM). REFER 	<ul style="list-style-type: none"> • Inertia fuel shutoff (IFS) switch needs to be reset • Open FPDM ground circuit • Open circuit to FPDM PWR RLY • Open FPDM PWR circuit 	The PCM expects to see one of the following duty cycle signals from the FPDM on the FPM circuit: 1) 50% (500 ms on, 500 ms off), all OK. 2) 25% (250 ms on, 750 ms off), FPDM did not receive a fuel pump (FP) duty cycle command from the PCM, or the duty cycle that was received was invalid. 3) 75% (750 ms

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
	<p>to Workshop Manual Section 418 for REM self-test/diagnostics.</p> <p>All Others:</p> <ul style="list-style-type: none"> The PCM monitors the fuel pump monitor (FPM) circuit from the fuel pump driver module (FPDM). With the key on, the FPDM continuously sends a duty cycle signal to the PCM through the FPM circuit. The test fails if the PCM stops receiving the duty cycle signal. 	<ul style="list-style-type: none"> Open or shorted FPM circuit (engine should start) Damaged IFS switch Damaged FPDM PWR RLY Damaged FPDM Damaged PCM Also for Mustang: Open B+ circuit to the constant control relay module (CCRM) pin 11 Open ground to CCRM pin 18 Damaged CCRM 	<p>ON, 250 OFF), the FPDM has detected a fault in the circuits between the FPDM and the fuel pump.</p>
<p>P1235 - Fuel pump control out of range</p>	<p>The DTC indicates the FPDM detected an invalid or missing FP circuit signal from the PCM. The FPDM sends a message to the PCM through the FPM circuit, indicating this failure was detected. The PCM sets the DTC when the message is received.</p> <ul style="list-style-type: none"> Note: For LS6/LS8 and Thunderbird, the FPDM functions are incorporated in the Rear Electronics Module (REM). Also, the REM does not use an FPM circuit. Diagnostic information is sent on the communication link. 	<ul style="list-style-type: none"> FP circuit open or shorted ETC system concern (check for ETC DTCs) Damaged FPDM. Damaged PCM 	<ul style="list-style-type: none"> The FPDM sends a 25% duty cycle (250 ms ON, 750 ms OFF) through the FPM circuit to the PCM while the fault is being detected by the FPDM. If the fault is no longer detected, the PDM returns to sending an all OK (50% duty cycle) message to the PCM. For ETC applications, check if ETC DTC P2105 is present. An ETC system concern could cause P1235, and should be diagnosed first.
<p>P1237 - Fuel Pump Secondary Circuit Malfunction</p>	<p>The DTC indicates the FPDM detected a fuel pump secondary circuit fault. The FPDM sends a message to the PCM through the FPM circuit, indicating this failure was detected. The PCM sets the DTC when the message is received.</p> <ul style="list-style-type: none"> Note: For LS6/LS8 and Thunderbird, the FPDM functions are incorporated in the Rear Electronics Module (REM). Also, the REM does not use an FPM circuit. Diagnostic information is sent on the communication link. 	<ul style="list-style-type: none"> Open or shorted FP PWR circuit Open FP RTN circuit to FPDM Open or shorted circuit in the fuel pump Locked fuel pump rotor Damaged FPDM For LS6/LS8 and Thunderbird, circuits associated with the Fuel Pump relay 	<ul style="list-style-type: none"> The FPDM sends a 75% duty cycle (750 ms ON, 250 ms OFF) through the FPM circuit to the PCM while the fault is being detected by the FPDM. If the fault is no longer detected, the PCM returns to sending an all OK (50% duty cycle) message to the PCM. The FPDM controls pump speed by supplying a variable ground on the RTN circuit.
<p>P1244 - Generator Load Input High</p>	<p>The PCM monitors generator load from the generator/regulator in the form of frequency. The fault indicates the input is lower than the load should be in normal</p>	<ul style="list-style-type: none"> GEN-MON circuit short to B+ GEN-COM circuit short to B+ B+ open prior to start-up 	<ul style="list-style-type: none"> Verify the battery voltage is 14.5 volts. Verify the generator/regulator has the correct part number.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
	operation. The load input could be high when a battery short to ground exists.	<ul style="list-style-type: none"> • Open I-line prior to start-up • Open I-line prior to start-up • Damaged PCM 	
P1245 - Generator Load Input Low	The PCM monitors generator load from the generator/regulator in the form of frequency. The fault indicates the input is lower than the load should be in normal operation. The load input could be low when no generator output exists.	<ul style="list-style-type: none"> • GEN-COM circuit short to GND • GEN-MON circuit short to GND • Open B+ wire during operation • Low system voltage • Broken generator belt • Damaged generator/regulator assembly • Damaged PCM 	<ul style="list-style-type: none"> • Verify the battery voltage is 14.5 volts. • Verify the generator/regulator has the correct part number.
P1246 - Generator Load Input Failed	The PCM monitors generator load from the generator/regulator in the form of frequency. The frequency range is determined by the temperature of the voltage regulator, where 97% indicates full load, and below 6% indicates no load.	<ul style="list-style-type: none"> • GEN-MON circuit short to GND • GEN-MON circuit short to B+ • GEN-MON circuit open • GEN-COM circuit short to GND • GEN-COM circuit short to B+ • GEN-COM circuit open • ILC circuit short to GND • ILC circuit short to B+ • ILC circuit open • Battery-sense circuit open • Generator drive mechanism • Damaged generator/regulator assembly • Damaged PCM 	<ul style="list-style-type: none"> • Verify the battery voltage is 14.5 volts. • Verify the generator/regulator has the correct part number.
P1260 - Theft Detected - Vehicle Immobilized	Indicates the passive anti-theft system (PATS) determined a theft condition existed and the engine is disabled. This DTC is a good indicator to check the PATS for DTCs.	<ul style="list-style-type: none"> • Previous theft condition • Anti-theft system failure 	Theft indicator flashing rapidly or on solid when ignition switch is in the ON position. Check anti-theft system for DTCs. Typical vehicle symptoms are: start/stall or crank/no start. NOTE: No crank symptom only on vehicles equipped with PATS starter disable feature.
P1261 - Cylinder 1 High to Low Side Short	Indicates a low voltage condition exists at the injector output of the NG module for cylinder No. 1 when high voltage is expected.	<ul style="list-style-type: none"> • Fuel injector No. 1 output circuit open or short to ground. • Injector. • NG Module. 	PID Data Monitor INJ1F fault flags = YES.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
P1262 - Cylinder 2 High to Low Side Short	Indicates a low voltage condition exists at the injector output of the NG module for cylinder No. 2 when high voltage is expected.	<ul style="list-style-type: none"> • Fuel injector No. 2 output circuit open or short to ground. • Injector. • NG Module. 	PID Data Monitor INJ2F fault flags = YES.
P1263 - Cylinder 3 High to Low Side Short	Indicates a low voltage condition exists at the injector output of the NG module for cylinder No. 3 when high voltage is expected.	<ul style="list-style-type: none"> • Fuel injector No. 3 output circuit open or short to ground. • Injector. • NG Module. 	PID Data Monitor INJ3F fault flags = YES.
P1264 - Cylinder 4 High to Low Side Short	Indicates a low voltage condition exists at the injector output of the NG module for cylinder No. 4 when high voltage is expected.	<ul style="list-style-type: none"> • Fuel injector No. 4 output circuit open or short to ground. • Injector. • NG Module. 	PID Data Monitor INJ4F fault flags = YES.
P1265 - Cylinder 5 High to Low Side Short	Indicates a low voltage condition exists at the injector output of the NG module for cylinder No. 5 when high voltage is expected.	<ul style="list-style-type: none"> • Fuel injector No. 5 output circuit open or short to ground. • Injector. • NG Module. 	PID Data Monitor INJ5F fault flags = YES.
P1266 - Cylinder 6 High to Low Side Short	Indicates a low voltage condition exists at the injector output of the NG module for cylinder No. 6 when high voltage is expected.	<ul style="list-style-type: none"> • Fuel injector No. 6 output circuit open or short to ground. • Injector • NG Module. 	PID Data Monitor INJ6F fault flags = YES.
P1267 - Cylinder 7 High to Low Side Short	Indicates a low voltage condition exists at the injector output of the NG module for cylinder No. 7 when high voltage is expected.	<ul style="list-style-type: none"> • Fuel injector No. 7 output circuit open or short to ground. • Injector • NG Module. 	PID Data Monitor INJ7F fault flags = YES.
P1268 - Cylinder 8 High to Low Side Short	Indicates a low voltage condition exists at the injector output of the NG module for cylinder No. 8 when high voltage is expected.	<ul style="list-style-type: none"> • Fuel injector No. 8 output circuit open or short to ground. • Injector • NG Module. 	PID Data Monitor INJ8F fault flags = YES.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
P1270 - Engine RPM/Vehicle Speed Limiter	Indicates the vehicle has been operated in a manner which caused the engine or vehicle to exceed a calibration limit. The engine RPM and vehicle speed are continuously monitored and evaluated by the PCM. The DTC is set when the RPM or vehicle speed falls out of a calibrated range. For additional information on the engine RPM/vehicle speed limiter, refer to Section 1, Electronic Engine Control (EC) System Powertrain Control Software.	<ul style="list-style-type: none"> • Wheel slippage (water, ice, mud, and snow) • Excessive engine RPM in NEUTRAL or operated in the wrong transmission gear • Vehicle driven at a high rate of speed 	The DTC indicates the vehicle was operated in a manner which caused the engine or vehicle speed to exceed a calibrated limit.
P1271 - Cylinder 1 High to Low Side Open	Indicates a high voltage condition exists at the injector output of the NG module for cylinder No. 1 when low voltage is expected.	<ul style="list-style-type: none"> • Fuel injector No. 1 output circuit short to voltage. • Injector • NG Module 	PID Data Monitor INJ1F fault flags = YES.
P1272 - Cylinder 2 High to Low Side Open	Indicates a high voltage condition exists at the injector output of the NG module for cylinder No. 2 when low voltage is expected.	<ul style="list-style-type: none"> • Fuel injector No. 2 output circuit short to voltage. • Injector • NG Module 	PID Data Monitor INJ2F fault flags = YES.
P1273 - Cylinder 3 High to Low Side Open	Indicates a high voltage condition exists at the injector output of the NG module for cylinder No. 3 when low voltage is expected.	<ul style="list-style-type: none"> • Fuel injector No. 3 output circuit short to voltage. • Injector • NG Module 	PID Data Monitor INJ3F fault flags = YES.
P1274 - Cylinder 4 High to Low Side Open	Indicates a high voltage condition exists at the injector output of the NG module for cylinder No. 4 when low voltage is expected.	<ul style="list-style-type: none"> • Fuel injector No. 4 output circuit short to voltage. • Injector • NG Module 	PID Data Monitor INJ4F fault flags = YES.
P1275 - Cylinder 5 High to Low Side Open	Indicates a high voltage condition exists at the injector output of the NG module for cylinder No. 5 when low voltage is expected.	<ul style="list-style-type: none"> • Fuel injector No. 5 output circuit short to voltage. • Injector • NG Module 	PID Data Monitor INJ5F fault flags = YES.
P1276 - Cylinder 6 High to Low Side Open	Indicates a high voltage condition exists at the injector output of the NG module for cylinder No. 6 when low voltage is expected.	<ul style="list-style-type: none"> • Fuel injector No. 6 output circuit short to voltage. • Injector • NG Module 	PID Data Monitor INJ6F fault flags = YES.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
P1277 - Cylinder 7 High to Low Side Open	Indicates a high voltage condition exists at the injector output of the NG module for cylinder No. 7 when low voltage is expected.	<ul style="list-style-type: none"> • Fuel injector No. 7 output circuit short to voltage. • Injector • NG Module 	PID Data Monitor INJ7F fault flags = YES.
P1278 - Cylinder 8 High to Low Side Open	Indicates a high voltage condition exists at the injector output of the NG module for cylinder No. 8 when low voltage is expected.	<ul style="list-style-type: none"> • Fuel injector No. 8 output circuit short to voltage. • Injector • NG Module 	PID Data Monitor INJ8F fault flags = YES.
P1285 - Cylinder Head Over Temperature	Indicates an engine overheat condition was sensed by the Cylinder Head Temperature (CHT) sensor.	<ul style="list-style-type: none"> • Low engine coolant level • Base engine concerns • Engine cooling system concerns • CHT sensor concern 	On some applications when this fault occurs the Engine Temperature warning indicator will illuminate and/or force the temperature gauge to the full H (hot) zone. The warning indicator can be triggered by either grounding the engine temperature warning circuit when wired to the PCM, or by sending a PCM network message to the instrument cluster.
P1288 - Cylinder Head Temperature (CHT) Sensor Circuit Out of Self-Test Range	Indicates the CHT sensor is out of self-test range. The engine is not at a normal operating temperature.	<ul style="list-style-type: none"> • Cold engine • Engine overheating • Damaged harness connector • Damaged PCM • Low engine coolant level • Damaged CHT sensor 	Bring the engine to operating temperature. If cold, repeat the self-test. If the engine over-heats, check the cooling system.
P1289 - Cylinder Head Temperature (CHT) Sensor Circuit High Input	Indicates a CHT sensor circuit malfunction (open).	<ul style="list-style-type: none"> • Open CHT sensor circuit. • CHT sensor circuit short to PWR • Damaged CHT sensor • Improper harness connection • Damaged PCM 	A CHT V PID reading greater than 4.6 volts with key ON and engine OFF or during any engine operating mode indicates a hard fault. Note: DTC P0118 may also be reported when this DTC is set. Either of these DTCs activate the MIL light.
P1290 - Cylinder Head Temperature (CHT) Sensor Circuit Low Input	Indicates a CHT sensor circuit malfunction (shorted).	<ul style="list-style-type: none"> • Grounded circuit in CHT harness • Damaged CHT sensor • Improper harness connection • Damaged PCM 	A CHT V PID reading less than 0.2 volt with key ON and engine OFF or during any engine operating mode indicates a hard fault. Note: DTC P0117 may also be reported when this DTC is set. Either of these DTCs activate the MIL light.
P1299 - Cylinder Head Over Temperature Protection Active	Indicates an engine overheat condition was detected by the cylinder head temperature (CHT) sensor. An FMEM strategy called Fail-safe Cooling was activated to cool the engine.	<ul style="list-style-type: none"> • Engine cooling system concerns • Low engine coolant level 	REFER to Section 1, Powertrain Control Software, for more information on the Fail-safe Cooling Strategy and the Cylinder Head Temperature sensor.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
		<ul style="list-style-type: none"> • Base engine concerns 	
P1309 - Misfire Monitor Disabled	When the misfire monitor is disabled, usually due to the input signal generated by the camshaft position (CMP) sensor, by sensing the passage of teeth from the CMP wheel.	<ul style="list-style-type: none"> • Camshaft Position Sensor • Powertrain Control Module • ECT, MAF, and CKP sensors 	Verify the CMP is installed correctly and is not out of synchronization.
P1336 - CKP and/or CMP Input Signal to the PCM Concerns	Input Signal to PCM from CKP Sensor and or CMP Sensor erratic.	<ul style="list-style-type: none"> • Damaged PCM • Damaged CKP sensor • Damaged CMP sensor • Base engine concerns • Harness Concerns 	Harness routing, alterations, improper shielding, or electrical interference from other improperly functioning systems.
P1380 - Variable Camshaft Timing Solenoid A Circuit Malfunction (Bank 1)	The comprehensive component monitor (CCM) monitors the VCT circuit to the PCM for high and low voltage. If the voltage falls below a calibrated limit a calibrated amount of time during testing, the test fails.	<ul style="list-style-type: none"> • Open or short in the VCT circuit • Open VPWR circuit • Damaged PCM • Open or short in the VCT solenoid valve 	DTC P1380 is a VCT circuit check. Testing should include wires, solenoid coil, and the PCM.
P1381 - Variable Camshaft Timing Over-advanced (Bank 1)	The comprehensive component monitor (CCM) monitors the VCT position for an over-advanced camshaft timing. The test fails when the camshaft timing exceeds a maximum calibrated value or remains in an advanced position.	<ul style="list-style-type: none"> • Camshaft timing improperly set • No oil flow to the VCT piston chamber • Low oil pressure • VCT solenoid valve stuck closed • Camshaft advance mechanism binding (VCT unit) 	P1381 DTC is a check of the VCT unit. Testing should not include electrical checks. Diagnostics and repair for the VCT unit are located in the Workshop Manual.
P1383 - Variable Camshaft Timing Over-retarded (Bank 1)	The comprehensive component monitor (CCM) monitors the VCT position for over-retarded camshaft timing. The test fails when the camshaft timing exceeds a maximum calibrated value or remains in a retarded position.	<ul style="list-style-type: none"> • Camshaft timing improperly set • Continuous oil flow to the VCT piston chamber • VCT solenoid valve stuck open • Camshaft advance mechanism binding (VCT unit) 	DTC P1383 is a check of the VCT unit. Testing should not include electrical checks. The engine will idle rough, start hard and may stall. Diagnostics and repair for the VCT unit are located in the Workshop Manual.
P1385 - Variable Camshaft Timing Solenoid A Circuit Malfunction (Bank 2)	The comprehensive component monitor (CCM) monitors the VCT circuit to the PCM for high and low voltage. If the	<ul style="list-style-type: none"> • Open or short in the VCT circuit 	DTC P1380 is a VCT circuit check. Testing should include wires, solenoid coil, and the PCM.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
	voltage falls below calibrated limit a calibrated amount of time during testing, the test fails.	<ul style="list-style-type: none"> • Open VREF circuit • Damaged PCM • Open or short in the VCT solenoid valve 	
P1386 - Variable Camshaft Timing Over-advanced (Bank 2)	The comprehensive component monitor (CCM) monitors the VCT position for an over-advanced camshaft timing. The test fails when the camshaft timing exceeds a maximum calibrated value or remains in an advanced position.	<ul style="list-style-type: none"> • Camshaft timing improperly set • No oil flow to the VCT piston chamber • Low oil pressure • VCT solenoid valve stuck closed • Camshaft advance mechanism binding (VCT unit) 	P1381 DTC is a check of the VCT unit. Testing should not include electrical checks. Diagnostics and repair for the VCT unit are located in the Workshop Manual.
P1388 - Variable Camshaft Timing Over-retarded (Bank 2)	The comprehensive component monitor (CCM) monitors the VCT position for over-retarded camshaft timing. The test fails when the camshaft timing exceeds a maximum calibrated value or remains in a retarded position.	<ul style="list-style-type: none"> • Camshaft timing improperly set • Continuous oil flow to the VCT piston chamber • VCT solenoid valve stuck open • Camshaft advance mechanism binding (VCT unit) 	DTC P1383 is a check of the VCT unit. Testing should not include electrical checks. The engine will idle rough, start hard and may stall. Diagnostics and repair for the VCT unit are located in the Workshop Manual.
P1397 - System Voltage Out Of Self -Test Range	This diagnostic trouble code (DTC) indicates that the 12-volt system voltage is too high or too low during the key on engine off (KOEO) or key on engine running (KOER) self-test. It sets if the system voltage falls below or exceeds the calibrated threshold at any time during the KOEO or KOER self-test.	<ul style="list-style-type: none"> • Battery or charging system concern. 	Make sure the battery voltage is between 11 and 18 volts before running a KOEO or KOER self-test.
P1400 - DPF EGR Sensor Circuit Low Voltage Detected	The EGR monitor checks the DPF EGR sensor signal to the PCM for low voltage. The test fails when the average voltage to the PCM drops to a voltage less than the minimum calibrated value.	<ul style="list-style-type: none"> • DPF EGR circuit short to GND • Damaged DPF EGR sensor • VREF short to GND • Damaged PCM 	A DPF EGR PID reading less than 0.2 volt with the key ON and engine OFF or running indicates a hard fault.
P1401 - DPF EGR Sensor Circuit High Voltage Detected	The EGR monitor checks the DPF EGR sensor signal to the PCM for high voltage. The test fails when the average voltage to the PCM goes to a voltage greater than the maximum calibrated value.	<ul style="list-style-type: none"> • DPF EGR circuit open • VREF short to PWR • Damaged DPF EGR sensor • DPF EGR circuit short to PWR • SIG RTN circuit open 	A DPF EGR PID reading greater than 4.5 volts with the key ON and engine OFF or running indicates a hard fault.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
		<ul style="list-style-type: none"> • Damaged PCM 	
P1405 - DPF EGR Sensor Upstream Hose Off or Plugged	While driving, the EGR monitor commands the EGR valve closed and checks the differential pressure across the EGR orifice. The test fails when the signal from the DPF EGR sensor indicates EGR flow is in the negative direction.	<ul style="list-style-type: none"> • The upstream hose is disconnected • The upstream hose is plugged (ice) • Plugged or damaged EGR tube 	<ul style="list-style-type: none"> • Look for signs of water or icing in the hose. • Verify the hose connection and routing (no excessive dips) • Verify the DPF EGR sensor for proper mounting and function. View the DPF EGR PID while applying and releasing vacuum directly to the sensor with a hand pump.
P1406 - DPF EGR Sensor Downstream Hose Off or Plugged	While driving, the EGR monitor commands the EGR valve closed and checks the differential pressure across the EGR orifice. The test fails when the signal from the DPF EGR sensor continues to indicate EGR flow even after the EGR valve is commanded closed.	<ul style="list-style-type: none"> • Downstream hose is disconnected • Downstream hose is plugged (ice) • Plugged or damaged EGR tube 	<ul style="list-style-type: none"> • Look for signs of water or icing in the hose. • Verify the connection and routing (no excessive dips) • Verify the DPF EGR sensor proper mounting and function. View the DPFEGR PID while applying and releasing vacuum directly to the sensor with a hand pump
P1408 - EGR Flow Out of Self-Test Range (Non-MIL)	This test is performed during the KOER on-demand self-test only. The EGR system is commanded on at a fixed engine speed. The test fails and the DTC is output when the measured EGR flow falls above or below the required calibration .	For vacuum activated systems, see the possible causes for DTC P0401. For electric motor systems, see the possible causes for DTC P0400.	For electric EGR, use the output state control function of the diagnostic tool and monitor the MAP PID (MAP) and the EEGR PID (EGRMDS) while commanding the EEGR on. If EGR is introduced into the engine at idle, the RPM will drop or stall out. For vacuum systems see Diagnostic Aids for P0401.
P1409 - EGR Vacuum Regulator Solenoid Circuit Malfunction	This test checks the electrical function of the EGRVR solenoid. The test fails when the EGRVR circuit voltage is either too high or too low when compared to the expected voltage range. The EGR system must be enabled for the test to be completed.	<ul style="list-style-type: none"> • EGRVR circuit open • VPWR open to EGRVR solenoid • EGRVR circuit short to VPWR or GND • Damaged EGRVR solenoid • Damaged PCM 	The EGR vacuum regulator solenoid resistance is between 26 and 40 ohms.
P1436 - A/C Evaporator Temperature (ACET) Circuit Low Input	Indicates the ACET signal input was less than the self-test minimum. The self-test minimum is 0.13 volts.	<ul style="list-style-type: none"> • ACET circuit short to ground or SIG RTN • Damaged ACET sensor • Damaged PCM 	The PCM sources a low current 5 volts on the ACET circuit (this voltage can be measured with the sensor disconnected). As the A/C evaporator air temperature changes, the ACET circuit resistance to SIG RTN (ground) changes (which changes the voltage the PCM detects). When the ACET signal is detected below the self-test minimum, check for shorts to the SIG RTN or ground, which would pull the voltage low.
P1437 - A/C Evaporator Temperature (ACET) Circuit High Input	Indicates the ACET signal input was greater than the self-test maximum. The self-test maximum is 4.5 volts.	<ul style="list-style-type: none"> • ACET circuit open • SIG RTN circuit open to the ACET sensor 	The PCM sources a low current 5 volts on the ACET circuit (this voltage can be measured with the sensor disconnected). As the A/C evaporator air temperature

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
		<ul style="list-style-type: none"> • ACET circuit short to voltage (VREF) • Damaged ACET sensor • Damaged PCM 	<p>changes, the ACET circuit resistance to SIG RTN (ground) changes (which changes the voltage the PCM detects). When the ACET signal is detected above the self-test maximum, check for open circuits (ACET or SIG RTN), which would cause the voltage to remain high. Although not as probable, also check for a short to voltage (VREF).</p>
<p>P1443 - Very Small or No Purge Flow Condition</p>	<p>A fuel tank pressure change greater than minus (-) 7 inches of water in 30 seconds occurred with a purge (fuel vapor) flow at less than 0.02 pounds per minute.</p>	<ul style="list-style-type: none"> • Blocked fuel vapor hose between the EVAP canister purge valve and the FTP sensor. • Blocked fuel vapor hose between the EVAP canister purge valve and the engine intake manifold. • Blocked vacuum hose between the EVAP canister purge valve solenoid and the engine intake manifold. • EVAP canister purge valve stuck closed (mechanically). 	<p>Check for blockages between the fuel tank, the EVAP canister purge valve, and the engine intake manifold. Check for obstructions in the EVAP canister purge valve diaphragm and ports.</p>
<p>P1450 - Unable to Bleed Up Fuel Tank Vacuum</p>	<p>Monitors the fuel vapor vacuum and pressure in the fuel tank. System failure occurs when the EVAP running loss monitor detects excessive fuel tank vacuum with the engine running (but not at idle).</p>	<ul style="list-style-type: none"> • Blockages or kinks in the EVAP canister tube or EVAP canister purge outlet tube (between the fuel tank, EVAP the canister purge valve and the EVAP canister) • Fuel filler cap stuck closed (no vacuum relief) • Contaminated fuel vapor elbow on the EVAP canister • Restricted EVAP canister • CV solenoid stuck open (partially or fully) • Plugged CV solenoid filter • EVAP canister purge valve stuck open • VREF circuit open (harness near FTP sensor, FTP sensor or PCM) • Damaged FTP sensor 	
<p>P1451 - EVAP Control System Canister Vent Solenoid Circuit Malfunction</p>	<p>Monitors the canister vent (CV) solenoid circuit for an electrical failure. The test fails when the signal moves outside the minimum or maximum allowable</p>	<ul style="list-style-type: none"> • VPWR circuit open • CV solenoid circuit shorted to PWR GND or CHASSIS GND 	<p>To verify normal functioning, monitor the EVAP canister vent solenoid signal PID EVAPCV and the signal voltage (PCM control side). With the valve open, EVAPCV indicates 0% duty cycle and a voltage</p>

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
	calibrated parameters for a specified canister vent duty cycle by PCM command.	<ul style="list-style-type: none"> • Damaged CV solenoid • CV solenoid circuit open • CV solenoid circuit shorted to VPWR • Damaged PCM 	approximately equal to battery voltage. When the valve is commanded fully closed, EVAPCV indicates 100% duty cycle, and a minimum voltage drop of 4 volts is normal. Output test mode may be used to switch output on/off to verify function.
P1460 - A/C Clutch Relay (A/CCR) Primary Circuit Malfunction (also referred to as WAC circuit)	Monitors the wide open throttle A/C cutoff (WAC) circuit output from the PCM. The test fails if: When the PCM grounds the WAC circuit, excessive current draw is detected on the WAC circuit; or, with the WAC circuit not grounded by the PCM, voltage is not detected on the WAC circuit (the PCM expects to detect VPWR voltage coming through the WAC relay coil to the WAC circuit).	<ul style="list-style-type: none"> • Open or shorted WAC circuit • Damaged WAC relay (or CCRM) • Open VPWR circuit to the WAC relay • Damaged PCM 	<ul style="list-style-type: none"> • The A/CCR control circuit can be monitored using the WACF & WAC PID • When the WACF PID reads YES, a fault is currently present • An open circuit or short to ground can only be detected when the PCM is not grounding the circuit • A short to voltage can only be detected when the PCM is grounding the circuit • During the KOEO and KOER self-test, the WAC circuit is cycled on and off • Verify the A/C and defrost were off during the KOEO and KOER self-tests. Check the ACCS PID to verify. • If the vehicle is not equipped with A/C, DTC P1460 can be ignored
P1461 - Air Conditioning Pressure Sensor (ACP) Sensor High Voltage Detected	The ACP inputs a voltage to the PCM. If the voltage is above a calibrated level the DTC sets.	<ul style="list-style-type: none"> • ACP sensor circuit short to PWR • ACP circuit open • Damaged PCM • ACP circuit short to VREF • ACP circuit short to SIGRTN • Damaged ACP sensor 	Verify a VREF voltage between 4 and 6 volts.
P1462 - Air Conditioning Pressure Sensor (ACP) Sensor Low Voltage Detected	The ACP inputs a voltage to the PCM. If the voltage is below the calibrated level the DTC sets.	<ul style="list-style-type: none"> • ACP circuit short to GND or SIGRTN • VREF circuit open • Damaged PCM • Open ACP circuit • Damaged ACP sensor 	Verify a VREF voltage between 4 and 6 volts.
P1463 - Air Conditioning Pressure Sensor (ACP) Insufficient Pressure Change	Each time the A/C clutch engages, the PCM is looking for a pressure change in the refrigerant. If the change in pressure is outside of the calibration the DTC sets.	<ul style="list-style-type: none"> • A/C system mechanical failure • Open ACP or VREF circuit • A/C sensor damaged • A/C system electrical failure 	Verify the A/C system function, including refrigerant charge.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
		<ul style="list-style-type: none"> A/C clutch always engaged 	
P1464 - A/C Demand Out Of Self-Test Range	<p>The DTC is set if the PCM receives a request for A/C during the self-test.</p>	<ul style="list-style-type: none"> A/C or defrost on during self-test A/C Clutch PWR circuit short to voltage (applications with N/C WAC relay contacts) ACCS circuit short to voltage Damaged A/C demand switch Damaged WAC relay (or CCRM) Damaged PCM 	<ul style="list-style-type: none"> If A/C or defrost was on during self-test, turn off and rerun test. The A/C request to the PCM may come through the communication link or be on a dedicated hardwire circuit from the driver's A/C switch.
P1469 - Low A/C cycling period	<p>Indicates frequent A/C compressor clutch cycling.</p>	<ul style="list-style-type: none"> Mechanical A/C system concern (such as low refrigerant charge, damaged A/C cycling switch) Intermittent open between the cycling pressure switch and the PCM Intermittent open in the IGN RUN circuit to cycling pressure switch (if applicable) 	<ul style="list-style-type: none"> An intermittent open circuit, although possible, is unlikely This test is designed to protect the transmission. In some strategies, the PCM unlocks the torque converter during A/C clutch engagement. If a concern is present that results in frequent A/C clutch cycling, damage could occur if the torque converter is cycled at these intervals. This test detects this condition, sets the DTC and prevents the torque converter from excessive cycling.
P1474 - Low Fan Control (LFC)/Fan Control 1 (FC1) Primary Circuit Malfunction LS, Thunderbird, Crown Victoria, Grand Marquis, Town Car	<p>This test checks the Fan Control - Variable (FCV) output circuit. The DTC sets if the PCM detects the voltage on the FCV circuit is not within the expected range.</p>	<ul style="list-style-type: none"> FCV circuit open or shorted. B+ or ground circuit fault to cooling fan. VPWR open to cooling fan (if applicable). Damaged cooling fan module. PCM damaged 	<p>During the KOEO self-test, the cooling fan is cycled on and off.</p>
P1474 - Low Fan Control (LFC)/Fan Control 1 (FC1) Primary Circuit Malfunction All others	<p>Monitors the low fan control (LFC) or fan control (FC) for one speed fan application, primary circuit output from the PCM. The test fails if: When the PCM grounds the LFC/FC circuit, excessive current draw is detected on the LFC/FC circuit; or with the LFC/FC circuit not grounded by the PCM, voltage is not detected on the LFC/FC circuit (the PCM expects to detect VPWR voltage coming</p>	<ul style="list-style-type: none"> Open or shorted LFC/FC circuit Open VPWR circuit to the low speed FC relay Damaged low speed FC relay (or CCRM) PCM damaged 	<ul style="list-style-type: none"> When the LFCF PID reads YES, a fault is currently present An open circuit or short to ground can only be detected when the PCM is not grounding the LFC/FC circuit A short to voltage can only be detected when the PCM is grounding the LFC/FC circuit. During the KOEO and KOER self-test, the LFC/FC circuit is cycled on and off

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
	through the low speed FC relay coil to the LFC/FC circuit).		
P1477 - Medium Fan Control (MFC) Primary Circuit Failure	Monitors the medium fan control (MFC) primary circuit output from the PCM. The test fails if: With the MFC output commanded on (grounded), excessive current draw is detected on the MFC circuit; or, with the MFC circuit commanded off, voltage is not detected on the MFC circuit (the PCM expects to detect IGN START/RUN voltage through the medium speed FC relay coil to the MFC circuit).	<ul style="list-style-type: none"> • Open or shorted MFC circuit • Open IGN START/RUN circuit to the medium speed FC relay • Damaged medium speed FC relay • Damaged PCM 	<ul style="list-style-type: none"> • When the MFCF PID reads YES, a fault is currently present • An open circuit or short to ground can only be detected when the PCM is not grounding the MFC circuit • A short to voltage can only be detected when the PCM is grounding the MFC circuit. • During the KOEO and KOER self-test, the MFC circuit is cycled on and off • Using Output Test Mode on a diagnostic tool, when commanding the low speed fan on, the PCM also activates the medium speed fan output.
P1479 - High Fan Control (HFC)/Fan Control 3 (FC3) Primary Circuit Malfunction	Monitors the high fan control (HFC) primary circuit output from the PCM. The test fails if: With the HFC output commanded on (grounded), excessive current draw is detected on the HFC circuit; or, with the HFC circuit commanded off, voltage is not detected on the HFC circuit (the PCM expects to detect VPWR voltage through the high speed FC relay coil to the HFC circuit).	<ul style="list-style-type: none"> • Open or shorted HFC circuit • Open VPWR circuit to the high speed FC relay • Damaged high speed FC relay (or CCRM) • Damaged PCM 	<ul style="list-style-type: none"> • When the HFCF PID reads YES, a fault is currently present • An open circuit or short to ground can only be detected when the PCM is not grounding the HFC circuit • A short to voltage can only be detected when the PCM is grounding the HFC circuit. • During the KOEO and KOER self-test, the HFC circuit is cycled on and off
P1489 - PCV Heater Control Circuit	A DTC sets when the PCM detects a PCV heater circuit failure.	<ul style="list-style-type: none"> • Open or shorted PCV circuit • Damaged PCV heater assembly • Damaged PCM 	Make sure the PCV valve is correct for the engine application and the PCV heater circuit is properly connected.
P1500 - Vehicle Speed Sensor (VSS) Intermittent	Indicates the VSS input signal was intermittent. This DTC is set when a VSS fault interferes with other OBDII tests, such as the catalyst efficiency monitor, the EVAP monitor or the HO2S monitor.	<ul style="list-style-type: none"> • Intermittent VSS connections • Intermittent open in the VSS harness circuit(s) • Intermittent short in VSS harness circuit(s) • Damaged VSS • Damaged PCM 	
P1501 - Vehicle Speed Sensor (VSS) Out of Self-Test Range	Indicates the VSS input signal is out of self-test range. If the PCM detects a VSS input signal any time during the self-test, DTC P1501 is set and the test aborts.	<ul style="list-style-type: none"> • Noisy VSS/TCSS input signal from the radio frequency interference / electromagnetic interference (RFI/EMI) 	Check for VSS input to be 0 mph when the vehicle transmission is in PARK.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
		external sources, such as ignition components or the charging circuit	
P1502 - Vehicle Speed Sensor (VSS) Intermittent	Indicates the powertrain control module (PCM) detected an error in the vehicle speed information. Vehicle speed data is received from either the vehicle speed sensor (VSS), transfer case speed sensor (TCSS) or anti-lock brake system (ABS) control module. This DTC is set the same way as P0500. However, it is intended to flash the transmission control indicator lamp (TCIL) for first time VSS circuit error/malfunctions.	<ul style="list-style-type: none"> • Refer to possible causes for P0500. 	Refer to Diagnostic Aids for P0500.
P1504 - Idle Air Control (IAC) Circuit Malfunction	This DTC is set when the PCM detects an electrical load failure on the IAC output circuit.	<ul style="list-style-type: none"> • IAC circuit open • VPWR to IAC solenoid open • IAC circuit short to PWR • IAC circuit short to GND • Damaged IAC valve • Damaged PCM 	The IAC solenoid resistance is 6 to 13 ohms. Monitor the IAC PID duty cycle and/or voltage.
P1506 - Idle Air Control (IAC) Overspeed Error	This DTC is set when the PCM detects an engine idle speed that is greater than the desired RPM.	<ul style="list-style-type: none"> • IAC circuit short to GND • Damaged or incorrect IAC valve • IAC valve stuck open • Air intake leak after throttle body • Vacuum Leaks • Failed EVAP system • Damaged PCM 	Disconnect the IAC valve and look for little or no change in engine RPM as an indication of a stuck or damaged valve.
P1507 - Idle Air Control (IAC) Underspeed Error	This DTC is set when the PCM detects an engine idle speed that is less than the desired RPM.	<ul style="list-style-type: none"> • IAC circuit open • Air inlet is plugged • Damaged or incorrect IAC valve • IAC valve stuck closed • VPWR to IAC solenoid open • IAC circuit short to PWR • Damaged PCM 	Disconnect the IAC valve and look for no change in engine RPM as an indication of a stuck or damaged valve.
P1512 - Intake Manifold Runner Control (IMRC) Stuck Closed (Bank 1)	This DTC is set when the vacuum actuated IMRC is commanded open, but the IMRCM indicates closed.	<ul style="list-style-type: none"> • IMRC monitor circuit open • Suspect IMRC solenoid 	

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
		<ul style="list-style-type: none"> • Mechanical concern - bind, seize, damage or obstruction of IMRC hardware • Damaged PCM 	
P1513 - Intake Manifold Runner Control (IMRC) Stuck Closed (Bank 2)	This DTC is set when the vacuum actuated IMRC is commanded open, but the IMRCM indicates closed.	<ul style="list-style-type: none"> • IMRC monitor circuit open • Suspect IMRC solenoid • Mechanical concern - bind, seize, damage or obstruction of IMRC hardware • Damaged PCM 	
P1516 - Intake Manifold Runner Control (IMRC) Input Error (Bank 1)	The IMRC system is monitored for failure during continuous or KOEO self-test. Each DTC distinguishes the corresponding failed bank for IMRC actuator assemblies with dual monitor switches. The test fails when the signal on the monitor pin is outside an expected calibrated range.	<ul style="list-style-type: none"> • Mechanical concern - bind, seize, damage or obstruction of IMRC hardware 	An IMRCM PID reading at closed throttle that is less than VREF may indicate a fault. An IMRCM PID reading near 1 volt or greater with an engine RPM of at least 3,000 may indicate a fault.
P1517 - Intake Manifold Runner Control (IMRC) Input Error (Bank 2)	The IMRC system is monitored for failure during continuous or KOEO self-test. Each DTC distinguishes the corresponding failed bank for IMRC actuator assemblies with dual monitor switches. The test fails when the signal on the monitor pin is outside an expected calibrated range.	<ul style="list-style-type: none"> • Mechanical concern - bind, seize, damage or obstruction of IMRC hardware 	An IMRCM PID reading at closed throttle that is less than VREF may indicate a fault. An IMRCM PID reading near 1 volt or greater with an engine RPM of at least 3,000 may indicate a fault.
P1518 - Intake Manifold Runner Control (IMRC) Malfunction (Stuck Open)	This DTC is set when the electrically actuated IMRC is commanded closed, but the IMRCM indicates open.	<ul style="list-style-type: none"> • IMRC monitor signal circuit shorted to PWR GND or SIG RTN • Damaged IMRC actuator • Damaged PCM 	An IMRCM PID reading near approximately 1 volt at closed throttle may indicate a fault.
P1519 - Inlet Manifold Runner Control (IMRC) Malfunction (Stuck Closed)	This DTC is set when the electrically actuated IMRC is commanded open, but the IMRCM indicates closed.	<ul style="list-style-type: none"> • IMRC monitor circuit open • IMRC control circuit open • IMRC monitor circuit short to VREF • IMRC monitor return circuit open • Damaged IMRC actuator • IMRC VPWR circuit open • Damaged PCM 	An IMRCM PID reading at VREF with an engine RPM of at least 3,000 may indicate a fault.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
P1520 - Intake Manifold Runner Control (IMRC) Circuit	This DTC indicates a failure in the IMRC primary control circuit.	<ul style="list-style-type: none"> • IMRC control circuit open 	An IMRCM PID reading near 1 volt or greater with an engine RPM of at least 3,000 may indicate a fault.
P1537 - Intake Manifold Runner Control (IMRC) Stuck Open (Bank 1)	This DTC is set when the vacuum actuated IMRC is commanded closed, but the IMRCM indicates open.	<ul style="list-style-type: none"> • IMRC monitor signal circuit shorted to PWR GND or SIG RTN • Damaged IMRC solenoid • Blocked vacuum hoses • Damaged PCM 	
P1538 - Intake Manifold Runner Control (IMRC) Stuck Open (Bank 2)	This DTC is set when the vacuum actuated IMRC is commanded closed, but the IMRCM indicates open.	<ul style="list-style-type: none"> • IMRC monitor signal circuit shorted to PWR GND or SIG RTN • Damaged IMRC solenoid • Blocked vacuum hoses • Damaged PCM 	
P1549 - Intake Manifold Communication Control Circuit Malfunction	The IMCC or intake manifold tuning (IMT) valve system is monitored for failure during continuous or KOEO self-test. The test fails when the PCM detects a concern with the IMT valve output circuit.	<ul style="list-style-type: none"> • Open IMT valve circuit • Open VPWR circuit • Shorted IMT valve circuit • Damaged IMT valve • Damaged PCM 	<ul style="list-style-type: none"> • An IMT valve fault PID (IMTVF) displaying YES may indicate a fault
P1550 - Power Steering Pressure (PSP) Sensor Malfunction	The PSP sensor input signal to the PCM is continuously monitored. The test fails when the signal falls out of a maximum or minimum calibrated range.	<ul style="list-style-type: none"> • PSP sensor damaged • Damaged PCM 	<ul style="list-style-type: none"> • The DTC indicates the PSP sensor is out of self-test range.
P1572 - Brake Pedal Switch Circuit	Indicates the brake input rationality test for brake pedal position (BPP) and brake pressure applied (BPA) switches has failed. One or both inputs to the PCM did not change state when expected. Note: On vehicles with stability assist, the BPP switch is connected to the ABS module and the ABS generates a Driver Brake Application (DBA) signal, which is then sent to the PCM.	<ul style="list-style-type: none"> • Misadjusted brake switches, BPP or BPA • Blown fuse • Damaged BPP switch • Damaged BPA switch • Open or short in the BPP circuit • Open or short in the DBA circuit • Open or short in the BPA circuit • Damaged PCM 	DTC P1572 is set when the PCM does not sense the proper sequence of the brake pedal input signal from both the BPP and BPA switches when the brake pedal is applied and released.
P1582 - Electronic Throttle Monitor Data Available	Indicates the actuation of restraint deployment, and the availability of electronic throttle monitor data.	<ul style="list-style-type: none"> • The DTC only indicates the actuation of the restraint deployment system. Do not 	

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
		replace the PCM, because there is no fault indicated.	
P1633 - Keep Alive Power Voltage Too Low	Indicates the keep alive power (KAPWR) circuit has experienced a voltage interrupt.	<ul style="list-style-type: none"> • Open KAPWR circuit • Intermittent KAPWR • Damaged PCM 	Loss of KAPWR to the PCM results in immediate MIL illumination and DTC P1633.
P1635 - Tire/Axle Ratio Out of Acceptable Range	This diagnostic trouble code (DTC) indicates the tire and axle information contained in the vehicle ID block (VID) does not match the vehicle hardware.	<ul style="list-style-type: none"> • Incorrect tire size • Incorrect axle ratio • Incorrect VID configuration parameters 	Using the diagnostic tool, view the tire and axle parameters within the VID. They must match the vehicle hardware.
P1636 - Inductive Signature Chip Communication Error	Indicates the PCM has lost communication with the Inductive Signature Chip.	<ul style="list-style-type: none"> • PCM damaged 	
P1639 - Vehicle ID Block Not Programmed or is Corrupt	This diagnostic trouble code (DTC) indicates the vehicle ID (VID) block is not programmed or the information within is corrupt.	<ul style="list-style-type: none"> • New PCM • Incorrect PCM • Incorrect VID configuration 	Using a diagnostic tool, reprogram the PCM to the most recent calibration available.
P1640 - Powertrain DTCs Available in Another Module	Vehicles using a secondary Engine Control Module can request that the Powertrain Control Module illuminate the Check Engine light when a failure occurs which affects emissions.	<ul style="list-style-type: none"> • DTCs stored in a secondary module, which requested the MIL to be turned on. 	Call-up PID address 0946 to determine the secondary module requesting MIL illumination. Once the secondary module is determined, request the DTCs from the module.
P1641 - Fuel pump primary circuit malfunction.			DTC is equivalent to P1235/P1236.
P1641 - Fuel pump primary circuit malfunction.			DTC is equivalent to P0230.
P1650 - Power Steering Pressure (PSP) Switch Malfunction	In the KOEO self-test, this DTC indicates the PSP input to the PCM is high. In the KOER self-test, this DTC indicates the PSP input did not change state.	<ul style="list-style-type: none"> • The steering wheel must be turned during Key On/Engine Running self-test • PSP switch/shorting bar damaged • SIG RTN circuit open • PSP circuit open or shorted to SIGRTN • PCM damaged 	
P1651 - Power Steering Pressure (PSP) Switch Signal Malfunction	The PCM counts the number of vehicle speed transitions from 0 to a calibrated speed. After a calibrated number of speed transitions, the PCM expects the PSP	<ul style="list-style-type: none"> • Vehicle towed with the engine running 	<ul style="list-style-type: none"> • Check, if possible, if the vehicle was towed or power steering repair was performed.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
	input to change. This DTC is set if the transition is not detected.	<ul style="list-style-type: none"> • The power steering hydraulic concern was repaired but the DTC was not erased • PSP switch/shorting bar damaged • SIG RTN circuit open • PSP circuit open or shorted to SIGRTN • PCM damaged 	<ul style="list-style-type: none"> • Observe the PSP V PID while checking the wires for intermittents.
P1703 - Brake Switch Out of Self-Test Range	Indicates that during Key On Engine Off (KOEO) self-test, the BPP signal was high, or during Key On Engine Running (KOER) self-test, the BPP signal did not cycle high and low.	<ul style="list-style-type: none"> • Open or short in the (BPP) circuit • Open or short in the stoplamp circuits • Damaged PCM • Malfunction in module(s) connected to the BPP circuit (rear electronic module [REM] for Freestar/Monterey, LS, and Thunderbird or lighting control module [LCM] for Town Car). • Damaged brake switch • Misadjusted brake switch 	Check for proper function of the stoplamps. Using a diagnostic tool, check the BPP PID. The stoplamps and PID should toggle on and off with brake pedal activation.
P1705 - Transmission Range Sensor Out of Self-Test Range	Transmission Range circuit not indicating PARK/NEUTRAL during self-test.	<ul style="list-style-type: none"> • Gear selector not in PARK/NEUTRAL 	Verify the gear selector is in PARK/NEUTRAL.
P1709 - Park/Neutral Position Switch Out of Self-Test Range	The DTCs indicate that the voltage is high when it should be low.	<ul style="list-style-type: none"> • PNP/ CPP circuit short to PWR • Damaged PNP or CPP switch • PNP/ CPP circuit open in the SIGRTN • Damaged PCM 	When exercising either the PNP or CPP switch the voltage should cycle from 5 volts to low.
P1729 - 4x4L switch circuit malfunction	The 4x4L switch is an on/off switch. If the PCM does not sense appropriate voltage when the switch is cycled on and off, a DTC sets for mechanical shift on the fly systems.	<ul style="list-style-type: none"> • The 4x4L harness between the PCM and the 4x4L switch is open or shorted. • Damaged 4x4L switch • Damaged PCM 	Verify the 4x4L switch cycles on/off.
P1780 - Transmission Control Switch Out of Self-Test Range	During KOER self-test the TCS must be cycled, or a DTC is set.	<ul style="list-style-type: none"> • TCS circuit short or open • Damaged TCS switch 	Verify the TCS switch cycles on/off.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
		<ul style="list-style-type: none"> • Damaged PCM 	
P1781 - 4x4L Switch Out of Self-Test Range	The 4x4L switch is an on/off switch. If the PCM does not sense low voltage when the switch is on, the DTC sets.	<ul style="list-style-type: none"> • 4x4L harness open or shorted • Damaged electronic shift module • Damaged PCM 	Verify the 4x4L switch cycles on/off.
P1900 - Output Shaft Speed sensor circuit intermittent failure	The output shaft speed sensor signal to the PCM is irregular or interrupted.	<ul style="list-style-type: none"> • Harness connector not properly seated • Harness intermittently shorted or open • Harness connector damaged • OSS sensor damaged, or not installed properly 	<ul style="list-style-type: none"> • Verify harness and connector integrity • Verify OSS sensor proper installation
P1901 - Turbine Shaft Speed sensor circuit intermittent	The TSS sensor signal to the PCM is irregular or interrupted.	<p>Harness connector not properly seated.</p> <p>Harness intermittently shorted or open.</p> <p>Harness connector damaged.</p> <p>TSS sensor damaged or not installed properly.</p>	<p>Verify harness and connector integrity.</p> <p>Verify TSS sensor proper installation.</p>
P2004 - Intake Manifold Runner Control (IMRC) Stuck Open (Bank 1)	This DTC is set when the IMRC is commanded closed, but the IMRCM indicates open. This DTC replaces P1518 and P1537.	<ul style="list-style-type: none"> • IMRC monitor signal circuit shorted to PWR GND or SIG RTN • Damaged IMRC actuator or solenoid • Damaged PCM • Blocked vacuum hoses 	An IMRCM PID reading near approximately 1 volt at closed throttle may indicate a fault.
P2005 - Intake Manifold Runner Control (IMRC) Stuck Open (Bank 2)	This DTC is set when the IMRC is commanded closed, but the IMRCM indicates open. This DTC replaces P1538.	<ul style="list-style-type: none"> • IMRC monitor signal circuit shorted to PWR GND or SIG RTN • Damaged IMRC actuator or solenoid • Damaged PCM • Blocked vacuum hoses 	An IMRCM PID reading near approximately 1 volt at closed throttle may indicate a fault.
P2006 - Intake Manifold Runner Control (IMRC) Stuck Closed (Bank 1)	This DTC is set when the IMRC is commanded open, but the IMRCM indicates closed. This DTC replaces P1512 and P1519.	<ul style="list-style-type: none"> • IMRC monitor circuit open • IMRC control circuit open • IMRC monitor circuit short to VREF 	An IMRCM PID reading at VREF with an engine RPM of at least 3,000 may indicate a fault.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
		<ul style="list-style-type: none"> • Damaged IMRC actuator or solenoid • Damaged PCM 	
P2007 - Intake Manifold Runner Control (IMRC) Stuck Closed (Bank 2)	This DTC is set when the IMRC is commanded open, but the IMRCM indicates closed. This DTC replaces P1513.	<ul style="list-style-type: none"> • IMRC monitor circuit open • IMRC control circuit open • IMRC monitor circuit short to VREF • Damaged IMRC actuator or solenoid • Damaged PCM 	An IMRCM PID reading at VREF with an engine RPM of at least 3,000 may indicate a fault.
P2008 - Intake Manifold Runner Control (IMRC) Circuit Open (Bank 1)	This DTC indicates a failure in the IMRC primary control circuit. This DTC replaces P1520.	<ul style="list-style-type: none"> • IMRC control circuit open 	An IMRCM PID reading near 1 volt or greater with an engine RPM of at least 3,000 may indicate a fault.
P2014 - Intake Manifold Runner Position Sensor/Switch Circuit (Bank 1)	The IMRC system is monitored for failure during continuous or KOEO self-test. Each DTC distinguishes the corresponding failed bank for IMRC actuator assemblies with dual monitor switches. The test fails when the signal on the monitor pin is outside an expected calibrated range. This DTC replaces P1516.	<ul style="list-style-type: none"> • IMRC monitor circuit open • Mechanical concern - bind, seize, damage or obstruction of IMRC hardware 	
P2019 - Intake Manifold Runner Position Sensor/Switch Circuit (Bank 2)	The IMRC system is monitored for failure during continuous or KOEO self-test. Each DTC distinguishes the corresponding failed bank for IMRC actuator assemblies with dual monitor switches. The test fails when the signal on the monitor pin is outside an expected calibrated range. This DTC replaces P1517.	<ul style="list-style-type: none"> • IMRC monitor circuit open • Mechanical concern - bind, seize, damage or obstruction of IMRC hardware 	
P2065 - Fuel Level Sensor B circuit concern	Fuel Level Sensor B circuit concern. This information is sent to the PCM on the communication link.		
P2066 - Fuel Level Sensor B circuit concern	Fuel Level Sensor B circuit concern. This information is sent to the PCM on the communication link.		
P2067 - Fuel Level Sensor B circuit concern	Fuel Level Sensor B circuit concern. This information is sent to the PCM on the communication link.		
P2068 - Fuel Level Sensor B circuit concern	Fuel Level Sensor B circuit concern. This information is sent to the PCM on the communication link.		

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
P2070 - Intake Manifold Tuning Valve (IMTV) Stuck Open	The IMTV system is monitored for failure during continuous, KOEO, or KOER self-tests. The test fails when the signal on the monitor pin is more or less than an expected calibrated range.	<ul style="list-style-type: none"> • IMTV signal circuit shorted to PWR GND or SIG RTN • Damaged IMRC actuator • Damaged PCM 	An IMTVM PID reading may indicate a fault if available.
P2071 - Intake Manifold Tuning Valve (IMTV) Stuck Closed	The IMTV system is monitored for failure during continuous, KOEO, or KOER self-tests. The test fails when the signal on the monitor pin is more or less than an expected calibrated range.	<ul style="list-style-type: none"> • IMTV signal circuit shorted to PWR GND or SIG RTN • Damaged IMRC actuator • Damaged PCM • IMTV circuit open. 	An IMTVM PID reading may indicate a fault if available.
P2072 - PCM is indicating the throttle mode has been activated. F-150 4.6L	This DTC only identifies that the strategy has performed several open and closed cycles to remove potential ice build up. The DTC does not imply any system fault, only that the mode has occurred, and that mode may be causing a long start time.	Ice or oil in the induction system could be the result of a fault in the PCV system.	CHECK the PCV system for evidence of water or ice: <ul style="list-style-type: none"> • Disconnect the air induction fresh air plenum from the throttle body. Check for water or oily residue at the PCV fresh air port. • Disconnect the tube at the camshaft cover and check the tube for ice obstruction/ice. • Start the engine and, to check the PCV system, place a piece of card board on the crankcase vent in the rocker cover. • If the cardboard is held on the crankcase vent and fumes are not exiting, reconnect the tube to the camshaft cover and the Air Induction port. If the test passes, no further investigation of the PCV system is required. • If the cardboard is not held in place, turn off the engine and check the PCV valve side of the system for ice or obstruction and repair as needed. • If no obstruction is found there, isolate and repair any obstruction in the intake manifold connection. • If no obstruction is found there, make sure the PCV coolant heater is functional and repair as needed. • If no fault is detected, make sure the PCV valve is allowing the proper vacuum flow and repair as needed.
P2072 - PCM is indicating the throttle mode has been activated. F-150 5.4L 3V	This DTC only identifies that the strategy has performed several open and closed cycles to remove potential ice build up. The DTC does not imply any system fault, only that the mode has occurred, and that mode may be causing a long start time.	Ice or oil in the induction system could be the result of a fault in the PCV system.	CHECK the PCV system for evidence of water or ice: <ul style="list-style-type: none"> • Disconnect the air induction fresh air plenum from the air fuel module IAFM, and remove oil or water near the fresh air port as needed. • Disconnect the tube at the camshaft cover and check the tube for ice obstruction. Repair as

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
			<p>needed.</p> <ul style="list-style-type: none"> Start the engine and, to check the PCV system, place a piece of card board on the crankcase vent in the rocker cover. If the cardboard is held on the crankcase vent and fumes are not exiting, reconnect the tube to the camshaft cover and the Air Induction port. If the test passes, no further investigation of the PCV system is required. If the cardboard is not held in place, turn off the engine and check the PCV valve side of the system for ice or obstruction and repair as needed.
P2100 - Throttle Actuator Control Motor Circuit/Open.	PCM fault flag is set indicating the motor circuit is open. May require cycling the key.	<ul style="list-style-type: none"> TACM has an open winding TACM is damaged TACM harness is open TACM harness is shorted to PWR TACM harness circuits are shorted together TACM harness connector is unplugged 	An (TACM) circuit PID reading may indicate a fault if available.
P2101 - Throttle Actuator Control Motor Range/Performance.	PCM fault flag is set indicating the motor circuit is open. May require cycling the key.	<ul style="list-style-type: none"> TACM circuits are crosswired 	An (TACM) circuit PID reading may indicate a fault if available.
P2104 - Throttle Actuator Control System - Forced Idle.	The throttle actuator control system is in the FMEM mode of forced idle.		This DTC is an informational DTC and may be set in combination with a number of other DTCs which are causing the FMEM. Diagnose other DTCs first.
P2105 - Throttle Actuator Control System - Forced Engine Shutdown.	The throttle actuator control system is in the FMEM mode of forced engine shutdown.		This DTC is an informational DTC and may be set in combination with a number of other DTCs which are causing the FMEM. Diagnose other DTCs first.
P2106 - Throttle Actuator Control System - Forced Limited Power.	The throttle actuator control system is in the FMEM mode of forced limited power. This DTC indicates the FMEM action is in effect due to a failure in an ETC related component or module.		This DTC is an informational DTC and may be set in combination with a number of other DTCs which are causing the FMEM. Diagnose other DTCs first.
P2107 - Throttle Actuator Control Motor Processor.	The ETC control area of the PCM failed the self-test. The fault could be the result of an incorrect TP command, or the TACM wires shorted together.	<ul style="list-style-type: none"> TACM wire shorted together TACM circuit wires shorted to PWR PCM damaged ETB damaged 	An (TACM) circuit PID reading may indicate a fault if available.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
P2110 - Throttle Actuator Control System - Forced Limited RPM.	The throttle actuator control system is in the FMEM mode of forced limited RPM.		This DTC is an informational DTC and may be set in combination with a number of other DTCs which are causing the FMEM. Diagnose other DTCs first.
P2111 - Throttle Actuator Control System - Stuck Open.	PCM fault status indicates throttle plate is at a greater angle than commanded.	<ul style="list-style-type: none"> • Binding throttle body, stuck open • TACM circuits are crosswired • TACM harness circuits are shorted together • PCM damaged 	An (TACM) circuit PID reading may indicate a fault if available.
P2112 - Throttle Actuator Control System - Stuck Closed.	PCM fault status indicates throttle plate is at a lower angle than commanded.	<ul style="list-style-type: none"> • Binding throttle body, stuck closed • PCM damaged 	An (TACM) circuit PID reading may indicate a fault if available.
P2121 - Accelerator Pedal Position Sensor Circuit 1 Range/Performance.	The accelerator pedal position sensor fault flag is set for sensor 1 by the PCM, indicating the signal is out of the normal self-test operating range.	<ul style="list-style-type: none"> • APP sensor is defective • APP sensor 1 is open, or shorted to ground or voltage • APP sensor signal circuits are shorted together • Damaged PCM 	An (APP) sensor PID reading may indicate a fault if available.
P2122 - Accelerator Pedal Position Sensor Circuit 1 Low Input.	Accelerator Pedal Position sensor 1 is out of self-test range low.	<ul style="list-style-type: none"> • APP sensor is defective • APP sensor harness open • APP sensor harness shorted to ground • Damaged PCM 	An (APP) sensor PID reading may indicate a fault if available.
P2123 - Accelerator Pedal Position Sensor Circuit 1 High Input	Accelerator Pedal Position sensor 1 is out of self-test range high.	<ul style="list-style-type: none"> • APP sensor is defective • APP sensor harness is shorted to VREF • Damaged PCM 	An (APP) sensor PID reading may indicate a fault if available.
P2126 - Accelerator Pedal Position Sensor Circuit 2 Range/Performance.	Accelerator Pedal Position sensor 2 has flagged a fault by the PCM, indicating the signal is not within the normal self-test operating range.	<ul style="list-style-type: none"> • APP sensor is defective • APP sensor assembly is binding • Damaged PCM 	An (APP) sensor PID reading may indicate a fault if available.
P2127 - Accelerator Pedal Position Sensor Circuit 2 Low Input.	Accelerator Pedal Position sensor 2 is out of range low, open circuit.	<ul style="list-style-type: none"> • APP sensor is defective • APP sensor circuit is shorted to ground 	An (APP) sensor PID reading may indicate a fault if available.

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
		<ul style="list-style-type: none"> • APP sensor circuit is open • Damaged PCM 	
P2128 - Accelerator Pedal Position Sensor Circuit 2 High Input.	Accelerator Pedal Position sensor 2 is out of range high input.	<ul style="list-style-type: none"> • APP sensor is defective • APP sensor assembly is binding • APP sensor harness is shorted to voltage • Damaged PCM 	An (APP) sensor PID reading may indicate a fault if available.
P2131 - Accelerator Pedal Position Sensor Circuit 3 Range Performance	Accelerator Pedal Position sensor 3 has flagged a fault by the PCM, indicating the signal is not within the normal self-test operating range.	<ul style="list-style-type: none"> • APP sensor is defective • APP sensor assembly is binding • Damaged PCM 	An (APP) sensor PID reading may indicate a fault if available.
P2132 - Accelerator Pedal Position Sensor Circuit 3 Low Input.	Accelerator Pedal Position sensor 3 is out of range low, open circuit.	<ul style="list-style-type: none"> • APP sensor is defective • APP sensor assembly is binding • Damaged PCM 	An (APP) sensor PID reading may indicate a fault if available.
P2133 - Accelerator Pedal Position Sensor Circuit 3 High Input.	Accelerator Pedal Position sensor 3 is out of range high input.	<ul style="list-style-type: none"> • APP sensor is defective • APP sensor assembly is binding • APP sensor harness is shorted to voltage • Damaged PCM 	An (APP) sensor PID reading may indicate a fault if available.
P2135 - ETC Throttle Position (TP) Sensor A/B Voltage Correlation.	The PCM flagged a fault indicating that TP1 and TP2 disagree, or that TP1 should not be in the present position given the position of TP2 unless a problem is present.	<ul style="list-style-type: none"> • ETC TP is defective • TP sensor shorted internally to VREF • TP sensor harness is shorted to voltage • TP sensor signal wire are shorted together • Damaged PCM 	
P2195 - Lack of HO2S-11 Switch, Sensor Indicates Lean	A Heated Oxygen (HO2S) sensor indicating lean at the end of a test is trying to correct for an over-rich condition. The test fails when the fuel control system no longer detects switching for a calibrated amount of time.	<ul style="list-style-type: none"> • Electrical: • Short to VPWR in the harness or HO2S • Water in the harness connector • Open/shorted HO2S circuit 	

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
		<ul style="list-style-type: none"> • Corrosion or poor mating terminals and wiring • Damaged HO2S • Damaged PCM • Fuel System: • Excessive fuel pressure • Leaking/contaminated fuel injectors • Leaking fuel pressure regulator • Low fuel pressure or running out of fuel • Vapor recovery system • Induction System: • Air leaks after the MAF • Vacuum Leaks • PCV system • Improperly seated engine oil dipstick • EGR System: • Leaking gasket • Stuck EGR valve • Leaking diaphragm or EVR • Base Engine: • Oil overfill • Cam Timing • Cylinder compression • Exhaust leaks before or near the HO2S(s) 	
P2196 - Lack of HO2S-11 Switch, Sensor Indicates Rich	A Heated Oxygen (HO2S) sensor indicating rich at the end of a test is trying to correct for an over-lean condition. The test fails when the fuel control system no longer detects switching for a calibrated amount of time.	See the possible causes for DTC P2195.	
P2197 - Lack of HO2S-21 Switch, Sensor Indicates Lean	A Heated Oxygen (HO2S) sensor indicating lean at the end of a test is trying to correct for an over-rich condition. The test fails when the fuel control system no longer detects switching for a calibrated amount of time.	See the possible causes for DTC P2195.	
P2198 - Lack of HO2S-21 Switch, Sensor Indicates Rich	A Heated Oxygen (HO2S) sensor indicating rich at the end of a test is trying to correct for an over-lean condition. The test fails when the fuel control system no longer detects switching for a calibrated amount of time.	See the possible causes for DTC P2195.	

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
P2257 - Secondary Air Injection System Monitor Circuit Low	The secondary air injection system monitor circuit is low, indicating the electrical AIR pump is off although the electrical AIR pump was commanded on by the PCM.	<ul style="list-style-type: none"> • Open B+ circuit • Open VPWR circuit • Open voltage circuit between the AIR relay and the AIR pump. • Faulted AIR relay • Damaged PCM 	<p>The AIR monitor circuit PCM input contains a pull up voltage through a resistance internal to the PCM. This voltage is normally held low by the resistance path through the AIR pump when the pump is off.</p> <p>A single electrical open circuit component such as an AIR relay coil in this multi-component circuit will not be detected by the PCM output driver, yet it will create DTC P2257.</p>
P2258 - Secondary Air Injection System Monitor Circuit High	The secondary air injection system monitor circuit is high, indicating the electrical AIR pump is on although the electrical AIR pump was commanded off by the PCM.	<ul style="list-style-type: none"> • AIR relay fault - stuck closed • AIR pump fault - circuit open in motor. • Open ground to AIR pump. • Open AIR monitor circuit between the AIR pump and the PCM. • Short to voltage in the AIR relay to AIR pump voltage circuit. • Damaged PCM 	<p>The AIR monitor circuit PCM input contains a pull up voltage through a resistance internal to the PCM. This voltage is normally held low by the resistance path through the AIR pump when the pump is off.</p>
P2270 - Lack of HO2S-12 Switch, Sensor Indicates Lean	The downstream HO2Ss are forced rich and lean and monitored by the PCM. The test fails if the PCM does not detect the output of the HO2S in a calibrated amount of time.	<ul style="list-style-type: none"> • Pinched, shorted, and corroded wiring and pins • Crossed sensor wires • Exhaust leaks • Contaminated or damaged sensor 	
P2271 - Lack of HO2S-12 Switch, Sensor Indicates Rich	See the description for DTC P2270.	See the possible causes for DTC P2270.	
P2272 - Lack of HO2S-22 Switch, Sensor Indicates Lean	See the description for DTC P2270.	See the possible causes for DTC P2270.	
P2273 - Lack of HO2S-22 Switch, Sensor Indicates Rich	See the description for DTC P2270.	See the possible causes for DTC P2270.	
P2274 - O2 Sensor Signal Stuck Lean - Bank 1, Sensor 3	See the description for DTC P2270.	See the possible causes for DTC P2270.	
P2275 - O2 Sensor Signal Stuck Rich - Bank 1, Sensor 3	See the description for DTC P2270.	See the possible causes for DTC P2270.	
P2278 - HO2S sensor signals swapped bank to bank (HO2S-13-23)	The heated oxygen sensor (HO2S) monitor determines if the HO2S signal response for a fuel shift corresponds to the correct engine bank. The test fails when a response from the HO2S being tested is not indicated.		

Diagnostic Trouble Code	Description	Possible Causes	Diagnostic Aids
U0300 - Internal Control Module Software Incompatibility	This DTC indicates that there are incompatible software levels within the PCM that control the Electronic Throttle Control (ETC) system. The ETC system utilizes three different chips (Power PC, TPPC and Equizzer) within the PCM, each having its own software level and function. The three chips must have the proper level of software in order to communicate and function together.		DTC U0300 can be set in combination with P2105. Check and confirm the correct, latest version of software is present on the PCM, and reflash the PCM if required.
U1021 - SCP Invalid or Missing Data for Air Conditioning Clutch		<p>Network DTC(s) occur during module to module communication failures. Two types of network faults can be categorized:</p> <ul style="list-style-type: none"> • Invalid data network faults - data is transferred within the normal inter-module message, but contains known invalid data. The transmitting module logs a DTC related to the invalid data fault. • Missing message network faults - missing message faults are logged by module upon failure to receive a message from another module within a defined retry period. 	PERFORM the on-board diagnostics for the associated network module. For additional information concerning the description and operation of the vehicle communication network, REFER to Section 418-00 in the Workshop Manual.
U1039 - SCP Invalid or Missing Data for Vehicle Speed		See the possible causes for DTC P1021.	See the diagnostic aids for DTC P1021.
U1051 - SCP Invalid or Missing Data for Brakes		See the possible causes for DTC P1021.	See the diagnostic aids for DTC P1021.
U1131 - SCP Invalid or Missing Data for Fuel System		See the possible causes for DTC P1021.	See the diagnostic aids for DTC P1021.
U1147 - SCP Invalid or Missing Data for Vehicle Security		See the possible causes for DTC P1021.	See the diagnostic aids for DTC P1021.
U1262 - SCP Communication Bus Fault - Perform Network Communication Test		See the possible causes for DTC P1021.	Go to the Workshop Manual Section 418, Module Communications Network for further diagnosis.
U1451 - SCP Invalid or Missing Data for Anti-Theft module		See the possible causes for DTC P1021.	See the diagnostic aids for DTC P1021.

